Evaluation, Measurement & Verification Report

Residential Direct Install Program

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Section 1 Executive Summary

The City of Colton, in conjunction with Richard Heath & Associates, Inc. (RHA), provides eligible residential customers with energy assessments and energy efficient retrofits through the Residential Direct Installation Program. Participating customers obtain energy savings through a no cost installation of more efficient equipment.

This report has three key objectives: 1) it is a persistence study that measures the extent to which targeted measures installed through the City of Colton's Residential Direct Install Program during the 2015 fiscal year remain in place and operational; 2) to evaluate the claimable energy savings and financial impacts attributable to the measures installed as a result of the program offerings; and 3) to determine and improve the efficacy of the program.

The ex-post analysis provided in this report was conducted in June of 2016, and focuses on measures implemented from July 1, 2014 through June 30, 2015. The fiscal year 2015 reporting of energy and demand savings as determined by RHA is referred to as the ex-ante analysis for purposes of this report.

Table 1-1 summarizes the findings detailed within the report. The data used during the analysis is based upon information provided by City of Colton, RHA, and participating customers as well as observations of site verifications conducted by Alternative Energy Systems Consulting, Inc. (AESC). As shown below, 91% percent of the measures implemented as part of the program offering remain in operation at the time of this evaluation effort. However, the associated energy and demand savings associated with the measures differs significantly as a result of corrected calculation methodology and savings sources, as detailed in section 2.2.

Table 1-1 Summary of gross EM&V findings of City of Colton's Residential Direct Installation Program

Number of Customers	Ex-Ante kWh	Ex-Ante kW	Ex-Post kWh	Ex-Post kW	Program Cost	Persistence Rate
88	101,796.9	57.26	31,597.9	6.70	$32,955	91%

1.1 INTRODUCTION

The City of Colton engaged AESC to provide an Evaluation, Measurement and Verification (EM&V) of the Residential Direct Install Program for fiscal year 2015 (July 1, 2014 to June 30, 2015). The purpose for conducting EM&V of publicly owned utility (POU) programs is to assess credible grid impacts from program implementation, as well as to determine and improve the cost-effectiveness of POU energy efficiency programs.

In September of 2006 Assembly Bill 2021 (AB2021) was signed into law, which expanded the annual reporting requirements for POUs to include:

- An independent evaluation, measurement and verification of energy and demand savings produced by the POU energy efficiency programs.
- A tri-annual report highlighting annual target and potential savings of energy efficiency and demand reduction for a ten-year period.

The results provided in this EM&V effort fulfill the first requirement by providing an unbiased, independent evaluation of the Residential Direct Install Program (DIP).

1.2 DESCRIPTION OF PROGRAM

City of Colton provides the utility-driven direct install program that serves the residential customer market inclusive of single family homes, apartments, condominiums, and mobile homes. The program is directly marketed to pre-selected qualified customers to offer installation of energy efficiency measures, based on a pre-installation energy assessment completed by RHA. The initiative sought to obtain peak load reduction and energy savings through the installation of the energy efficient measures identified in Appendix A. The program offers a total of 253 various energy-efficient CFL lighting, fluorescent lighting, LED lighting, HVAC, controls and weatherization measures. Of the measures offered, only the 27 measures identified in Table 1-2 below were implemented in fiscal year (FY) 2015.

Table 1-2 Overview of measures implemented for fiscal year 2015

MEASURE DESCRIPTION	MEASURE TYPE
14W A-TYPE SCREW-IN	Lamp Replacement
14W CFL A-TYPE 2700K	Lamp Replacement
14W CFL R20 2700K	Lamp Replacement
14W SCREW-IN CFL	Lamp Replacement
18W SCREW-IN CFL	Lamp Replacement
19 W CFL R40 2700K	Lamp Replacement
23 W SCREW-IN PAR 38 CFL	Lamp Replacement
23W CFL PAR38 2700K	Lamp Replacement
23W SCREW-IN CFL	Lamp Replacement
2FT 2L F17 2ND GEN T8 W/EB	Fixture Retrofit
3FT 2L 25W 2ND GEN T8 W/EB & INTERACTIVE	Fixture Retrofit
40W CFL	Lamp Replacement
4FT 1L 32W T8 HIGH PERF W/EB	Fixture Retrofit
4FT 2L 32W T8 HIGH PERF W/EB	Fixture Retrofit
4FT 2L W/EB (NEW FIXTURE)	Fixture Replacement
4FT 4L 32W T8 HIGH PERF W/EB	Fixture Retrofit
65 WATT CFL FLOODLIGHT FIXTURE	Fixture Replacement
65 WATT CFL YARD LIGHT FIXTURE	Fixture Replacement
8FT 2L T8 W/EB	Fixture Retrofit
9 W CFL CANDELABRA 2700K	Lamp Replacement
9W CANDELABRA	Lamp Replacement
9W GLOBE CFL	Lamp Replacement
9W GLOBE CFL 2700K	Lamp Replacement
CFL 15W PAR30	Lamp Replacement
CFL 16 W R30 2700K	Lamp Replacement
CFL 16W PAR30 2700K	Lamp Replacement
TRICKLE STAR POWER STRIP DEVICE	Power Strip

As seen above, the installed measures include a variety of CFL and fluorescent lamp and fixture replacements, as well as controlled power strips. A total of 1,492 energy efficiency measures were installed during FY 2015. A measure type breakdown is provided in Table 1-3 below.

Table 1-3 Installed quantities by measure type

Lamp Replacements	Fixture Replacement	Fixture Retrofits	Power Strip
1,307	8	127	50

Section 2 EM&V Findings

2.1 PREPARATION AND DATA COLLECTION

This EM&V effort was based on several different data sources including provided program documentation, on-site data collection, and customer interviews during ex-post inspections. The data collection methodology is detailed in this section of the report.

2.1.1 Provided Program Documentation and Data Sources

To understand the initial estimates of the 2015 ex-ante kWh savings and kW demand reduction, AESC reviewed the program documentation provided by RHA and the City of Colton. This documentation included the initial vendor audits for each site, installation notes, associated work papers, calculation tools, implementation costs and program marketing material. These sources provided specific customer information, existing equipment details, installed equipment details, measure installation locations, energy and demand savings per measure, cost per measure, and an overview of all program offerings. AESC utilized all pertinent data at hand to aid in the development of accurate estimations of ex-post findings. All information regarding the in situ systems were assumed to be accurate, as reported by RHA, and operational prior to measure implementation.

2.1.2 Data Collection and Site Sampling Overview

As part of the evaluation, AESC performed site inspections and collected data for key demand (kW) and energy usage (kWh) parameters. Site inspections were used to verify that program installed measures are in place and properly installed as specified by program requirements. Information on building type and measure parameters were also recorded during the visit for comparison against any assumptions used to estimate the program ex-ante savings. Inspections were performed on a sample of projects sufficient to achieve a confidence level of 90%. AESC initially expected a sample size based on California Evaluation Framework guidelines and the following expressions:

$$n_0 = \left(\frac{1.645cv}{D}\right)^2; \quad n = \frac{n_0}{1 + \frac{n_0}{N}}$$

Where:

n_o = unadjusted sample size

n = adjusted sample size based on finite population

cv = coefficient of variation

D = Desired precision

N = Population Size

For ease of use, regardless of the error bound level (10%, 15%, 25%, or other), the Framework recommends that all uncertainty calculations be expressed at 90% confidence, to facilitate the calculation of portfolio-level savings and uncertainties.

Establishing evaluation priorities and methods is an exercise in balancing the available evaluation budgets with meeting the evaluation goals for each program without placing too much burden on programs with limited resources. Applying evaluation techniques and choosing sample sizes that are appropriate given the program size, budget, and risk to the portfolio can maintain this balance.

The evaluation framework suggests that a *cv* assumption of 0.5 should be used in conjunction with the 90/10 assumption. Based on the stated program participation levels and an expected sample accuracy of 85%, AESC initially anticipated conducting 16 site inspections.

2.1.3 Inspection Findings

Site inspections were performed during the period from June 23, 2016 through June 30, 2016. As anticipated, the site inspections yielded a high level of accuracy of 91%, which exceeded the expectation of 85%. Accuracy was evaluated for each sample site based on the confirmed measure quantity and measure type as compared to the program documentation. Utilizing the above methodology, a total of nine site inspections were needed to confirm a statistically viable sample size at a program level population. As part of this effort, AESC conducted a total of ten

site inspections. Due to cost and customer accessibility constraints, only 21 of the 27 implemented measures FY 2015 were observed as part of this study. However, due to the high level of measure persistence observed, AESC believes the sample is appropriate in determining program level impacts.

The below graph depicts the persistence of implemented measures and demonstrates the high level of accuracy observed during the site inspections.

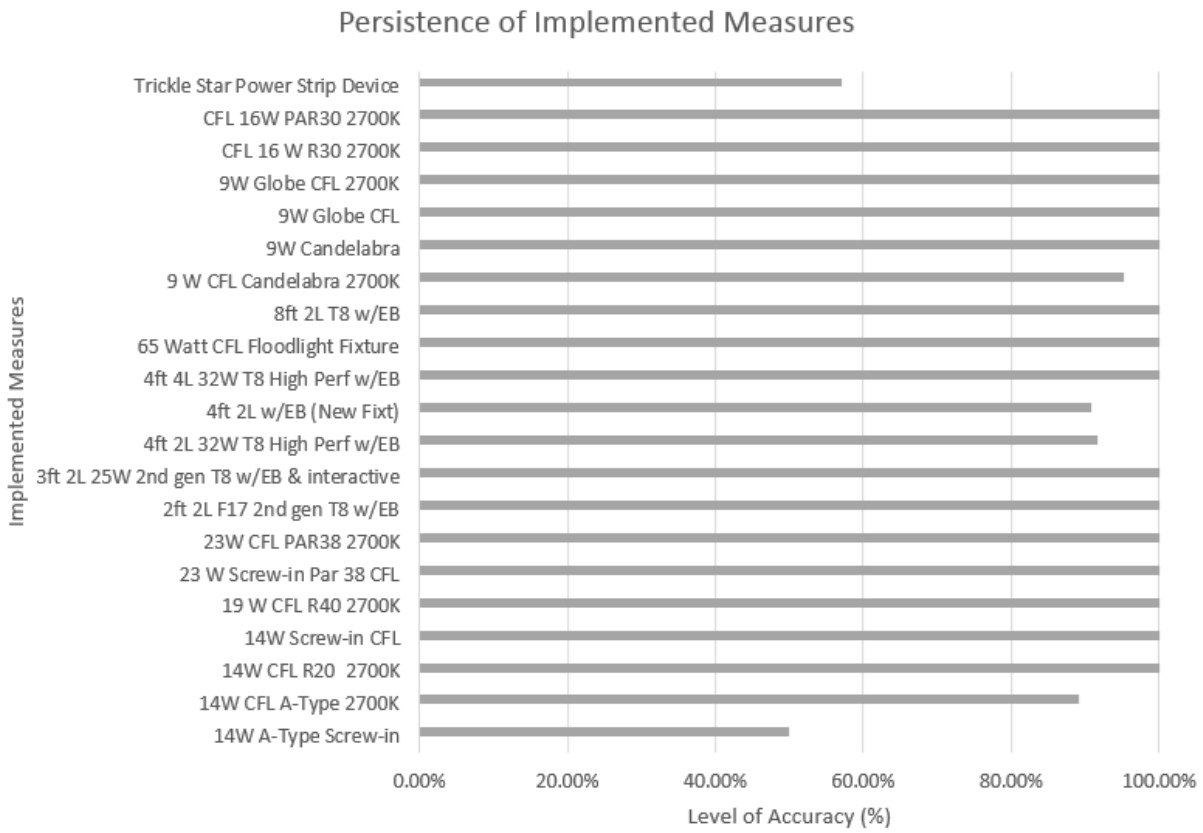


Figure 1 Accuracy of implemented measures as observed during sample site inspections

2.1.4 Verified Measure Equipment

During the site visits AESC verified the quantity and type of energy-efficiency measure that remained installed and operational. As stated previously, data was collected for a total of ten participating residences and encompassed 21 of the 27 implemented measures. Table 2-1 illustrates the quantity of each measure verified for the sample site population. Based on customer interviews, the reasons offered for missing equipment included the installed lamps had already burned out and measure equipment was removed and not replaced.

The baseline equipment type was assumed as accurate from the reports provided by RHA, as AESC was not able to verify baseline equipment. All baseline equipment is presumed to have been operating and fully functional prior to replacement.

Table 2-1 Comparison of inspection findings to claimed program installations

MEASURE DESCRIPTION	TOTAL INSTALLED	SAMPLE TOTAL	SAMPLE ACTUAL
14W A-TYPE SCREW-IN	67	2	1
14W CFL A-TYPE 2700K	617	46	41
14W CFL R20 2700K	8	2	2
14W SCREW-IN CFL	3	1	1
19 W CFL R40 2700K	4	2	2
23 W SCREW-IN PAR 38 CFL	25	5	5
23W CFL PAR38 2700K	15	1	1
2FT 2L F17 2ND GEN T8 W/EB	1	1	1
3FT 2L 25W 2ND GEN T8 W/EB & INTERACTIVE	2.5	2	2
4FT 2L 32W T8 HIGH PERF W/EB	94	12	11
4FT 2L W/EB (NEW FIXT)	17	11	10
4FT 4L 32W T8 HIGH PERF W/EB	5	1	1
65 WATT CFL FLOODLIGHT FIXTURE	2	2	2
8FT 2L T8 W/EB	1	1	1
9 W CFL CANDELABRA 2700K	268	21	20
9W CANDELABRA	16	2	2
9W GLOBE CFL	68	4	4
9W GLOBE CFL 2700K	148	9	9
CFL 16 W R30 2700K	9	1	1
CFL 16W PAR30 2700K	12	7	7
TRICKLE STAR POWER STRIP DEVICE	50	7	4

2.1.5 Operating Characteristics

While on site AESC conducted interviews with the participating customers to gauge the general operation of the installed equipment. Responses generally reflected that the lighting equipment is used on an as-needed basis, which is typical of residential applications.

2.2 GROSS SAVINGS ESTIMATION

The ex-ante savings, as determine by RHA, for lighting measures were developed using work paper SCPPALTG 101 and site specific operating hours. The work paper provides data for wattage of commonly encountered base case lighting fixtures, as well as interactive effects for non-residential buildings. The actual calculations per customer site were not provided. Additionally, the custom hours used to develop the associated energy savings were based on customer interviews, but were not available during the course of AESC's review.

Ex-ante savings for Trickle Star controlled strips were calculated on a per site basis using the vendor's supplied proprietary calculator. However, as the proprietary software is a locked tool, it could not be validated for technical accuracy and reasonableness.

The ex-post savings, as quantified by AESC, represent the energy savings that persisted up to one and a half years after the installation of energy efficient measures by participants in the 2015 Residential DIP. AESC used custom Excel spreadsheet calculations to model the savings for each residence by measure. Analysis of the energy savings associated with lighting measures are based on the following factors: (1) quantity of equipment, (2) input wattage of existing equipment, (3) input wattage of proposed equipment, (4) operating hours as determined by DEER 2013, and (5) interactive effects and coincident diversity factor determined from DEER 2016[1]. Ex-post energy savings associated with the controlled power strip installations are consistent with SCE work paper SCE13CS002.

[1] Interactive effects accounts for energy efficiency lighting measures reducing the internal heat gain of air-conditioned spaces, and is only applicable for interior equipment. This reduction in heat gain reduces the cooling energy consumption and increases heating energy consumption. Coincident diversity factor is a measure of the probability that a particular piece of equipment will turn on coincidentally to another piece of equipment.

The general formulas for calculating the annual energy savings are noted below:

Interior Lighting Measures:

$$kWh_{yr} = Quantity * \left(\frac{Watts_{Existing}}{1000} - \frac{Watts_{Installed}}{1000}\right) * Interactive\ Effect$$

Exterior Lighting Measures:

$$kWh_{yr} = Quantity * \left(\frac{Watts_{Existing}}{1000} - \frac{Watts_{Installed}}{1000}\right)$$

Controlled Power Strips:

$$EES = H_{OFF} * [(STB * kW_{STB}) + (OFF * kW_{OFF})] * P_{CD} * P_{PH}$$

Where,

EES	=	average energy savings per peripheral per home
H_{OFF}	=	annual hours controlling device is not used
STB	=	percentage of time peripheral is in standby or left on and not used
W_{STB}	=	power draw of peripheral while in standby
OFF	=	percentage time peripheral is turned off
W_{OFF}	=	power draw of peripheral while it is turned off
P_{CD}	=	percentage of time peripheral is used with a control device
P_{PH}	=	percentage of homes that have the peripheral in the same room as the control device

The 2016 ex-post demand reduction was calculated in a similar fashion. The on-peak reduction was attributed only to sites and measures that experienced operation during the timeframe between 2:00 pm and 5:00 pm during a three-day heat storm that includes the highest annual temperature. Exterior lighting and controlled power strips do not have associated demand savings. The general equations for calculating peak demand reduction are as follows:

Interior Lighting Measures:

$$kW = Quantity * \left(\frac{Watts_{Existing}}{1000} - \frac{Watts_{Installed}}{1000}\right) * Interactive\ Effects * CDF$$

2.3 EX-POST SAVINGS CALCULATION

The 2016 net ex-post energy savings estimates for the FY 2015 Residential DIP were calculated on a program level. Ultimately the desired confidence of 90% was obtained by inspecting a total of ten sites.

As an alternative to actual on/off measurements and operating profiles for lighting measures, AESC deemed it appropriate to utilize standardized values found in the California Municipal Utilities Associate Technical Reference Manual (TRM) dated May 5, 2014. The values, based on a DEER 2013 study, stipulate 541 annual hours for interior lights, and 1,249 annual hours for exterior lights. The installed controlled power strips are used 24 hours per day, 7 days per week, year-round.

Power measurements were not taken as part of this evaluation study. Lamp and fixture wattages for the implemented measures were stipulated based on the installation reports. The wattages provided by RHA were deemed appropriate for use in the EM&V effort. All lighting measures are assumed to operate at a constant load, with little to no fluctuation.

Controlled power strip wattage varies as determined by internal logic, and is based heavily on customer utilization of plug loads. As vendor supplied energy savings calculators are used for marketing purposes and can provide overly optimistic results, without the ability to properly evaluate the tool AESC deemed it more appropriate to utilize standardized values found in the California Municipal Utilities Associate Technical Reference Manual (TRM) dated May 5, 2014. These values and associated loads are based on SCE work paper SCE13CS002.

Ex-ante calculations were determined by RHA and provided by the City of Colton for use in the EM&V effort. Table 2-2 represents the gross ex-post calculated savings for the sites in which data was collected.

Table 2-2 Overview of gross ex-ante vs. ex-post savings analysis for inspected sites

Number of Sites	Ex-Ante kWh	Ex-Ante kW	Ex-Post kWh	Ex-Post kW	Persistence Rate
10	10,399.1	5.48	3,013.8	0.71	91%

Table 2-3 shows the projected impact on the FY2015 program by applying the persistency rates from Table 2-2 to the overall calculations.

Table 2-3 Overview of gross ex-ante vs. ex-post savings analysis for overall program.

Number of Sites	Ex-Ante kWh	Ex-Ante kW	Ex-Post kWh	Ex-Post kW	Persistence Rate
88	101,796.9	57.26	31,597.9	6.70	91%

The significant difference between the reported energy and demand savings determined in the ex-ante and ex-post analysis was determined as follows:

- Calculation methodology for lighting applications used in the ex-ante savings analysis was based on work paper values, which were determined to have non-residential applications.
- AESC performed site specific calculations, as there was enough data present to complete such a task.
- AESC applied a coincident diversity factor to all demand savings, which is approximately 4% for residential applications based on DEER 2016 data for Residential building types in climate zone 10.
- Ex-ante calculations utilized a locked, proprietary software to estimate energy savings associated with the installation of the controlled power strips.
- AESC utilized applicable work papers in lieu of custom calculations for the controlled power strips.

Table 2-4 presents an overview of the net ex-ante vs. ex-post savings analysis for the overall program, assuming a net-to-gross of 0.8.

Table 2-4 Overview of net ex-ante vs. ex-post savings analysis for overall program.

Number of Sites	Ex-Ante kWh	Ex-Ante kW	Ex-Post kWh	Ex-Post kW	Persistence Rate
88	81,437.5	45.81	25,278.3	5.36	91%

2.4 PROGRAM COST EFFECTIVENESS

The two cost effectiveness tests used for California POU energy efficiency programs are the Total Resource Cost (TRC)[2] and the Program Administrator Cost (PAC)[3]. The specific calculations and definitions of benefits and costs for each test are detailed in the Standard Practice Manual.

The total program cost associated with the Residential DIP, is $32,955.00, which is not inclusive of any program management costs. The weighted average estimated useful life (EUL) for the program is 4.4 years, with an expected electric real lifecycle avoided cost of $0.15/kWh. The net to gross ratio (NTGR) is one minus the fraction of free riders in the program. NTGR attempts to establish the energy and demand savings induced by the utility program. The ex-post gross load impact savings need to be "net" of what would have occurred in the absence of the program. There are three methods that can be used to establish the NTGR for a program: i. use of established NTGR accepted by California utilities (especially suitable for deemed programs), ii. survey based methods and iii. econometric methods of estimating free ridership. NTG was not evaluated as part of this study. The existing NTGR value of 0.8 was utilized and was determined to be appropriate, given that the program is a deemed rebate type of program with a homogeneous population. The TRC and PAC values are calculated using the expressions below:

[2] The TRC Test includes the benefits (such as avoided costs) resulting from the program divided by the net costs (participant and program) where a TRC test result greater than 1.0 indicates that the program is cost effective. Avoided costs are the savings associated with not having to produce and deliver the saved energy.

[3] The PAC Test is similar to the TRC Test, but only the program costs are included in the denominator.

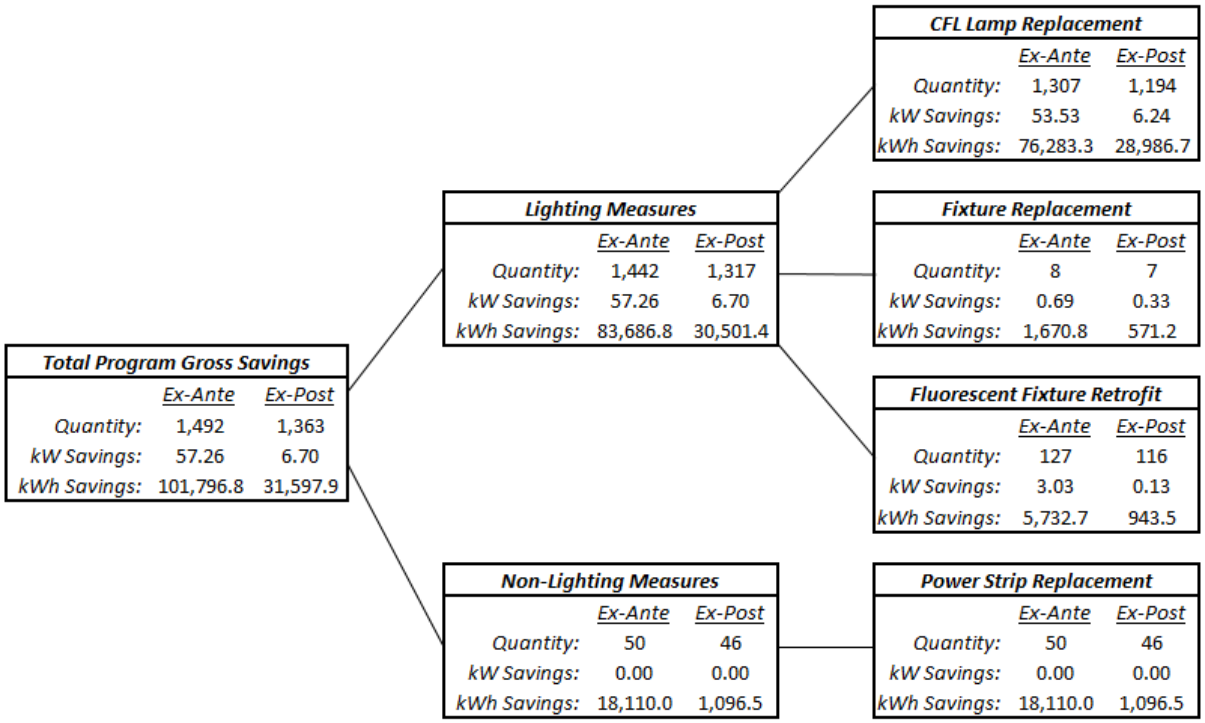
$$PAC = \frac{Lifecycle\ Avoided\ Cost}{\frac{Utility\ Cost}{Annual\ kWh\ Savings * NTG}}$$

$$TRC = \frac{Avoided\ Cost}{(Implementation\ Cost * NTG) + (Utility\ Cost * (1 - NTG)}$$

Therefore, the calculated PAC and TRC are 0.51 and 0.51, respectively. As the program management costs are not included in this calculations, the actual values may vary.

Section 3 Conclusions and Recommendations

Based on the EM&V performed for the City of Colton's FY 2015 Residential Direct Install Program, AESC concluded that the overall persistency rate for the program is approximately 91%, with a claimable gross ex-post energy savings of 31,597.9 kWh and 7.34 kW, and a net ex-post energy savings of 25,278.3 kWh and 5.87 kW. A key metric established as part of this effort is that a high percentage of implemented measures remained in operation nearly two years after installation, resulting in a high program persistency. However, the program has a relatively low Gross Realization Rate (GRR), the ratio of predicted and actual energy usage, of 31.0% for kWh and 11.7% for kW. The associated ex-post energy and demand savings associated with the measures differ significantly from the ex-ante claims as a result of corrected calculation methodologies and savings sources, as detailed in Section 2.2. There are four main factors that account for the reduced overall program performance: (1) differing equipment counts, (2) usage of standardized operating hours, (3) inclusion of lighting coincident diversity factors, and (4) site specific calculation methodology for lighting measures.



Moving forward, the City of Colton should consider the following recommendations in an effort to improve their Residential Direct Installation Program's realization rate:

- Utilize applicable work papers in lieu of custom calculations for the controlled power strips measure.
- If custom calculations are to be used for lighting measures, operating hours should reflect the DEER estimated operating hours of 541 for interior applications and 1,249 for exterior applications
- If work papers are to be used for lighting measures, work papers should reflect the appropriate residential market sector, which should take into consideration applicable interactive effects for the market sector and climate zone. In the event that work papers will be modified to reflect site specific operating hours per residence, accurate data should be gathered and stored in the program database for future EM&V efforts.
- Apply a coincident diversity factor to all demand savings, where appropriate, which is approximately 4% for residential applications.

Section 4 Appendix A

Complete Program Offering

Measure Code	INSTALLED MEASURE
LGT362	4ft 4L 32W T8 High Perf w/EB
LGT367	4ft 4L 32W T8 High Perf w/2EB & interactive effects
LGT373	4ft 3L 32W T8 High Perf w/EB
LGT376	4ft 3L 32WT8 High Perf w/2EB & interactive effects
LGT377	4ft 2L w/EB (New Fixt)
LGT383	4ft 2L w/EB (Retro)
LGT381	4ft 2L T8 U6 w/EB
LGT393	4ft 1L 32W T8 High Perf w/EB
LGT401	8ft 4L T8 High Perf w/2EB
LGT403	8ft 2L T8 w/EB (New Fixt) (use for HO's pricing)
LGT404	8ft 4L 28-32W w/EB & retro kit
LGT405	8ft 2L T8 w/EB
LGT406	8ft 2L 28-32W w/EB & retro kit
LGT407	8ft 1L T8 w/EB
LGT408	6ft 4L 28-32W w/EB & retro kit
LGT409	6ft 2L 28-32W w/EB & retro kit
LGT410	3ft 2L 25W 2nd gen T8 w/EB
LGT412	3ft 1L 25W 2nd gen T8 w/EB
LGT415	3ft 4L 25W 2nd gen T8 w/EB (6-ft conv kit)
LGT416	2ft 4L F17 2nd gen T8 w/EB
LGT420	2ft 2L 32T8 U6 w/EB
LGT422	2ft 2L F17 2nd gen T8 w/EB
LGT425	2ft 1L F17 2nd gen T8 w/EB
LGT426	4ft tube guard
LGT427	8ft tube guard
LGT623	Reduced Wattage 4 foot Lamp used with Existing Ballast (25W, 28W)
LGT449	20W Circline Replacement to CFL Fixture
	7W-13W CFL Fixture+Lamp

	14W-24W CFL Fixture+Lamp
LGT450	22W Circline Replacement to CFL Fixture
	16W CFL Fixture+Lamp
	18W CFL Fixture+Lamp
LGT451	30W Circline Replacement to CFL Fixture
	23W CFL Fixture+Lamp
	24W CFL Fixture+Lamp
	26W CFL Fixture+Lamp
	30W CFL Fxture
	T8 Lamps Sales
LGT 347	T-8 Bulbs Only
	8ft T8 5000K
	4ft T8 5000K
LGT314	Special Lamps
	8ft T8 4100K
	4ft T8 4100K
	4ft T8 to Daylight Harvesting Ballast with Sensor
LGT451-B (LGT451 in database)	4ft 2L T8 to 2L T8 Daylight Harvesting Ballast with sensor
LGT452	4ft 3L T8 to 3L T8 Daylight Harvesting Ballast with sensor
LGT453	4ft 4L T8 to 4L T8 Daylight Harvesting Ballast with sensor
	4ft F25T8 retrofit with Anti-Striation Ballast
LGT457	4ft 4 Lamp F25T8 Retrofit
LGT458	4ft 3 Lamp F25T8 Retrofit
LGT459	4ft 2 Lamp F25T8 Retrofit
LGT460	4ft 1 Lamp F25T8 Retrofit
	4ft F28T8 retrofit / Delamping
LGT461	4ft 3 Lamp F28T8 Retrofit
LGT462	4ft 2 Lamp F28T8 Retrofit
	4ft F28T8 New Fixture / Delamping
LGT463	4ft 3 Lamp F28T8 Fixture
LGT464	4ft 2 Lamp F28T8 Fixture
LGT465	4ft 1 Lamp T8 HO Fixture

LGT466	4ft 1 Lamp T5 HO Fixture
	4ft F25T8 retrofit / Delamping with Anti-Striation Ballast
LGT610	4ft 3 Lamp F25T8 Retrofit
LGT611	4ft 2 Lamp F25T8 Retrofit
LGT612	4ft 1 Lamp F25T8 Retrofit
	4ft F25T8 New Fixture/Delamping with Anti-Striation Ballast
LGT467	4ft 3 Lamp F25T8 Fixture
LGT468	4ft 2 Lamp F25T8 Fixture
LGT469	4ft 1 Lamp T8 HO Fixture
LGT470	4ft 1 Lamp T5 HO Fixture
	8ft T12 retrofit to Two-4ft T8 Tamdon
LGT471	4ft 2 Lamp T8 retrofit
LGT472	4ft 2 Lamp T8 HO Fixture
	HID Replacement to Linear Florescent Fixture
LGT473	4ft 4 Lamp T8 High Bay Fixture
LGT474	4ft 2 Lamp T5HO High Bay Fixture
LGT475	4ft 6 Lamp T8 High Bay Fixture
LGT476	4ft 4 Lamp T5HO High Bay Fixture
LGT477	4ft 8 Lamp T8 High Bay Fixture
LGT478	4ft 6 Lamp T5HO High Bay Fixture
LGT479	4ft 10 Lamp T8 High Bay Fixture
LGT480	4ft 8 Lamp T5HO High Bay Fixture
	8ft T12 HO Exterior Retrofit to 8ft T8 HO
LGT481	8ft 1 Lamp T8HO Exterior Retrofit
LGT482	8ft 2 Lamp T8HO Exterior Retrofit
LGT483	8ft 3 Lamp T8HO Exterior Retrofit
LGT484	8ft 4 Lamp T8HO Exterior Retrofit
LGT485	8ft 6 Lamp T8HO Exterior Retrofit
CFL	
LGT428	CFL 5-13W
	5 W Screw-n CFL
	7 W Screw-in CFL
	9 W Screw-in CFL

	9 W Globe CFL
	11 W Screw-in CFL
	13W/60W Spiral - Indoor CFL
LGT429	CFL 14-26W
	14 W A-Type Screw-in
	14W Screw-in CFL
	15 W Globe
	23W Screw-in CFL
LGT430	>= 27W
	l 27W/100W Spiral Indoor CFL
LGT432	CFL 11W R20
	9 W R20 Flood Type
	11 W R20 Flood Type R20 2700K
	11 W R20 Flood Type R20 4000K
LGT433	CFL 15W R30
	CFL Indoor Flood, 14 W R20
	CFL Indoor Flood, 15 W R30 2700K
	CFL Indoor Flood, 15 W R30 3200K
	CFL Indoor Flood, 15 W R30 4100K
	CFL Indoor Flood, 15 W R30 6400K
LGT434	CFL 20W R40
	19 W Screw-in Par 38 CFL
	20 W Screw-in Par 38 CFL
	CFL Indoor Flood, 20 W R40 2700K
	CFL Indoor Flood, 20 W R30 3200K
LGT435	CFL 25W R40
	CFL Indoor Flood, 25 W R30 2700K
	CFL Indoor Flood, 25 W R30 3200K
	CFL Indoor Flood, 25 W R30 4000K
	CFL Indoor Flood, 25 W R30 6400K
LGT436	CFL 27W Wall Fixture
LGT437	CFL 65W Floodlight Fixture
LGT438	CFL 65W Yardlight Fixture

	PAR16 / MR16 Incandescent to CFL 9-11 W PAR16
LGT558	9W PAR16
LGT559	11W PAR16
	PAR20 Incandescent to CFL 9-14W PAR20
LGT560	9W PAR20
LGT561	11W PAR20
LGT562	14W PAR20
	PAR30 Incandescent to CFL 15-19W PAR30
LGT563	15W PAR30
LGT564	19W PAR30
	PAR38 CFL 19-23W PAR38
LGT565	19W PAR38
LGT566	20W PAR38
LGT567	23W PAR38
	PAR16 / MR16 Incandescent to CMH PAR16
LGT568	20W PAR16
	PAR20 Incandescent to CMH PAR20
LGT569	20W PAR20
LGT570	39W PAR20
	PAR30 Incandescent to CMH PAR30
LGT571	20W PAR30
LGT572	35W PAR30
LGT573	70W PAR30
	HID Fixture Replacement to CFL
LGT574	27W CFL Spiral 2700K 120V Retrofit
LGT575	45W CFL Spiral 3200K 120V Retrofit
LGT576	45W CFL Spiral 5500K 120V Retrofit
LGT577	55W CFL Spiral 3200K 120V Retrofit
LGT578	55W CFL Spiral 5500K 120V Retrofit
LGT579	60W CFL Spiral 5500K 120V Retrofit
LGT580	65W CFL Spiral 3200K 120V Retrofit
LGT581	65W CFL Spiral 5500K 120V Retrofit
	HID Wall pack Replacement to CFL Wall pack

LGT590	42W CFL Wall pack Fixture
LGT591	100W CFL Wall pack Fixture
	Chandelier Incandescent replacement to CFL Chandelier
LGT596	2W CFL Tear Drop Candelabra
LGT597	14W CFL Tear Drop Candelabra
LGT598	5W CFL Flame Tip Bulb
LGT617	Cold Cathode CFL (1-6W)
LGT617a	Cold Cathode CFL (7-15W)
LED LIGHTING	
	4ft LED Retrofit
LGT486	4ft 4L LED Retrofit 76W
LGT486a	4ft 4L LED Retrofit plugin play
LGT487	4ft 3L LED Retrofit 57W
LGT487a	4ft 3L LED Retrofit plugin play
LGT488	4ft 2L LED Retrofit 38W
LGT488a	4ft 2L LED Retrofit plugin play
LGT489	4ft 1L LED Retrofit 19W
LGT489a	4ft 1L LED Retrofit plugin play
LGT489_2b	4ft 1L (2pc) LED Retrofit
LGT486_2a_1	4ft 1L 4ft + 1L 2ft (3pc) LED Retrofit
LGT486_2a	4ft 2L (4pc) LED Retrofit
LGT486_2d	4ft 2L (4pc) LED High Bay Retrofit
LGT486_2c	4ft 3L (6pc) LED Retrofit
LGT-LED-09	4ft 4L (8pc) LED Retrofit
	4ft LED Retrofit / Delamping
LGT490	4ft 3L LED Retrofit 57W
LGT491	4ft 2L LED Retrofit 38W
LGT492	4ft 1L LED Retrofit 38W
	4ft LED New Fixture / Delamping
LGT493	4ft 3L LED Fixture 57W
LGT494	4ft 2L LED Fixture 38W
LGT495	4ft 1L LED Fixture 38W
	Chandelier Incandescent replacement to LED Chandelier

LGT496	3W LED Tear Drop Dimmable Candelabra
LGT497	3W LED Flame Tip Dimmable Candelabra
	Incandescent Replacement to LED
LGT498	7W A-type LED
LGT499	8W A-type LED
LGT500	9W A-type LED
LGT501	10W A-type LED
LGT502	11W A-type LED
LGT503	12W A-type LED
LGT504	7W Globe-Type LED
LGT505	8W Globe-Type LED
LGT506	9W Globe-Type LED
LGT507	10W Globe-Type LED
LGT508	11W Globe-Type LED
LGT509	12W Globe-Type LED
	PAR16 / MR16 incandescent to LED 2-6 W PAR16 / MR16
LGT539	2W PAR16
LGT540	3W PAR16
LGT541	4W PAR16
LGT542	6W PAR16
LGT542a	10W PAR16
	PAR20 Incandescent to LED 3-9W PAR20
LGT543	3W PAR20
LGT544	4W PAR20
LGT545	6W PAR20
LGT546	8W PAR20
	PAR30 Incandescent to LED 7-19W PAR30
LGT547	7W PAR30
LGT548	10W PAR30
LGT549	11W PAR30
LGT550	13W PAR30
LGT551	14W PAR30
LGT552	15W PAR30

LGT553	19W PAR30
	PAR38 Incandescent to LED 16-23W PAR38
LGT554	16W PAR38
LGT555	20W PAR38
LGT556	23W PAR38
	HID Replacement to LED
LGT510	40W LED Wall Pack 5000K
LGT511	60W LED Wall Pack 5000K
LGT512	90W LED Wall Pack 5000K
	Flood Lights
LGT515_1	30W LED Flood Light
LGT515_2	50W LED Flood Light
LGT515_3	150W LED Flood Light
T-STATS	
HVACS207	7 Day Programmable Thermostat
	5 Day Programmable Thermostat
	7 DayThermostat
	7 DayThermostat PSP722E
HVACS208	All in One Thermostat
HVACS209	Reprogramming/Education Existing Programmable Thermostats
HVACS210	Thermostat Lock Box
WEATHERIZATION	
WTHRS005	Seal Doors - Mohair per Door
WTHRS007	Door Sweeps per Door
WTHRS008	Caulking
WTHRS009	Expandable Foam
WTHRS006	Seal Windows - Silicon per Window
WTHRS010	External Water Heater Insulation (=> 50 Gal Tank) and piping insulation (up to 20ft)
WTHRS010a	Water Heater Tank and Pipe Insulation
SENSORS/TIMERS	
LGT445	Wall sensor
LGT447	Lighting timers

LGT448	Lighting dimmers sliding
APPLS016	Appliance Timer 120V 10A
LGT599	Photo Cell Sensor
LGT600	Ceiling Mount Sensor
VDM06	Trickle Star Device
T24S05	Daylight Sensor
T24S08	Dual-Circuit Occupancy Sensor Switch
T24S09	Outdoor photocell sensor
T24S10	Astronomical Time Clock With Holiday Programing
T24S11	Outdoor Motion Sensor
T24S12	Indoor Time Clock
MISCELLANEOUS	
LABORS06	High Ceiling charge per fixture
LABORS07	Scissor Lift per day