Ameren Exhibit 2.0

ILLINOIS COMMERCE COMMISSION

DOCKET No. 13-_____

DIRECT TESTIMONY

OF

ANDREW W. COTTRELL
APPLIED ENERGY GROUP, INC.

Submitted On Behalf

Of

AMEREN ILLINOIS COMPANY
d/b/a Ameren Illinois

August 30, 2013

TABLE OF CONTENTS

Page No.

I. INTRODUCTION 1

II. PURPOSE AND SCOPE 1

III. DEVELOPMENT OF A COST-EFFECTIVE ENERGY EFFICIENCY PORTFOLIO 2

A. SELECTION OF ENERGY EFFICIENCY MEASURES 4

1. Identification of Potential Energy Efficiency Measures 4

2. Analysis of Cost Effectiveness of Measures 5

B. DEVELOPMENT OF A PORTFOLIO OF ENERGY EFFICIENCY PROGRAMS 11

1. Bundling of Measures into Programs 11

2. Program and Portfolio Design 12

3. Results of Savings Analysis 18

4. Analysis of Cost-Effectiveness of Programs and Portfolio 22

IV. AMEREN ILLINOIS' INTEGRATED PORTFOLIO 27

V. SPENDING LIMITS 29

VI. DIVERSITY OF THE AMEREN ILLINOIS ENERGY EFFICIENCY AND DEMAND RESPONSE PLAN 30

VII. CONCLUSION 31

APPENDIX A i

APPENDIX B i

ILLINOIS COMMERCE COMMISSION

DOCKET No. 13-_____

DIRECT TESTIMONY

OF

ANDREW W. COTTRELL
APPLIED ENERGY GROUP, INC.

Submitted on Behalf Of

Ameren Illinois

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Andrew W. Cottrell. My business address is 317 George Street, Suite 305, New Brunswick, New Jersey, 08901.

Q. By whom are you employed and in what capacity?

A. I am a Principal Consultant in the Utility Consulting practice for Applied Energy Group, Inc. ("AEG"). See my Statement of Qualifications attached as Appendix A to this testimony.

II. PURPOSE AND SCOPE

Q. What are the purposes of your direct testimony?

A. The purpose of my direct testimony is to:

1) Describe and document the planning and analysis process for the energy efficiency measures and programs set forth in the integrated energy efficiency portfolio (gas and electric) submitted by Ameren Illinois Company d/b/a Ameren Illinois (“Ameren Illinois”, “AIC” or the “Company”).

2) Demonstrate how the portfolio development process identified measures that when merged into full programs are cost-effective under the total resource cost ("TRC") test at the overall portfolio level.

3) Demonstrate that the proposed Ameren Illinois Energy Efficiency and Demand Response plan ("Plan 3") is designed to fall within the spending limits described in Section 8-103(d) and 8-104(d) of the Illinois Public Utilities Act ("Act").

4) Explain how the Ameren Illinois proposed portfolio is designed to achieve electric energy savings within the electric statutory spending limit while maintaining a diverse portfolio of programs and also to achieve natural gas savings within the natural gas statutory spending limit while maintaining a diverse portfolio of programs.

5) Explain how the Ameren Illinois overall portfolio of energy efficiency and demand response measures represents a diverse cross-section of opportunities for customers of all rate classes to participate in the programs including the consideration of a savings mix favoring longer life measures with a higher first year cost as opposed to a higher and disparate volume of measures with lower lifetime savings and higher first year savings.

III. DEVELOPMENT OF A COST-EFFECTIVE ENERGY EFFICIENCY PORTFOLIO

Q. What was your role in assisting Ameren Illinois in the development of its Energy Efficiency and Demand Response plan?

A. I am one of the lead consultants and planners in the development of the Ameren Illinois plan, which includes performing cost-effectiveness analysis of energy efficiency and demand response measures and programs as well as new development and continued evolution of existing program designs. Our planning team began with the list of measures currently being offered by Ameren Illinois and supplemented those measures with additions from several nationally recognized sources for consideration in the analysis, as described in greater detail below. As part of this database construction, the Illinois Technical Reference Manual ("IL TRM") was utilized for all data inputs where appropriate.[1] Additional measure level data was garnered from impact evaluations[2] of programs in the field during the prior Plan ("Plan 2"). Using the above data sources, AEG prepared the analysis of measure cost-effectiveness

[1] Version 1 of the Illinois Technical Reference Manual was utilized as approved by the Commission in ICC Docket No. 12-0528.

[2] An impact evaluation is performed by independent evaluators who asses the energy savings attributable to a particular program. Examples of such evaluations were filed in ICC Docket Nos. 10-0519 and 11-0592.

described below. The Ameren Illinois energy efficiency management and implementation teams, in addition to members of the Illinois Stakeholders Advisory Group ("IL SAG") and their consultants, reviewed the results of this planning process in detail and their input helped refine the calculations.

Q. What other information did Ameren Illinois use in designing the portfolio?

A. Ameren Illinois used a Demand Side Management ("DSM") market assessment and potential study. Ameren Illinois engaged an expert, independent contractor, EnerNOC, to perform market research and determine the potential for electric and natural gas energy efficiency in the Ameren Illinois service territory.[3] The market research consisted of online surveys of residential customers, online surveys of small and medium non-residential customers, and on-site surveys of large non-residential customers. EnerNOC then prepared a DSM potential study to identify potential energy efficiency opportunities in Ameren Illinois' service territory.

Q. Are you familiar with the DSM potential study?

A. Yes. I served as a technical reviewer and advisor for the study and was involved in all aspects of study planning and work products. AEG also performed the Program Design analysis for EnerNOC where the measure-level potential was transferred to program-level potential and costs were assigned to the implementation of those programs. I am familiar with the market research, the subsequent data processing, the analysis, and the study's results. A copy of EnerNOC's study ("DSM potential study") is attached as Appendix D to Plan 3.

[3] EnerNOC Utility Solutions is a utility consulting firm that was contracted by Ameren Illinois to perform the DSM Potential Study.

Q. What were the results of the DSM potential study?

A. The DSM potential study identified significant electric and natural gas savings opportunities in multiple Ameren Illinois segments and sectors. Nonetheless, the study projected that the kilowatt ("kWh") and therm savings targets set forth in the statute are too aggressive, and according to study results it would be unrealistic and highly unlikely for Ameren Illinois to meet them at the prescribed spending limits. The proposed modified Plan 3 savings goals are addressed in more detail in Dr. Robert Obeiter's testimony.

Q. How were the results of the DSM potential study used in the planning process?

A. The DSM potential study was a resource for our plan development process. First, the primary market research data EnerNOC gathered informed how the market has changed from the Plan 2 time period and identified areas of limited market penetration. Next, EnerNOC developed a measure database that was useful for the refinement of our own measure database. The study also provided relative allocations of savings potential by end-use, which also assisted our subsequent program design.

A. Selection of Energy Efficiency Measures

1. Identification of Potential Energy Efficiency Measures

Q. What is an energy efficiency measure?

A. An energy efficiency measure is a device, appliance, or practice which, when implemented for a home, business, or manufacturing process, results in a reduction in the amount of energy used per unit of useful service.

Q. How does a "measure" differ from a "program"?

A. A program combines a number of measures into a useful delivery mechanism which is a program.

Q. How did Ameren Illinois select the initial list of energy efficiency measures for consideration?

A. The initial broad list of energy efficiency measures considered for adoption by consumers in the Ameren Illinois service territory was compiled from several sources. The measures offered in Ameren Illinois' Plan 2 programs served as the starting point for measure inclusion. This original measure database was supplemented with additional measures that were provided in the DSM Potential Study. DSM Potential Study utilized a variety of data from several industry sources to augment the dataset, including the Consortium for Energy Efficiency ("CEE") and the American Council for an Energy Efficient Economy ("ACEEE"). A review of all these sources was performed to ultimately create a robust, comprehensive list of measures to form the composite Plan 3 Measure Database. I note that when each of the measures is considered in its multiple applications, the list of unique combinations is several thousand.

2. Analysis of Cost Effectiveness of Measures

Q. Please summarize the Illinois TRC test in your own words.

A. The Total Resource Cost or TRC test is meant to measure the net cost of a demand-side management program as a resource option based on the total costs of the program, including both participant and utility costs. While I am not a lawyer, I understand that in Illinois, the definition of the TRC test is found in statute. In practical terms, the test represents the combined program effects on both participant and non-participant utility customers. The benefits calculated in the TRC test include the avoided supply cost. Avoided supply costs reflect the marginal reduction in

transmission, distribution, commodity and capacity costs as a result of energy usage reduction. The costs in the test are the program costs paid by the utility and the participants plus the increase in supply costs for periods in which demand is increased. All equipment costs, operation and maintenance, costs of removal and administration costs are included in the TRC test.

Q. Please explain how you obtained the measure data required for the TRC analyses.

A. The IL TRM was utilized for all measure savings, incremental costs, and lifetimes, where applicable. The IL TRM provided the majority of measure data required for the TRC analysis. However, if data was not available in the IL TRM for specific measures, a combination of industry sources, simulation modeling, and evaluation data was utilized for the TRC analysis. For example, ENERGY STAR New Homes are not included in the IL TRM. To fill the data gap AEG obtained simulation modeling data from Conservation Services Group ("CSG"), the Ameren Illinois residential implementation contractor, which compared homes built to 2012 Illinois Energy Code standards to homes built to specific HERS ratings.

Specifically for Residential HVAC electric measures, hourly load shapes were utilized to capture the weather-sensitive usage of the measures. Separate load shapes were developed for Central Air Conditioners ("CAC") and for Air Source Heat Pumps ("ASHP"). The load shapes were developed by AEG utilizing hourly billing data from a Missouri electric utility. The utilization of the load shapes allowed AEG to capture the weather-sensitive nature of the measures with higher savings of CACs and ASHPs in the summer months where energy prices are also higher.

Q. Please describe how you applied the TRC test to the individual measures.

A. The TRC test compares benefits (avoided costs times energy and demand savings) to costs (incremental capital, installation and O&M costs of measures + utility implementation and administrative costs). The formal expression of the Illinois TRC test is as follows:

TRC = Benefits/Costs

$$BTRC = \sum_{t=1}^{N} \frac{UAC_t}{(1+d)^{t-1}}$$

$$CTRC = \sum_{t=1}^{N} \frac{PRC_t + PCN_t + UIC_t}{(1+d)^{t-1}}$$

Where:

BTRC = Benefits of the program/measure
CTRC = Costs of the program/measure
UAC_t = Utility avoided supply costs in year t
UIC_t = Utility increased supply costs in year t
PRC_t = Program Administrator (Utility) program costs in year t
PCN = Net Participant Costs

I would note that the TRC test is highly sensitive to the variable and inputs used in the calculation. Here, AEG applied the measure-level data described above to the TRC test, which resulted in a TRC value for each measure considered by Ameren Illinois. Measures with a benefit-cost ratio of 1.0 or greater were considered to "pass" the TRC test. AEG also used the Ben-Cost model to provide state-of-the-art cost-effectiveness analysis of the individual measures. The Ben-Cost model is an open-source cost-effectiveness model that is utilized in multiple states throughout the country. Ben-Cost is a fully customizable cost-effectiveness

modeling platform that enabled AEG to evaluate the costs, benefits, and risks of DSM programs and services using utility-specific measures and programs.

The TRC test may be applied to assess the cost-effectiveness of individual energy efficiency measures as well as entire energy efficiency programs or portfolios. Each level of analysis considers variables that are relevant to that scope. For example, a measure-level cost-effectiveness analysis only looks at a single measure's costs and benefits and would not include program-level variables such as Program Administrator Costs. Likewise, program and portfolio-wide costs are considered when the TRC is calculated at the program and portfolio levels.

Q. What avoided cost data was used by the Ben-Cost cost-effectiveness calculations?

A. The Ameren Illinois DSM portfolio plan focuses on measures installed in the upcoming 3-year cycle, but many measures produce savings for multiple years beyond their installation. Thus, cost-effectiveness calculations consider multiple years of economic forecasting.

To estimate the avoided costs of electricity and natural gas, the relevant Ben-Cost software inputs relied on energy market forecasts provided by the Ameren Corporate Planning Department. The avoided cost curve that was provided for use in the cost effectiveness analysis process was derived from two sources. For years 2014-2017 the values represent the traded market prices for what is commonly referred to as the Indy Hub as of April 30th 2013. For years 2018-2025 the values are not available from a traded market and therefore represent the results of a simulation model to reflect a modeled expectation of market prices. The forward price forecasts were developed with modeling software provided by Ventyx and commonly referred to as "Strategic Planning" or "MIDAS." This detailed simulation modeling software provides a dispatch production cost projection that utilizes load, fuel and many other projections. To provide the detailed data needed to populate the Strategic Planning model for purposes of

developing a forward electric price forecast, Ventyx provides a service that incorporates all the assumptions that are used in their Power Reference Case. This model does not include an expectation for a carbon price but does reflect an updated market price expectation for natural gas as of the date of this model run. Market based natural gas prices are available out through 2025 and can be incorporated into the model assumptions. Finally, to better reflect the expected prices in the Ameren Illinois area, a basis adjustment has been applied to adjust the Indy Hub prices to Ameren Illinois prices.

In addition to avoided energy costs, avoided capacity costs are considered a benefit and are factored into the cost-effectiveness of the measures. Some measures have a greater impact on peak demand than others, for example: a central air conditioner impacts the peak more than installation of a residential CFL, since the CFL most likely is not on during the summer peak period. When Ameren Illinois calculates the cost-effectiveness of a measure, coincident peak impact is used for cost-effectiveness. Avoided capacity cost estimates are based upon The Midwest Independent Transmission System Operator, Inc.'s ("MISO") market prices in the near term (through 2014) and escalated to the annual recalculation of the Cost of New Entry value ("CONE") starting in 2021 for the Transmission Provider Region.

The avoided costs of distribution are another benefit factored into the TRC calculation. These costs were based on an internal Ameren study that estimates the distribution expenditure reduction associated with curtailing each incremental kW of system growth. Although this process improvement has not previously been included in Ameren Illinois' avoided cost calculations, it adds significant precision to DSM measures with peak kW savings.

Finally, each avoided cost is adjusted upwards in the TRC calculation by the appropriate line loss factor. For every unit of energy that is delivered to a customer, there is some amount of

energy that is lost in the delivery process. If the customer does not use that unit of energy on their premises, they also prevent the system losses that would have been incurred. In other words, one unit of savings at the customer's premise means greater than one unit of savings for the grid, the system, and society.

The last piece of data used in the cost-effectiveness calculation is the discount rate used to estimate the present value of the efficiency measures' costs and benefits. Ameren Illinois used the corporate weighted average cost of capital ("WACC").

Q. Please describe the results of the TRC test on the individual energy efficiency measures.

A. While Ameren Illinois calculates the TRC retrospectively at the program and portfolio level during implementation, for planning purposes the Company prospectively applies the TRC test at the measure level. I would note that it is possible for a program that passes the TRC test to contain measures that are not cost-effective on the measure-level. The decision to include non-cost-effective measures, that is, measures with a TRC less than 1.0, could be driven by several factors, including:

1) The measure is needed for the program to offer a full array of measure options. An example of this is insulation measures in the Residential Home Energy Performance program. Insulation measures installed in homes with Gas Heat only have a TRC less than 1.0, compared to homes with Electric Heat or homes with Gas Heat and Central Air Conditioning that have a TRC greater than 1.0. It is important to offer insulation in all homes independent of heating/cooling types so these measures are included so contractors are not limited in their offerings and so customer confusion is limited.

2) The measure is needed to continue market momentum and avoid program shut-down and start-up. The Residential HVAC program has three measures with a TRC less than 1.0. The Residential HVAC program in particular has a very strong trade ally network that took several years to develop, with many contractors in this program that market the benefits of program participation to prospective customers. Contractors require robust offerings and sufficient measure inclusions in order to participate in the program. The removal of specific measures could cause the program to shut down in its current form or cause contractors to become inactive in the program. Such results undermine development of robust energy efficiency and would lead to needless implementation

difficulty in the event the program would need to be shut down due to TRCs less than 1.0 only to later being restarted later in the implementation cycle if the measures became cost-effective.

3) The measure is directly influenced by volatile avoided cost forecasts. Natural gas prices are at historically low levels and that is reflected in the avoided cost price forecasts.

4) The results of the measure screening are presented in tables B1 through B2 as Appendix B to this Direct Testimony. Measures included in Appendix B are inclusive of measures that are not included in the Plan 3 portfolio.

5) Even if a measure fails the TRC test at the individual level, the program that the measure is included in still passes the TRC test.

Over 300 measure types were screened for inclusion, and approximately 250, or 80%, passed with a benefit-cost ratio of 1.0 or greater. Since Ameren Illinois has substantial amounts of electric customers and natural gas customers, as well as many dual-fuel customers, TRC tests were performed for all three possible cases. We found that some measures have a passing TRC for every Ameren Illinois customer type. For example, the ENERGY STAR New Homes program, which reduces the need for heating and cooling energy, passes the TRC test with electric fuel benefits, gas fuel benefits, or with both benefits. Other measures do not pass for every fuel combination. For example, installation of an efficient gas furnace passes TRC for gas-only or dual-fuel customers, but not for electric-only customers.

Table B1 in the appendix to this direct testimony describes the Residential measures that passed the TRC test, and Table B2 describes the Non-Residential measures that passed the TRC test. These measures are subsequently bundled into proposed programs.

B. Development of a Portfolio of Energy Efficiency Programs

1. Bundling of Measures into Programs

Q. Please explain the process of bundling measures into program types.

A. A program comprises a number of measures combined into a useful delivery mechanism (a program). In order to be useful, multiple measures are typically bundled within a program.

Conversely, the same measures may also be included in multiple programs. Broad, multi-measure programs are preferred over single-measure programs except where markets or a market segment dictate a targeted focus because they offer the greatest opportunity for savings, program cost-sharing, and creating economies of scale.

For example, measures relating to all residential heating, cooling, and climate control equipment is bundled into the HVAC program. This bundling process is used because it results in combinations of measures that appeal to a given market and that can be delivered using similar delivery methods in order to lower delivery and administrative costs and increase participation. For example, certain trade allies, like HVAC service contractors can deliver all or some of the measures in a single interaction with customers, who may have heating, cooling equipment and/or climate control thermostats in the home or business. Importantly, the bundling process is also necessary to estimate how many of each measure would or could be adopted by program participants. The Ameren Illinois Plan and templates in Section 6 show each program along with its bundled measures. Ameren Illinois witness, Mr. Ken Woolcutt provides additional testimony about the mix of programs within the portfolio.

2. Program and Portfolio Design

Q. Please explain the process of how programs are built.

A. AEG relied heavily on feedback and input from Ameren Illinois' implementation teams and evaluators as well as direct input from the energy efficiency team at Ameren Illinois, who I understand regularly meets with the Illinois Stakeholder Advisory Group. A collection of resources on best practices in program design was also utilized, including the National Action Plan for Energy Efficiency, the Consortium for Energy Efficiency, the U.S. EPA Energy Star Program, and ACEEE's compendium of Exemplary Programs. Programs are then summarized

in the form of a Program Template. Program Templates bundle energy efficiency measures that have passed the TRC screening process into deliverable programs as described above. The Program Templates provide certain strategic detail for several program attributes, including program description, delivery strategy, target market, marketing strategy, measure eligibility, and program targets (participation, savings, budgets, and cost-effectiveness), though they are not exhaustive of all details of the program. AEG used the same process for electric and gas measures.

The program cost data that were used in the analysis are based primarily on the costs to deliver each measure to end-use customers as determined by the implementation contractors and evaluators.

The participation data is based on inputs from the implementation contractors and information from the Ameren Illinois DSM Potential Study. Although the Potential Study suggested that further savings were possible at additional cost, the absolute participation (and thus savings) allocations reflect the projected savings realistically achievable within the mandated spending limit. The number of electric measures was allocated in proportion to the relevant Ameren Illinois electric only and dual-fuel customers. The number of gas measures was allocated in proportion to the relevant Ameren Illinois gas only and dual-fuel customers.

Q. Please explain the process of how the Ameren Illinois Plan 3 portfolio was built.

A. At the portfolio level, AEG designed the relative mix of programs to achieve portfolio goals while staying within the spending limit. AEG also took into account other important considerations and objectives, such as how programs may be ramping up or down based on inception or sun-setting of technologies, introduction of codes and standards, market changes, etc.

Ameren Illinois bundled what are described above as programs into several broad "solutions" offerings, which were designed from the view point of the customer. Providing customers with an excessive number of measures and options without guidance and focus can result in customer confusion and lower participation. On the other hand, operating too many targeted, independent programs can result in inefficiency in administration and implementation. Additionally, separate implementation of too many programs may lead to missed opportunities to provide customers solutions that cut across multiple program elements. Therefore, Ameren Illinois has worked to bundle these individual programs as elements within two broad solutions programs – Residential Solutions (or Residential Programs or Portfolio) and Business Solutions (or Business Programs or Portfolio). Although these solutions-based programs will involve multiple incentive types and services, the intent is to market the programs as the equivalent of super-stores, with easy-to-find portals that will provide access to a full range of services.

Notably, cross-cutting portfolio administrative requirements such as incremental labor, evaluation and planning, as well as vital program elements that do not directly yield energy savings are accounted for on the portfolio level. These line items are as follows:

Table 1. Costs added across the portfolio

Budget Line Item	**Percent of Total Program Costs**
Portfolio Admin costs	4.3%
EM&V costs	3%
Education	2.15%
Marketing	2.15%
Emerging Technology	3%

Q. When a program measure has both electric and natural gas energy savings, can you explain how the benefits and costs are allocated to the electric and natural gas portfolios?

A. Measures with dual-fuel savings include insulation for dual-fuel customers, thermostats, and ENERGY STAR New Homes. Program costs were allocated 70% to the electric budget and 30% to the natural gas budget to account for the disparate amounts of total budget available for each fuel and to increase the amount of dual-fuel measures. If this allocation was shifted to a lower proportion to the electric budget, the amount of dual-fuel measures would decrease due to the limited natural gas budget.

Q. How are un-incented savings handled in the modeling and how does Ameren Illinois take credit for un-incented savings?

A. Multiple measures with dual-fuel benefits are included in the Ameren Illinois' Plan 3 filing. Measures that have dual-fuel benefits include, for example, insulation or ENERGY STAR New Homes. The full electric and gas savings are accounted for in each of these measures (for the portion that are estimated to be AIC customers).

Note that the total electric budget is $44.7 million and the total gas budget is $11.7 million for PY7 (over 70% smaller), with the electric budget representing 79% of the total portfolio's combined budget and the gas budget only representing 21%. This presents a serious challenge and disparity in the funding available for dual-fuel measures. Because of limited gas funding for dual-fuel measures as compared to the electric funding, incentive dollars are split with 70% allocated to electric budgets and 30% allocated to gas budgets. This allows Ameren Illinois to maximize the savings while staying within each fuel's budget constraints, while still providing appropriate incentives to encourage customers to install dual-fuel measures. Further, due to disproportionate funding, in the Plan 2 order the Commission instructed Ameren Illinois

to 1) fund a measure from one fuel's budget for another fuel's measure and 2) claim both the customer's dual fuel savings that were incurred towards its savings goal regardless of whether a different fuel's budget paid for the other fuel's measure costs. The methodology for Plan 3 is therefore consistent with the Commission's previous order approving Ameren Illinois' Plan 2,[4] which states:

> The Commission agrees with Staff that Ameren should be allowed to fund a measure resulting in both gas (therm) and electric (kWh) energy savings, and charge the full incentive cost of the measure to the gas portfolio, so long as the measure results in sufficient benefits to gas customers that it is likely to be provided by a gas-only utility. The Commission directs Ameren to claim all electric (kWh) savings associated with measures installed for Ameren's combination electric and gas customers, including measures for which no electric incentive has been paid, as these savings reduce Ameren's deliveries. In addition, the Commission directs Ameren to claim all gas (therm) savings associated with measures installed for Ameren's combination electric and gas customers, including measures for which no gas incentive has been paid, as these savings reduce Ameren's deliveries. However, electric (kWh) savings for measures installed for Ameren's gas-only customers should not be counted toward Ameren's electric savings goal as these savings do not affect Ameren's electric deliveries.

For modeling Plan 3, the same premise was assumed and the disproportionate electric funds were used to supplement the gas incentives. Also, as directed by the Commission the total dual-fuel AIC customer savings were also assumed in calculating the savings goal for all dual fuel measures (regardless of which fuel funds the measure).

Q. How has the Illinois Power Authority DSM filing affected the Plan filing?

A. Due to passage of Section 16-111.5B, AIC has been required to submit additional, or incremental, electric energy efficiency programs starting in 2012. The first of these programs was implemented in 2013 for PY6. AIC has already submitted additional savings to the Illinois

[4] ICC Docket No. 10-0568, Final Order, pp. 29-30.

Power Authority ("IPA") which, if approved by the Illinois Commerce Commission ("ICC" or "Commission"), would be implemented in 2014 for PY7 (the first year of Plan 3). A key component to IPA programs is that they are incremental to standard AIC Plan 3 electric programs. However, in June 2013 when the IPA submission was due, AIC had not yet submitted their Plan 3 filing and therefore did not have PY7 savings estimates. To rectify the incremental nature of the IPA it was decided, for both implementation and planning purposes, to submit completely separate portfolios with no overlapping measures between IPA and Plan 3. Therefore, the Plan 3 filing has necessarily been limited to those programs not included in the IPA submission.

Notably, the PY7 IPA submission includes annual cost-effective programs that could have otherwise been included in the Plan 3 filing in the absence of the IPA's procurement plan. For example, in the Residential sector the IPA submission accounts for over 32,000 Mega-watt hour ("MWh") of savings, while accounting for over 28,000 MWh of savings in the Business sector. There are three significant programs in the IPA submission that could have been substantial contributors to Plan 3:

1) Residential Specialty Lighting: This single year Program provides annual incentives for specialty CFL bulbs and could account for approximately 5,500 MWh of savings. Specialty CFLs were included in the Residential Lighting program in the Plan 2 filing and were a significant contributor of savings.

2) Residential Multi-Family: This single year Program provides incentives for Multi-Family "major measures" which includes common area lighting, insulation, and air sealing. This program could account for approximately 13,000 MWh of savings.
3) Small Business Direct Install: This single year Program provides enhanced lighting incentives to Business customers and could account for approximately 28,000 MWh in savings.

As described, the IPA programs have considerably more Residential program savings than the Business sector duirng Plan 3 and, as a consequence additional funds were made available to the Business portfolio and therefore the Business portfolio in Plan 3 has a larger amount of electric

energy savings compared to the Residential portfolio. This is primarily because the business electric savings in the IPA portfolio are limited to small commercial class, thus limiting business savings in the IPA portfolio. And therefore the 8-103 portfolio caters more to the medium and large commercial classes.

Q. How are compact fluorescent lamp carry-over savings accounted for in the modeling?

A. Ameren Illinois followed the IL TRM with regard to when installation of compact fluorescent lamp ("CFL") bulbs takes place and when savings are accrued. The IL TRM designates a specific in-service rate for CFLs with 69.5% installed in year 1, 15.4% installed in year 2, and 13.1% installed in year 3. The result of the staggered in-service rate is carry-over savings that are incented in one year and the first-year savings take place in a subsequent program year. For example, if 1,000 CFLs were incented by Ameren Illinois in PY7, Ameren Illinois would receive savings credit for 695 CFLs in PY7, 154 CFLs in PY8, and 131 CFLs in PY9. It should be noted that the savings in this example for PY7 are in addition to the bulbs incented in PY8 and PY9.

3. Results of Savings Analysis

Q. What are the total savings goals for Plan 3?

A. Total annual savings are provided in Table 2 below by fuel type and by program year. Electric savings are in MWh, gas savings are in therms.

Table 2. AIC Plan 3 Electric and Gas Savings Goals

	PY7		PY8		PY9	
	Electric	Gas	Electric	Gas	Electric	Gas
RES	64,785	2,667,461	66,532	2,667,461	66,748	2,667,461
BUS	128,455	1,975,567	133,549	1,972,082	139,484	1,968,609

Total	**193,240**	**4,643,027**	**200,081**	**4,639,542**	**206,232**	**4,636,069**

Additional information on portfolio and program savings can be found in the direct testimony of AIC Witness Mr. Woolcutt.

Q. How were first year cost per energy savings and lifetime levelized costs taken into account in the modeling?

A. First year cost per energy savings takes into account the total utility program costs (incentives, administration, marketing, evaluation, delivery, etc.) compared to the first year energy savings. Levelized costs are derived by dividing the lifetime utility costs of implementing a measure by the lifetime energy savings of the measures. All first year cost per energy and levelized costs were reasonable and fell within the expected range by program, sector, and fuel. This is especially important when considering how the budget cap limits the amount of savings that can be achieved. The information below illustrates that the cost per energy is reasonable and therefore the ability to achieve additional savings is unreasonable. Dr. Robert Obeiter will discuss the limitation of the budget and the reasonableness of the Ameren Illinois portfolio's cost per energy as compared to national norms in his testimony. The range of first year cost per energy saved is provided below in Table 3. The range of levelized costs is provided below in Table 4.

Table 3. First Year Utility Costs per First Year Energy Saved

	$/kWh			$/therm		
	High	Low	Total	High	Low	Total
RES	1.26	0.03	0.29	14.10	0.49	1.96
BUS	0.17	0.11	0.15	2.79	0.96	2.42
Total	**1.26**	**0.03**	**0.23**	**14.10**	**0.49**	**2.52**

Table 4. Portfolio Levelized Utility Costs per Lifetime Savings

	$/kWh			$/therm		
	High	Low	Total	High	Low	Total
RES	0.117	0.027	0.055	0.854	0.244	0.309
BUS	0.023	0.013	0.015	0.498	0.207	0.321
Total	**0.117**	**0.013**	**0.027**	**0.854**	**0.207**	**0.373**

Q. How have budgets changed from Plan 2 to Plan 3?

A. The available budgets have decreased from Plan 2 to Plan 3. While electric budgets have remained relatively flat from Plan 2 to Plan 3, gas budgets have significantly decreased. This is especially important to note in regards to the disparity of gas versus electric funds as discussed previously. Gas budgets have decreased because budgets are based on a percentage of Ameren Illinois revenue. Due to severely depressed natural gas prices and a large reduction in demand, the compounded effect caused a cumulative decrease of more than 17% from Plan 2 to Plan 3. Table 5 provides the electric and gas budgets for Plan 2 versus Plan 3. The reduction in the gas budget of approximately $3 million per year causes a significantly decreased opportunity to achieve therm and dual fuel measure savings.

Table 5. Plan 2 vs. Plan 3 Ameren Illinois Statutory Budgets (Million $)

	Plan 2			Plan 3		
	PY4	PY5	PY6	PY7	PY8	PY9
AIC Electric Budget	$44.45	$43.55	$44.05	$44.69	$45.41	$45.66
AIC Gas Budget	$13.90	$14.17	$14.41	$11.71	$11.75	$11.77
AIC Total Budget	$58.35	$57.73	$58.45	$56.40	$57.16	$57.43

Q. How have the savings goals and the utility costs per savings changed from Plan 2 to Plan 3?

A. Proposed electric savings goals have decreased from Plan 2 to Plan 3 while gas goals have increased. The decreased electric savings is due to a variety of factors including and most

especially changes in lighting standards (for both residential and commercial lighting, as covered previously in this testimony), the implementation of IPA programs, changes in federal appliance standards, a decreasing net-to-gross ratio for most programs, a mix of longer life yet higher cost measures, and a greater reliance on measures that yield less savings because of the maturity of the Ameren Illinois market. However many of these factors that affect electric savings goals do not have as much of an impact on gas savings goals. Despite these challenges the cost per savings has followed the expected path that was established in Plan 2. Table 6 displays the total savings goals, total utility costs, and the first year utility costs per first year savings for Plan 2 versus Plan 3.

Table 6. Plan 2 vs. Plan 3 Total Utility Costs, Savings, and Costs per Savings

	Plan 2			Plan 3		
	PY4	PY5	PY6	PY7	PY8	PY9
AIC Electric Budget	$44.45	$43.55	$44.05	$44.69	$45.41	$45.66
AIC MWh Savings	273,534	245,871	216,495	193,240	200,081	206,232
$/kWh	$0.16	$0.18	$0.20	$0.23	$0.23	$0.22
AIC Gas Budget	$13.90	$14.17	$14.41	$11.71	$11.75	$11.77
AIC Therm Savings	3,735,017	4,355,658	4,942,447	4,643,027	4,639,542	4,636,069
$/Therm	$3.72	$3.25	$2.91	$2.52	$2.53	$2.54

As displayed in Table 6, the $/kilowatt-hour ("kWh") has steadily risen from the inception of Plan 2 through the completion of Plan 3. The rise is mainly due to the changing lighting standards and the implementation of IPA programs that utilize many low-cost measures which increases the cost of implementing electric savings measures. The rise in electric first year utility costs per savings is expected due to the reasons already stated and is reasonable compared to the Plan 3 electric costs per energy. The gas first year utility costs per savings decreased from Plan 2 to Plan 3. This is due mainly to low natural gas prices, causing many measures not to pass TRC, and the reduction in budgets, causing the program to only be able to fund the cheapest and most cost-effective measures. The natural gas program has a heavy reliance on less expensive

measures including showerheads, aerators, behavior modification, and steam traps. In previous Plans there was a greater reliance on higher cost measures such as furnaces and boilers. These measures, which help penetrate markets and increase energy efficiency awareness, are included in Plan 3, but at lower participation levels most especially due to limited gas funding. For example, the Plan 2 Compliance Filing assumes the installation of 3,566 Furnaces in the RES HVAC program in PY6; this compares to the Plan 3 installation assumption of 865 Furnaces in the RES HVAC program in PY7. An additional justification for the increased $/Therm is the 70/30 cost sharing for dual fuel measures. In Plan 2, dual fuel measures assumed a 50/50 cost sharing split of incentive dollars for dual fuel measures. An example of how this affects cost per energy is if you had an insulation measure that received a $100 rebate, had 100 kWh savings, and 100 therm savings. In Plan 2 the costs would be distributed with $50 allocated to electric with 100 kWh savings, for a cost per energy of $0.50 per kWh, and $50 allocated to gas, with a cost per energy of $0.50 per therm. In Plan 3 the cost distribution has changed where $70 are allocated to electric with a cost per energy of $0.70 per kWh, and $30 are allocated to gas with a cost per energy of $0.30 per therm. This redistribution contributed to both the increase in electric cost per energy and the decrease in gas cost per energy.

4. Analysis of Cost-Effectiveness of Programs and Portfolio

Q. How did you determine whether the programs and the portfolio were cost-effective?

A. Ameren Illinois performed the TRC test on the program and portfolio level to determine the overall cost effectiveness. As previously noted, the TRC test must utilize variables that are appropriate for the given level of analysis. There are three differences between the TRC screening process at the measure and program level in this specific instance.

First, the Program Cost term in the denominator of the TRC (given as "PRC" in the definition set forth above) is set to zero for the measure level analysis. However, program-level screening requires that the PRC term take a value equal to the sum of the cost to implement and administer the program.

Second, program participation is included in the program level analysis. The measure level analysis is focused on the cost-effectiveness of a single measure and does not include a participation variable. By definition, Ameren Illinois is interested in the cost-effectiveness of a bundle of measures as these measures are adopted by program participants. This means that at the program level, Ameren Illinois must also project the participation level achieved through the program.

The third difference is that the portfolio and program TRCs consider a net-to-gross ("NTG") factor that attempts to isolate the net effects of the program from market conditions absent the program.

Q. Could you please expand on your methodology for finding Net-to-Gross factors?

A. AEG utilized NTG factors that were based on evaluations of existing Ameren Illinois programs. Ameren Illinois' evaluation contractor, Opinion Dynamics Corporation ("ODC"), utilized a variety of methodologies for characterizing and calculating the NTG ratio for each of the DSM programs combining free-ridership and spillover (note: realization rates, which provides a factor for equalizing the actual amount of savings realized compared to previously estimated savings, were included in NTG calculations for Plan 2, but realization rates are now no longer factored due to them being utilized in gross energy savings calculations included in IL TRM calculations).

According to ODC "free riders" are program participants who would have implemented the incented energy efficiency measure(s) even without the program. Free riders are identified through a series of questions that explore the influence of the program in making the energy efficiency installations as well as the likely actions had the incentives not been available.

At the same time, however, there will be customers who undertake the action the program is attempting to motivate, but who do not take advantage of the incentive offered by the program. These customers are known as "free drivers," and the savings that their actions produce are termed "spillover." Just as the effects of free riders must be accounted for, so should the effects of free drivers. The Net-To-Gross ratio is adjusted downward to account for free riders and upward to account for spillover.

For purposes of Plan 3 program design, the programs use the results of prior NTG analyses from existing Ameren Illinois programs if available and still applicable. Otherwise, they draw on NTG best practices and data from evaluation reports in other jurisdictions. The resulting NTG strategy for each program and a brief discussion of the rationale can be seen in the table below:

533 **Table 7a: Proposed Net-to-Gross Ratios**

PROGRAM	Electric NTG Factor			Notes
	PY7	PY8	PY9	
Residential Appliance Recycling	0.64	0.64	0.64	Based on EM&V calculated data.
Residential Behavior Modification	1.0	1.0	1.0	"Net effect" calculation implicit in vendor's reporting methodology; as used by EM&V.
Residential Energy Star New Homes	0.8	0.8	0.8	Based on EM&V calculated data.
Residential Home Energy Performance	0.92	0.92	0.92	Based on EM&V calculated data.
Residential HVAC	0.69	0.69	0.69	Based on EM&V calculated data.
Residential Lighting	0.44	0.4	0.36	EM&V calculated for PY7. Declining in PY8-9 based on best practice and anticipated EISA impacts.
Residential Moderate Income	1.0	1.0	1.0	Similar to low Income market in that target market generally does not have funds or resources to participate in program
Residential Multifamily	1.0	1.0	1.0	Based on EM&V calculated data.
Residential School Kits	0.86	0.86	0.86	Provided by EM&V.
Business Standard Incentive	0.74	0.74	0.74	Based on EM&V calculated data.
Business Custom Incentive	0.76	0.76	0.76	Based on EM&V calculated data.
Business Retro-commissioning	0.95	0.95	0.95	Based on EM&V calculated data..

534 **Table 7b: Proposed Net-to-Gross Ratios**

PROGRAM	Gas NTG Factor			Notes
	PY7	PY8	PY9	
Residential Behavior Modification	1.0	1.0	1.0	"Net effect" calculation implicit in vendor's reporting methodology. No additional penalty applied here.
Residential Energy Star New Homes	0.8	0.8	0.8	Based on EM&V calculated data.
Residential Home Energy Performance	0.82	0.82	0.82	Based on EM&V calculated data.
Residential HVAC	0.72	0.72	0.72	Based on EM&V calculated data.
Residential Moderate Income	1.0	1.0	1.0	Similar to low Income market in that target market generally does not have funds or resources to participate in program
Residential Multifamily	1.0	1.0	1.0	Based on EM&V calculated data.
Residential School Kits	0.86	0.86	0.86	Provided by EM&V.
Business Standard Incentive	0.91	0.91	0.91	Based on EM&V calculated data.
Business Custom Incentive	0.76	0.76	0.76	Based on EM&V calculated data.
Business Retro-commissioning	0.95	0.95	0.95	Based on EM&V calculated data..

The testimony of Dr. Robert Obeiter addresses the need for fixed values, including NTG, in more detail.

Q. In your opinion, is the proposed schedule of fixed inputs, attached as Appendix A to Ameren Exhibit 1.1, reasonable and appropriate for use in this proceeding?

A. Yes, it is my opinion that the fixed inputs in Appendix A are reasonable and appropriate for the reasons stated in this Testimony. As mentioned, the data uses Ameren Illinois-specific sources whether from the IL TRM or from implementation and evaluation.

Q. Please explain why the NTG factor for CFLs decreases in PY8 and PY9.

A. The Energy Independence and Security Act ("EISA") of 2007 increased the minimum efficiency standards for general service lights and is transforming the lighting market. The new standards are phased in by bulb wattage from 2012 to 2014. EISA does not designate a specific bulb type as the baseline unit, but EISA compliant halogen light bulbs are assumed to be the baseline standard for general service lights from 2014-2017. However, the halogen bulb has a projected price point in the $1.00 to $2.50 per bulb range. In contrast, a general service CFL has an undiscounted price point in the $1.50 per bulb range. Ameren Illinois lighting saturation surveys have shown that CFL saturation has increased from 25% socket saturation in 2010 to 33% in 2012. This data shows a trend towards more purchases of general service CFLs where more people are expected to buy general service CFLs in the future simply because they no longer have the option to buy incandescent bulbs. This premise implies a larger free ridership component for the general service CFL market. As lower wattage incandescent bulbs get phased out in 2013 and again in 2014, it implies increasing free ridership in each ensuing year – hence lower net-to-gross ratios in each ensuing year (2014-2017).

Q. Please summarize the findings of your cost-effectiveness analysis.

A. Each program has been screened for program design purposes as passing the TRC cost-effectiveness test with a value greater than 1.0. Certain programs have a higher TRC than others, with Business Custom having the highest TRC in the Business portfolio and Residential Lighting having the highest TRC in the Residential portfolio. The Ameren Illinois portfolio as a whole has an estimated total resource cost test benefit-cost ratio of 2.24. The table below shows the results of the program cost-effectiveness analysis:

Table 8: TRC Results for the Ameren Illinois Programs

Program	TRC
RES-Appliance Recycling	1.12
RES-Behavior Modification	1.33
RES-ENERGY STAR New Homes	1.33
RES-HEP	1.23
RES-HVAC	1.01
RES-Lighting	1.98
RES-Moderate Income	1.14
RES-Multifamily	1.97
RES-School Kits	1.41
RES-TOTAL	**1.38**
BUS-Standard Incentive	3.22
BUS-Custom Incentive	4.45
BUS-Retro-commissioning	2.06
BUS-TOTAL	**3.51**
PORTFOLIO TOTAL	**2.24**

IV. AMEREN ILLINOIS' INTEGRATED PORTFOLIO

Q. Are there benefits from filing an integrated, dual fuel plan?

A. Yes. Ameren Illinois' integrated energy efficiency Plan 3 delivers a flexible portfolio capable of serving diverse market segments. Specifically, Ameren Illinois' integrated plan

includes administrative and programmatic synergies for program delivery, increased energy benefits, more cost-effective measures, and operational benefits for trade allies in the field.

Administrative costs are reduced with an integrated portfolio, as opposed to two separate and stand-alone energy efficiency programs. All energy efficiency portfolios require marketing, project management, customer outreach, contractor development, etc. Rather than duplicating efforts for fuel-specific portfolios, cost reductions occur through combining these administrative budget items. For example, Ameren Illinois uses its Act On Energy brand and website as a single marketing vehicle, allowing for one consistent message to customers, reducing customer uncertainty around energy savings options. Another administrative benefit exists in project management. Rather than having separate networks of natural gas contractors and electric contractors, Ameren Illinois can combine the trade allies and provide training and information for both fuel types. This decreases confusion and the administrative requirements needed to separate (by fuel type) training seminars, the incentive application process, and marketing materials to provide contractors.

An integrated portfolio's single marketing vehicle may encourage participation and program uptake, resulting in increased energy savings. As a result, increased energy savings can potentially increase the number of measures included and may also raise the cost-effectiveness of several dual-fuel measures. An example is residential insulation for customers with gas heat and central air conditioning. To illustrate this example, the table below displays measure level TRCs accounting for benefits in three separate ways: electric benefits only, gas benefits only, and dual fuel benefits. While the measure for both fuel types stand-alone does not pass the TRC screen of 1.0, the TRC is significantly increased when both fuel benefits are accounted for, and therefore, the measure can be included within the portfolio.

Table 9. Radiant Barrier measure TRC with different fuel combinations

Measure	ELEC. Benefits Only	GAS Benefits Only	Dual Fuel Benefits
R-11 Wall Insulation – Gas Heat CAC	0.51	0.88	1.39

V. SPENDING LIMITS

Q. Did Ameren Illinois review its program mix, incentives, or administrative costs in determining the modified electric and gas savings targets while staying within the statutory spending limit?

A. Yes. The Ameren Illinois plan is designed to provide the optimal energy and gas savings within the statutory spending limit. An emphasis was placed on measures with longer lifetimes that provide energy savings over a long period of time. For the both the electric and gas portfolios, the planning team considered several combinations of program designs that could have altered the savings numbers and decreased the budget numbers. Even with design modifications the level of change would not have been sufficient to meet the targets set forth in the electric and gas statutes within the spending limits. The decision was also made to include measures with longer lifetimes which have greater lifetime savings, which in my opinion correctly prioritized the continued growth of energy efficiency in Illinois. This has the effect of reducing the short-term goal, but increasing the lifetime savings of the program and reducing the lifetime energy delivery for the utility.

Q. Does Ameren Illinois have an estimate for what the spending limit would need to be to achieve the electric savings targets as set forth in the statute?

A. Yes. Assuming the Ameren Illinois proposed kWh and therm savings and budgets were to scale linearly, the 3-year budget required to achieve the statutory electric savings targets

would be approximately $280 million higher than the statutory spending limit and approximately $33 million higher than the statutory spending limit to achieve the gas savings targets. Ameren Illinois' required budgets would increase to approximately $130.9, $145.4 and $142.6 million for PY7, PY8, and PY9 respectively for electric. Ameren Illinois' required budgets would increase to approximately $18.2, $22.8 and $27.5 million for PY7, PY8, and PY9 respectively for gas. This, however, is an imperfect estimate as it does not consider the fact that expanded programs would be pursuing harder-to-reach savings opportunities with less motivated customers. In reality, actual costs per kWh and costs per them saved are likely multiples higher. This is also discussed in Dr. Robert Obeiter's direct testimony.

VI. DIVERSITY OF THE AMEREN ILLINOIS ENERGY EFFICIENCY AND DEMAND RESPONSE PLAN

Q. Please describe the diversity of the programs in the Ameren Illinois plan.

A. First, the Ameren Illinois portfolio does not include the programs developed by the Department of Commerce and Economic Opportunity ("DCEO"). The programs developed by DCEO represent a significant component of the diversity of energy efficiency services that will be delivered to customers in Ameren Illinois' territory. Those diverse offerings focus on low income, municipal, and educational sectors.

The Ameren Illinois programs focus on other diverse segments and markets. Within the residential sector, the programs address residential lighting, second refrigerators, new central and room air conditioners, air infiltration, central air conditioning equipment, customer energy-consumption behavior, and appliance recycling. Within the commercial sector, the programs incorporate measures addressing lighting, motors, air conditioning, building operations, commercial food service equipment, office equipment, and ventilation. The wide diversity of

industrial end-uses and measures is addressed by the custom incentive program, which is designed to include all measures that can be found to be cost-effective on a project basis.

The programs within the portfolio are designed to evolve and incorporate additional measures over time. In addition, the programs are diverse across sectors and market segments. The programs address residential customers living in existing single-family and multi-family homes. The portfolio also includes programs targeted at residential and commercial new construction. The programs address all commercial and industrial customers.

VII. CONCLUSION

Q. Please summarize the conclusions of your direct testimony.

A. For the reasons set forth above, I have come to the following conclusions. First, based on a broad assessment of energy efficiency measures and programs, including ongoing review of the experience of utilities in other states and jurisdictions when implementing similar programs, the Ameren Illinois portfolio of energy efficiency programs is designed to deliver cost-effective energy savings given the statutory spending limits. Second, based on my analysis, even though the portfolio contains some cost-ineffective measures, the portfolio as a whole that is proposed for the Ameren Illinois energy efficiency portfolio Plan 3 has been screened to satisfy the TRC test. Third, Plan 3 is designed to fall within the spending limits described in the Act. Finally, Plan 3 offers a variety of options for all customer classes to participate in energy efficiency programs and benefit from a mix of both longer life measures and lower cost measures.

Q. Does this conclude your direct testimony?

A. Yes, it does.

APPENDIX A

STATEMENT OF QUALIFICATIONS
ANDREW W. COTTRELL

My name is Andrew W. Cottrell. My business address is 317 George Street, Suite 305, New Brunswick, New Jersey, 08901. My current title is Principal Consultant for Applied Energy Group, Inc.

My educational background consists of a Bachelor's of Arts degree in Engineering with a minor Government & Law from Lafayette College in Easton, Pennsylvania in 2004. I also obtained a Master's of Public Policy from the Edward J. Bloustein School of Planning and Public Policy at Rutgers University in New Brunswick, New Jersey in 2006. I have performed professional internships with the Sustainable Development Fund in Philadelphia, PA and was a Graduate Assistant for the Center for Energy, Economic, and Environmental Policy in New Brunswick, NJ.

In my employment history prior to joining Applied Energy Group, I worked for four years as the Research Project Coordinator at the Center for Energy, Economic, and Environmental Policy ("CEEEP") at Rutgers University; performing wholesale electricity market modeling, designing cost-benefit analysis models, and evaluating energy efficiency programs. While working at CEEEP I also performed independent consulting with Independent Electricity Consultants in Ridgewood, NJ.

Beginning in July of 2010, I worked as a Senior Analyst in Applied Energy Group's Utility Consulting practice, supporting utility clients in the Northeast and Mid-West. My duties included the following: energy efficiency/demand response cost-effectiveness analysis and modeling, DSM implementation plan filings, baseline and market analysis studies, energy

efficiency potential studies, tracking of new technologies and DSM industry developments, and performing energy efficiency process and impact evaluations.

In 2010-2011, I performed the cost-effectiveness analysis to support the Integrys (North Shore Gas and Peoples Gas) 2011-2014 Energy Efficiency Program Plan Compliance Filing.

In September of 2012, I was promoted to Principal Consultant, where I continue to perform the work described above as well as manage Analysts and Support Staff in the Utility Consulting practice.

APPENDIX B

MEASURE SCREEN RESULTS

The results of the measure screening are presented in tables B1 through B2 below.

Table B1. Residential Measures Screened for Measure-Level TRC Test

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
Recycled Refrigerator	Electric	Yes		Yes
Recycled Freezer	Electric	Yes		Yes
Behavior Modification Group 1	Elec&Gas	Yes	Yes	Yes
Behavior Modification Group 2	Elec&Gas	Yes	Yes	Yes
Behavior Modification Group 3	Elec&Gas	No	No	No
Rated Home - gas heat only, HERS <=60	Elec&Gas	Yes	Yes	Yes
Rated Home - gas heat, HERS <=60	Elec&Gas	Yes	Yes	Yes
Rated Home - electric heat, HERS <=60	Electric	Yes		Yes
E-Star Home - gas heat only, HERS 41-60	Elec&Gas	Yes	Yes	Yes
E-Star Home - gas heat, HERS 41-60	Elec&Gas	Yes	Yes	Yes
E-Star Home - electric heat, HERS 41-60	Electric	Yes		Yes
E-Star Home - gas heat only, HERS <=40	Elec&Gas	Yes	Yes	Yes
Rated Home - gas heat, HERS <=60	Elec&Gas	Yes	Yes	Yes
E-Star Home - electric heat, HERS <=40	Electric	Yes		Yes
Rated Multifamily Unit - gas heat only, HERS <=60	Elec&Gas	Yes	Yes	Yes
Rated Multifamily Unit - gas heat, HERS <=60	Elec&Gas	Yes	Yes	Yes
Rated Multifamily Unit - electric heat, HERS <=60	Electric	Yes		Yes
E-Star Multifamily Unit - gas heat only, HERS 41-60	Elec&Gas	Yes	Yes	Yes
E-Star Multifamily Unit - gas heat, HERS 41-60	Elec&Gas	Yes	Yes	Yes
E-Star Multifamily Unit - electric heat, HERS 41-60	Electric	Yes		Yes
E-Star Multifamily Unit - gas heat only, HERS <=40	Elec&Gas	Yes	Yes	Yes
E-Star Multifamily Unit - gas heat, HERS <=40	Elec&Gas	Yes	Yes	Yes

[5] Measures marked with an asterisk do not pass TRC and are included in the portfolio.

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
E-Star Multifamily Unit - electric heat, HERS <=40	Electric	Yes		Yes
CFL 43w to 14w - Post-EISA	Electric	Yes		Yes
CFL 53w to 19w - Post-EISA	Electric	Yes		Yes
CFL 72w to 23w - Post-EISA	Electric	Yes		Yes
CFL 60w to 14w globe - Pre-EISA	Electric	Yes		Yes
CFL 60w to 14w candelabra - Pre-EISA	Electric	Yes		Yes
CFL 60w to 14w reflector - Pre-EISA	Electric	Yes		Yes
Showerhead 1.75 gpm - Electric DHW	Electric	Yes		Yes
Faucet Aerator - Electric DHW	Electric	Yes		Yes
Water Heater Temp Adjustment - Electric DHW	Electric	Yes		Yes
Showerhead 1.75 gpm - Gas DHW	Gas		Yes	Yes
Faucet Aerator - Gas DHW	Gas		Yes	Yes
Water Heater Temp Adjustment - Gas DHW	Gas		Yes	Yes
Air Sealing - Electric Heat	Electric	Yes		Yes
Ceiling Insulation (R-11 to R-49) - Electric Heat*	Electric	No		No
Ceiling Insulation (R-19 to R-49) - Electric Heat*	Electric	No		No
R-11 Wall Insulation - Electric Heat	Electric	Yes		Yes
Rim Joist Insulation - Electric Heat*	Electric	No		No
Crawl Space Insulation - Electric Heat*	Electric	No		No
Air Sealing - Gas Heat Only*	Elec&Gas	No	No	No
Ceiling Insulation (R-11 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
Ceiling Insulation (R-19 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
R-11 Wall Insulation - Gas Heat Only	Elec&Gas	No	Yes	Yes
Rim Joist Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Crawl Space Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Ceiling Insulation (R-11 to R-49) - Gas Heat w/ AC*	Elec&Gas	Yes	No	No
Ceiling Insulation (R-19 to R-49) - Gas Heat w/ AC*	Elec&Gas	Yes	No	No
R-11 Wall Insulation - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Rim Joist Insulation - Gas Heat w/ AC*	Elec&Gas	Yes	No	No
Crawl Space Insulation - Gas Heat w/ AC*	Elec&Gas	Yes	No	No
Air Sealing - Electric Heat & Ceiling Insulation (R-11 to R-49) - Electric Heat	Electric	Yes		Yes
Air Sealing - Electric Heat & Ceiling Insulation (R-19 to R-49) - Electric Heat	Electric	Yes		Yes

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
Air Sealing - Electric Heat & R-11 Wall Insulation - Electric Heat	Electric	Yes		Yes
Air Sealing - Electric Heat & Rim Joist Insulation - Electric Heat	Electric	Yes		Yes
Air Sealing - Electric Heat & Crawl Space Insulation - Electric Heat	Electric	Yes		Yes
Air Sealing - Gas Heat Only & Ceiling Insulation (R-11 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat Only & Ceiling Insulation (R-19 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat Only & R-11 Wall Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat Only & Rim Joist Insulation - Gas Heat Only*	Elec&Gas	No	Yes	No
Air Sealing - Gas Heat Only & Crawl Space Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat w/ AC & Ceiling Insulation (R-11 to R-49) - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Air Sealing - Gas Heat w/ AC & Ceiling Insulation (R-19 to R-49) - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Air Sealing - Gas Heat w/ AC & R-11 Wall Insulation - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Air Sealing - Gas Heat w/ AC & Rim Joist Insulation - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Air Sealing - Gas Heat w/ AC & Crawl Space Insulation - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
CAC 14.5-14.9 SEER	Electric	Yes		Yes
CAC 15.0-15.9 SEER	Electric	Yes		Yes
CAC 16.0+ SEER	Electric	Yes		Yes
CAC ER 14.5-14.9 SEER	Electric	Yes		Yes
CAC ER 15.0-15.9 SEER	Electric	Yes		Yes
CAC ER 16.0+ SEER	Electric	Yes		Yes
ASHP 14.5-14.9 SEER	Electric	Yes		Yes
ASHP 15.0-15.9 SEER	Electric	Yes		Yes
ASHP 16.0+ SEER	Electric	Yes		Yes
ASHP ER 14.5-14.9 SEER	Electric	Yes		Yes
ASHP ER 15.0-15.9 SEER	Electric	Yes		Yes
ASHP ER 16.0+ SEER	Electric	Yes		Yes
BPM Blower Motor	Electric	Yes		Yes
Furnace 97% AFUE*	Gas		No	No
Furnace ER 97% AFUE*	Gas		No	No

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
Boiler 90% AFUE*	Gas		No	No
Boiler ER 90% AFUE	Gas		Yes	Yes
Ground Source Heat Pump	Electric	No		No
Programmable Thermostat - Electric Heat	Electric	Yes		Yes
Programmable Thermostat - Gas Heat	Elec&Gas	Yes	Yes	Yes
Standard CFL	Electric	Yes		Yes
CFL 43w to 14w - Post-EISA	Electric	Yes		Yes
CFL 53w to 19w - Post-EISA	Electric	Yes		Yes
CFL 72w to 23w - Post-EISA	Electric	Yes		Yes
CFL 60w to 14w globe - Pre-EISA	Electric	Yes		Yes
CFL 60w to 14w candelabra - Pre-EISA	Electric	Yes		Yes
CFL 60w to 14w reflector - Pre-EISA	Electric	Yes		Yes
Showerhead 1.75 gpm - Electric DHW	Electric	Yes		Yes
Faucet Aerator - Electric DHW	Electric	Yes		Yes
Water Heater Temp Adjustment - Electric DHW	Electric	Yes		Yes
Showerhead 1.75 gpm - Gas DHW	Gas		Yes	Yes
Faucet Aerator - Gas DHW	Gas		Yes	Yes
Water Heater Temp Adjustment - Gas DHW	Gas		Yes	Yes
Air Sealing - Electric Heat	Electric	Yes		Yes
Ceiling Insulation (R-11 to R-49) - Electric Heat	Electric	Yes		Yes
Ceiling Insulation (R-19 to R-49) - Electric Heat	Electric	No		No
R-11 Wall Insulation - Electric Heat	Electric	Yes		Yes
Rim Joist Insulation - Electric Heat	Electric	Yes		Yes
Crawl Space Insulation - Electric Heat	Electric	Yes		Yes
Basement Wall Insulation - Electric Heat*	Electric	No		No
Air Sealing - Gas Heat Only	Elec&Gas	No	Yes	Yes
Ceiling Insulation (R-11 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
Ceiling Insulation (R-19 to R-49) - Gas Heat Only*	Elec&Gas	No	No	No
R-11 Wall Insulation - Gas Heat Only	Elec&Gas	No	Yes	Yes
Rim Joist Insulation - Gas Heat Only	Elec&Gas	No	No	No
Crawl Space Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Basement Wall Insulation - Gas Heat Only*	Elec&Gas	No	No	No
Air Sealing - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Ceiling Insulation (R-11 to R-49) - Gas Heat w/ AC	Elec&Gas	Yes	No	Yes
Ceiling Insulation (R-19 to R-49) - Gas Heat w/ AC*	Elec&Gas	Yes	No	No

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
R-11 Wall Insulation - Gas Heat w/ AC	Elec&Gas	Yes	Yes	Yes
Rim Joist Insulation - Gas Heat w/ AC	Elec&Gas	Yes	No	Yes
Crawl Space Insulation - Gas Heat w/ AC	Elec&Gas	Yes	No	No
Basement Wall Insulation - Gas Heat w/ AC*	Elec&Gas	Yes	No	No
CAC 14.5+ SEER*	Electric	No		No
ER CAC 14.5+	Electric	Yes		Yes
ASHP 14.5+ SEER	Electric	Yes		Yes
ER ASHP 14.5+ SEER (Replace ASHP)	Electric	Yes		Yes
ER ASHP 14.5+ SEER (Replace Resistance)	Electric	Yes		Yes
Programmable Thermostat - Electric Heat Pump	Electric	Yes		Yes
Furnace 95% AFUE - Gas Heat*	Gas		No	No
Furnace ER 95% AFUE - Gas Heat*	Gas		No	No
Boiler 90% AFUE	Gas		Yes	Yes
Boiler ER 90% AFUE	Gas		Yes	Yes
Programmable Thermostat - Gas Heat	Elec&Gas	Yes	Yes	Yes
In-Unit Integral CFL 43w to 14w - Post-EISA	Electric	Yes		Yes
In-Unit Integral CFL 53w to 19w - Post-EISA	Electric	Yes		Yes
In-Unit Integral CFL 72w to 23w - Post-EISA	Electric	Yes		Yes
In-Unit Showerhead - Electric DHW	Electric	Yes		Yes
In-Unit Faucet Aerator - Electric DHW	Electric	Yes		Yes
In-Unit Showerhead 1.75 gpm - Gas DHW	Gas		Yes	Yes
In-Unit Faucet Aerator - Gas DHW	Gas		Yes	Yes
In-Unit Programmable Thermostat - Electric Heat	Electric	Yes		Yes
In-Unit Programmable Thermostat - Gas Heat	Elec&Gas	Yes	Yes	Yes
Programmable Thermostat - Electric Heat	Electric	Yes		Yes
Programmable Thermostat - Gas Heat	Elec&Gas	Yes	Yes	Yes
Smart Strip	Electric	No		No
ENERGY STAR Air Purifier	Electric	Yes		Yes
Heat Pump Water Heater >=2.0 COP	Electric	Yes		Yes
Gas Storage Water Heater 0.67-0.69 EF	Gas		No	No
Gas Storage Water Heater >=0.70 EF	Gas		No	No
CFL 43w to 14w - Post-EISA	Electric	Yes		Yes
Showerhead 1.75 gpm - Electric DHW	Electric	Yes		Yes
Faucet Aerator - Electric DHW	Electric	Yes		Yes
Water Heater Temp Adjustment - Electric DHW	Electric	Yes		Yes
Showerhead 1.75 gpm - Gas DHW	Gas		Yes	Yes
Faucet Aerator - Gas DHW	Gas		Yes	Yes

Residential Measures Passing the Measure-Level TRC Test:[5]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
Water Heater Temp Adjustment - Gas DHW	Gas		Yes	Yes

Table B2. Non-Residential Measures Screened for Measure-Level TRC Test

Residential Measures Passing the Measure-Level TRC Test:[6]	Fuel Type	Passing TRC – Electric Benefits	Passing TRC – Natural Gas Benefits	Passing TRC – Electric & Natural Gas Benefits (Statutory Application of TRC)
Highbay Fixture Replacement Option	Electric	Yes		Yes
T8 U-tube Lamps and Ballasts Replacing T12 U-bend Lamps and Ballasts	Electric	Yes		Yes
New, high performance T8 (32W) lamps and ballasts replacing existing T12 lamps and ballasts	Electric	Yes		Yes
Reduced wattage T8 (28W) lamps and ballasts replacing existing T12 lamps and ballasts	Electric	Yes		Yes
Ultra-low wattage T8 (25W) lamps and ballasts replacing existing T12 lamps and ballasts	Electric	Yes		Yes
T5 or reduced wattage T8 relamp and reballast upgrading an existing 32W T8*	Electric	Yes		No
2-foot T8 lamps (17W) and ballasts replacing 2-foot T12 lamps/ballasts OR replacing 4-foot T12 U-tube lamps/ballasts	Electric	Yes		Yes
New high performance T8 fixture (with or without a reflector) replacing an existing T12 fixture	Electric	Yes		Yes
New T5 fluorescent replacing an existing T12	Electric	Yes		Yes
High efficiency T5 or T8 fluorescent fixtures replacing existing T12 recessed or surface mounted troffer (prismatic, parabolic, or semi-indirect fixture)	Electric	Yes		Yes
Fixture mounted occupancy sensor for fluorescent or LED systems	Electric	Yes		Yes
Remote mounted occupancy sensors using ultrasonic or passive infrared technology	Electric	Yes		Yes
Wall switch plate mounted occupancy sensors using ultrasonic or passive infrared technology	Electric	Yes		Yes
Low wattage occupancy sensors or daylight dimming controls*	Electric	No		No
LED lamp	Electric	Yes		Yes
LED recessed down fixture (18W or less per fixture), replacing 60-100W incandescent lamp	Electric	Yes		Yes
Hard wired CFL fixtures replacing existing incandescent fixtures	Electric	Yes		Yes
Exterior Lighting *	Electric	No		No
Permanent Fixture/Lamp Removal	Electric	Yes		Yes
Glass Door LED Cooler/Freezer Lighting	Electric	Yes		Yes
Glass Door LED cooler/Freezer Lighting Controls/Sensors*	Electric	No		No

[6] Measures marked with an asterisk do not pass TRC and are included in the portfolio.

Fixture mounted occupancy sensor or daylighting controls for HID systems*	Electric	No		No
LED, T-1 or electroluminescent exit sign	Electric	Yes		Yes
LED Exit Sign Retro-fit Kit 6W or less	Electric	No		No
Interior LED Lamps and Fixtures*	Electric	Yes		No
Air Conditioner Tune-Up*	Electric	No		No
Unitary and Split AC Systems and Air Source Heat Pumps (up to 65,000 Btuh input, minimum 15 SEER)	Electric	Yes		Yes
Unitary and Split AC Systems and Air Source Heat Pumps (65,000 to 134,999 Btuh input, minimum 12 EER)	Electric	Yes		Yes
Unitary and Split AC Systems and Air Source Heat Pumps (240,000 to 759,999 Btuh input, minimum 10.8 EER/12.0 IPLV)	Electric	Yes		Yes
Unitary and Split AC Systems and Air Source Heat Pumps (760,000 or more Btuh input, minimum 10.2 EER/11.0 IPLV)	Electric	Yes		Yes
Air-Cooled Chillers (up to 150 tons)	Electric	Yes		Yes
Unitary and Split AC Systems and Air Source Heat Pumps 135,000 to 239,999 Btuh input, greater than 12.0 EER)	Electric	Yes		Yes
Air-Cooled Chillers (150 tons and larger)	Electric	Yes		Yes
PTAC/PTHP less than 65kBtuh input, new installation	Electric	Yes		Yes
Variable Frequency Drives on HVAC Motors	Electric	Yes		Yes
High Efficiency Tanked Water Heater (electric)*	Electric	No		No
High Efficiency Tankless Water Heaters (electric)*	Electric	No		No
PTAC/PTHP less than 65,000 Btuh input, replacing an existing unit	Electric	Yes		Yes
Beverage Machine Control	Electric	Yes		Yes
Snack Machine Control	Electric	No		No
Automatic Door Closer for Walk-in Freezer/Cooler (back access door) or Walk-in Cooler Door, or Walk-in Freezer Door	Electric	Yes		Yes
Auto Closer for Display Case Door: Reach-in Cooler Door or Reach-in Freezer Door	Electric	Yes		Yes
Strip Curtain on Walk-in Coolers or Freezers	Electric	Yes		Yes
Night Curtain for Open Cooler*	Electric	No		No
Glass Door Freezer (31-50 cu ft)	Electric	Yes		Yes
Glass Door Freezer (51 cu ft or more)	Electric	Yes		Yes
Anti Sweat Heater Control, Freezer	Electric	Yes		Yes
Anti Sweat Heater Control, Cooler	Electric	Yes		Yes
Evaporator Fan Controls	Electric	Yes		Yes
Solid Door Freezer (up to 15 cu ft)*	Electric	No		No
Solid Door Freezer (15-30 cu ft)	Electric	Yes		Yes
Solid Door Freezer (31-50 cu ft)	Electric	Yes		Yes

Solid Door Freezer (51 cu ft or more)	Electric	Yes		Yes
EC Motor for Walk-in Cooler	Electric	Yes		Yes
EC Motor for Walk-in Freezer	Electric	Yes		Yes
EC Motor for Reach-In Cooler	Electric	Yes		Yes
EC Motor for Reach-In Freezer	Electric	Yes		Yes
High Efficiency High Speed Exhaust/Ventilation Fans (24-35 in diameter)*	Electric	No		No
High Efficiency High Speed Exhaust/Ventilation Fans (36-47 in diameter)	Electric	Yes		Yes
High Efficiency High Speed Exhaust/Ventilation Fans (48-71 in diameter)	Electric	Yes		Yes
High Efficiency Circulation Fans (24-35 in diameter)	Electric	No		No
High Efficiency Circulation Fans (36-47 in diameter)	Electric	Yes		Yes
High Efficiency Circulation Fans (48-71 in diameter)	Electric	Yes		Yes
High Volume Low Speed (HVLS) Fans	Electric	Yes		Yes
Equipment Heater Timers	Electric	Yes		Yes
Live Stock Waterer (electrically heated)	Electric	Yes		Yes
Live Stock Waterer (energy free or ground source heat)	Electric	Yes		Yes
Guest Room Energy Management (GREM) Controls on PTAC System	Electric	Yes		Yes
Guest Room Energy Management (GREM) Controls on PTHP System	Electric	Yes		Yes
High Efficiency Ice Maker (101-200 lbs)	Electric	No		No
High Efficiency Ice Maker (201-300 lbs)	Electric	No		No
High Efficiency Ice Maker (301-400 lbs)	Electric	No		No
High Efficiency Ice Maker (401-500 lbs)	Electric	No		No
High Efficiency Ice Maker (501-1000 lbs)	Electric	No		No
High Efficiency Ice Maker (1001-1500 lbs)	Electric	No		No
High Efficiency Ice Maker (1501 and up lbs)	Electric	No		No
Electric Steamer (3 pan)	Electric	Yes		Yes
Electric Steamer (4 pan)	Electric	Yes		Yes
Electric Steamer (5 pan)	Electric	Yes		Yes
Electric Steamer (6 pan)	Electric	Yes		Yes
Hot Holding Cabinet (half size)	Electric	Yes		Yes
Hot Holding Cabinet (three-quarter size)	Electric	Yes		Yes
Hot Holding Cabinet (full size)	Electric	Yes		Yes
Electric Griddle	Electric	Yes		Yes
Dishwasher, High Temp (Includes Booster Heater)	Elec&Gas	Yes	Yes	Yes
Refrigeration Tune-up	Electric	Yes		Yes
VFD	Electric	Yes		Yes
GE UltraMax Ballast 232-MAX/L/Ultra	Electric	No		No

GE UltraMax Ballast 332-MAX/L/Ultra	Electric	No		No
GE UltraMax Ballast 432-MAX/L/Ultra	Electric	Yes		Yes
GE Ecolux Starcoat F32T8 (case of 36)	Electric	Yes		Yes
TCP 13W Eco$ave™SpringLight 1ES13	Electric	Yes		Yes
TCP 20W SpringLight 1ES20	Electric	Yes		Yes
TCP 23w Eco$ave SpringLight 1ES23	Electric	Yes		Yes
Earthmate 15w Spiral E1552AK	Electric	Yes		Yes
Earthmate 20w Spiral E2052AK	Electric	Yes		Yes
TCP 14w G25 Globe (2G2514)	Electric	Yes		Yes
Maxlite 25w MicroMax MLM25SWW	Electric	Yes		Yes
Harmony 20w Lightwiz Spiral(H20027S)	Electric	Yes		Yes
Harmony Light 25w/MaxLite 25w	Electric	Yes		Yes
Feit 23w PAR-38 EcoBulb Flood (EST23PAR38T)	Electric	Yes		Yes
GE 15w R30 Soft White Dimmable Flood (FLE 15/2/DV/R30)	Electric	Yes		Yes
GE 15w R30 Soft White Flood (FLE 15/2/R30XL)	Electric	Yes		Yes
TCP 14w R30 Reflector 803014	Electric	Yes		Yes
Cree LR6 Downlight Module LR6-27K	Electric	Yes		Yes
Cree CR6 Downlight Retrofit	Electric	Yes		Yes
Phillips 12w Endura LED A19 912E26A60)	Electric	Yes		Yes
Phillips 12w Endura LED TM Par30	Electric	Yes		Yes
Philips 17w EnduraLED PAR38	Electric	Yes		Yes
Phillips 10w Endura LED A19 L Prize	Electric	Yes		Yes
Sylvania 8W UltraLED PAR20 (LED8PAR20/DIM/830/NFL25)	Electric	Yes		Yes
TCP 14w 25 Deg Par30 LED14E26P3030KNFL	Electric	Yes		Yes
TCP 14w 40 Deg Beam Angle PAR30 LED	Electric	Yes		Yes
TCP 17w 25 Deg Par38 LED17E26P3830KNFL	Electric	Yes		Yes
TCP 17w 40 Deg Par38 LED17E26P3830KNFL	Electric	Yes		Yes
TCP 9W LED PAR20 (LED9E26P2027KFL)	Electric	Yes		Yes
TCP Exit Sign Retrofit Set 20714	Electric	Yes		Yes
TCP Red LED Exit Sign with Battery (22743D)	Electric	Yes		Yes
Hubbell White Wall Switch 120/277 1WS-ZP-3P-W	Electric	Yes		Yes
Hubbell Ivory Motion-Sensing Wall Switch 120/277 Iws-ZP-3P-I	Electric	Yes		Yes
Vending Miser VM150	Electric	Yes		Yes
Vending Miser VM151	Electric	Yes		Yes
Vending Miser EZ VM170	Electric	Yes		Yes
Vending Mizer EZ VM171	Electric	Yes		Yes

SnackMizer (Primary with Sensor) SM150	Electric	Yes		Yes
SnackMizer SM151-Secondary W/cable	Electric	Yes		Yes
SnackMizer (Primary with Sensor) SM170 Machine Mount	Electric	Yes		Yes
SnackMizer (Secondary W/Cable) SM171 Machine Mount	Electric	Yes		Yes
Gas Boiler Tune-Up	Gas		Yes	Yes
Gas Boiler Replacement (AFUE 85% min)	Gas		Yes	Yes
Gas Boiler Replacement (Thermal Eff 90%)	Gas		Yes	Yes
Gas Furnace Replacement (92% AFUE)	Gas		Yes	Yes
Gas Furnace Replacement (94% AFUE)	Gas		Yes	Yes
High Efficiency Tankless Water Heater (gas)	Gas		Yes	Yes
High Efficiency Condensing Tanked Water Heater (gas)	Gas		Yes	Yes
High Efficiency Tanked Water Heater (gas)	Gas		Yes	Yes
Gas Steamer (5 pan)	Gas		Yes	Yes
Gas Steamer (6 pan)	Gas		Yes	Yes
Gas Griddle	Gas		Yes	Yes
Gas Fryer	Gas		Yes	Yes
Steam Trap Repair / Replacement (HVAC)	Gas		Yes	Yes
Steam Trap Repair / Replacement (Industrial Process or Multi-use HVAC/Process Boilers over 7,750 hours per year operation)	Gas	Yes	Yes	Yes
Custom Electric (Includes New Const.)	Electric	Yes		Yes
Custom Gas (Includes New Const.)	Gas		Yes	Yes
Retro-commissioning Electric	Electric	Yes		Yes
Retro-commissioning Gas	Gas		Yes	Yes