Impact and Process Evaluations of Energy Efficiency Programs

P.Y. 2010 - 2011

Prepared for:
Imperial Irrigation District

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Final Report: May 30, 2012

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Executive Summary

This report presents the results of the impact and process evaluations of the custom and standard incentive components of the energy efficiency programs that Imperial Irrigation District (IID) offers to its residential and commercial customers. This report presents results for activity during the years 2010 and 2011.

The main features of the approach used for the evaluation are as follows:

- Data for the study were collected through review of program materials, on-site inspections, end-use metering, interviews with IID staff members, program implementation contractor staff members, and participating customers and contractors.
- Gross savings were estimated using proven techniques, including analytical desk reviews, industry standard engineering calculations and verification of computer simulations developed by program contractors to determine energy savings.
- For Custom Incentive components, Custom Energy Solutions Program (CESP) and New Construction Energy Efficiency Program (NCEEP), on-site visits were used to collect data for savings impact calculations, to verify measure installation, and to determine measure operating parameters. Facility staff were interviewed to determine the operating hours of the installed system and to locate any additional benefits or shortcomings with the installed system. When necessary, lighting equipment, HVAC equipment, or motors/VFDs were monitored in order to obtain accurate information on hours of operation. Based on data provided by IID a sample design was developed for on-site data collection. Samples were drawn for the Custom Incentive components that provide savings estimates for each component with ±10% precision at the 90% confidence level. Actual precision is 9.90%. The 15 projects for which including on-site measurements and verification data were collected or verification and/or custom energy savings were calculated accounts for approximately 65% of Custom Incentive expected kWh.
- Overall, 2010 programs saved 20,602,063 kWh and 4,912.99 kW and 2011 programs saved 12,012,947 kWh and 2,448.30 kW. This resulted in realization rates are 97% and 104% respectively. Total savings is 32,615,010 kWh and 7,361.29 kW, resulting in a 100% realization rate.

Table ES-1 Summary of total kWh savings for all energy efficiency programs in 2010 and 2011.

Program Year	*Expected kWh Savings*	*Realized Gross kWh Savings*	*Gross Realization Rate*	*Realized Net kWh Savings*	*kW Savings*
2010	21,146,842	20,602,063	97%	16,481,651	4,912.99
2011	11,595,374*	12,012,947	104%	10,649,553	2,448.30
Total	**32,742,216**	**32,615,010**	**100%**	**27,131,204**	**7,361.29**

*This number has been modified at IID's request. Please refer to section 3.1.1

Table ES-2 Summary of kWh savings for all energy efficiency programs by year, by program.

Program Component	*Expected kWh Savings*	*Realized Gross kWh Savings*	*Gross Realization Rate*	*Realized Net kWh Savings*	*Net to Gross Ratio*	*kW Reduction*
CESP	8,603,215	7,564,479	88%	6,051,584	80%	1,443.55
NCEEP	429,738	377,852	88%	302,282	80%	500.72
PEP	51,902	51,902	100%	41,522	80%	
Audits	169,741	109,712	63%	87,769	80%	67.67
CFL Distribution	126,215	141,240	112%	112,992	80%	145.41
Energy Rewards Rebates	2,260,723	2,783,555	123%	2,226,844	80%	14.89
LIEE	313,085	313,085	100%	250,468	80%	149.80
QAMP	9,192,223	9,192,223	100%	7,353,779	80%	2,590.95
2010 Total	**21,146,842**	**20,602,063**	**97%**	**16,481,650**	**80%**	**4,912.99**
CESP	3,530,106*	3,103,888	88%	2,576,227	83%	788.54
NCEEP	495,257*	435,461	88%	365,787	84%	141.99
AC Trade-Up	581,624	581,624	100%	494,380	85%	245.21
Audits	372,785	359,134	96%	308,855	86%	
CFL Exchange	144,158	135,753	94%	122,178	90%	172.09
Energy Rewards Rebates & SiS	2,587,787	3,496,860	135%	3,077,237	88%	122.22
Holiday Lights Exchange	3,075	3,272	106%	2,781	85%	7.12
LIEE	1,662	1,662	100%	1,578	95%	1.11
Lighting Retrofit: IID Facilities	222,690	312,268	140%	296,655	95%	64.35
Open for Business Direct Install	3,064,543	3,010,361	98%	2,859,843	95%	697.07
Vending Misers	472,428	472,428	100%	448,807	95%	0.00
Weatherization	119,259	100,237	84%	95,225	95%	73.30
2011 Total	**11,595,374**	**12,012,947**	**102%**	**10,649,553**	**95%**	**2,448.30**
Total	**32,742,216**	**32,615,010**	**99%**	**27,131,203**	**95%**	**7,361.29**

*These numbers have been modified at IID's request. Please refer to section 3.1.1

- Surveys of customer decision makers provided the information for the net-to-gross analysis and process evaluation. A total of 39 customer decision makers were interviewed.

Table ES-3 Sample sizes for data collection efforts

Type of Data Collected	*Sample Size*
Project Custom Analysis	15
Project On-Site Measurement and Verification	7
Customer Decision Maker Survey	39
IID Staff Member and Contractor Survey	7

- Relevant IID staff members and contractors were interviewed to provide information for the process evaluation.

1. Introduction

This report presents the results of the impact evaluations of the custom and standard incentives components of the energy efficiency programs that Imperial Irrigation District offers its residential and non-residential customers. This report presents results for the custom incentive and standard incentive components of the program for activity during 2010 and 2011.

1.1 Overview of Evaluation Approach

The overall objective for the impact evaluation of the custom and standard components of the energy efficiency programs was to determine the gross and net energy savings (kWh) and demand (kW) reductions resulting from program custom and standard projects during the periods of 2010 and 2011.

The approach for the impact evaluation had the following main features.

- Available documentation (e.g., audit reports, savings calculation work papers, etc.) was reviewed for a sample of projects, with particular attention given to the calculation procedures and documentation for savings estimates.
- An analytical desk review was performed on program measures to verify gross savings estimates.
- On-site data collection was conducted for a sample of custom projects to provide the information needed for estimating savings and demand reductions. Monitoring was also conducted at some sites to obtain more accurate information on the hours of operation for lighting, HVAC equipment, and motors/VFDs.
- Gross savings were estimated using proven techniques:
  - Analysis of lighting savings was accomplished using ADM's custom-designed lighting evaluation model with system parameters (fixture wattage, operating characteristics, etc.) based on information on operating parameters collected on-site and, if appropriate, industry standards.
  - For HVAC measures, the original analyses used to calculate the expected savings were reviewed and the operating and structural parameters of the analysis were verified. For custom measures or relatively more complex measures, simulations with the DOE-2 energy analysis model were used to develop estimates of energy use and savings from the installed measures.
- A customer survey was conducted of a sample of program participants to gather information on their decision making and factors determining net-to-gross savings ratios for the program.

1.2 Organization of Report

This report of the custom and prescriptive components of the energy efficiency program for 2010 and 2011 is organized as follows:

- Chapter 2 presents a list and descriptions of the Custom and prescriptive energy efficiency programs offered by IID during 2010 and 2011.
- Chapter 3 presents and discusses the methods used for and the results obtained from estimating gross savings for measures installed under the Custom and Prescriptive program components.
- Chapter 4 presents and discusses the methods used for and results obtained from estimating net savings for the programs.
- Chapter 5 presents process evaluation and recommendations for the various programs offered during 2010 and 2011.
- Appendix A provides site-level measurement and verification reports for each project for which data were collected on-site and/or a custom analysis was conducted by ADM.
- Appendix B presents the survey given to participant decision makers.

2. Programs

In this section is a list of programs with brief descriptions of each. This report refers to CESP and NCEEP as 'Custom' energy efficiency programs, as they rely on custom-calculated project-level savings instead of deemed savings values per measure rebated. Remaining programs offered by IID are considered 'Prescriptive.' Not all programs offered in 2010 and 2011 had participants, thus no savings. A list of these programs can be found in section 2.2.

2.1 Descriptions of Programs with nonzero claimed savings for 2010 and 2011

Custom Energy Solutions Program (CESP) (2010 & 2011)

This program offered financial incentives for annual energy savings to medium and large commercial customers. The financial incentives are intended for the customer's use in the purchase and installation of qualifying lighting, refrigeration, air conditioning, food service, agricultural, and/or controls equipment. Qualifying EEMs must have retrofitted, replaced, or upgraded old equipment with new, energy efficient technologies that exceed the applicable Title 24 energy efficiency requirements established by the California Energy Commission or current industry standards using IID approved project baselines, if Title 24 standards are not applicable.

New Construction Energy Efficiency Program (NCEEP) (2010 & 2011)

This is a non-residential new construction and renovation energy efficiency program that combines an integrated design process with financial incentives for energy saving design at least 10% over the current Title 24 requirements. The NCEEP assists customers in moving beyond initial cost considerations and towards the realization of long-term energy cost savings and avoidance of lost opportunities as new non-residential buildings are designed and constructed. The NCEEP was designed for commercial, agricultural and industrial new construction and renovation/remodel projects.

Pumping Efficiency Program (PEP) (2010)

This is an educational and financial incentive program intended to improve overall water pumping efficiency and encourage energy conservation in the Imperial Irrigation District service area. Rebates were available to encourage the retrofit or replacement of eligible electrically powered water pumps to improve overall pumping efficiency.

AC Trade Up (2011)

This was offered a higher per-ton incentive for the early replacement of low-efficiency air conditioning units. Units must have been in operable condition and have a rating of 10 SEER or lower.

CFL Distribution and Recycling Events (2010 & 2011)

Throughout both years, IID hosted various events where customers are allowed to recycle up to five incandescent light bulbs in exchange for CFLs.

Energy Rewards Rebate Program (2011)

IID offered customer rebates for qualified energy efficient products. The 2011 qualifying equipment for nonresidential customers must have retrofitted, replaced, or upgraded old equipment with new, energy-efficient technologies that meet and exceed the Title 24 standards in effect at the time of installation. The program offered rebates for the following product categories:

- ENERGY STAR qualified programmable thermostats
- Commercial and Industrial HVAC equipment
- Energy-efficient central air conditioners/heat pumps
- ENERGY STAR qualified room air conditioners
- ENERGY STAR qualified dual pane windows
- Variable Speed Pool Pumps (See 'Swimming in Savings')
- Energy efficient motors
- Lighting

Holiday Lights Exchange (2011)

IID offers this program to customers who wish to exchange their existing incandescent holiday lights for a rebate on LED holiday lights.

Home and Commercial Energy Audits (2010 & 2011)

This is the first step to assess how much energy the commercial customer consumes and to evaluate what measures can be applied to make a facility more energy efficient. An assessment showed problems that may, when corrected, save the customer significant amounts of money over time. IID offered energy audits and customized reports to customers.

Lighting Retrofit: IID Facilities (2011)

IID performed a lighting retrofit at the La Quinta headquarters facilities. Existing T12 fluorescent lighting were replaced with T8 fixtures and occupancy sensors were installed.

Low Income AC (LIEE) (2010 & 2011)

IID administers a Low Income Energy Efficiency program that replaces qualifying air conditioners of existing REAP customer who meet minimum qualifications such as home ownership and budget billing amounts. Note: This was not a customer-initiated program. Potential candidates were identified internally through a review process of the IID's REAP program based on specific qualifications.

Open for Business Direct Install (2011)

This program was offered to help small businesses decrease their operating costs. A certified contractor works with eligible small businesses to evaluate energy use, identify energy-saving opportunities and install energy-efficient retrofit replacement equipment at no cost to the customer. Measures include compact fluorescent light, hard-wired compact fluorescent light fixtures, T-8 lighting, occupancy sensors, LED exit signs and vending machine controls.

Quality AC Maintenance Program (QAMP) (2010)

This is an efficiency program for existing central air conditioner units designed to ensure that both refrigerant charge and airflow through the evaporator are properly tested and correctly adjusted, and also that duct leakage is detected and properly sealed. Early Retirement rebates for replacement of inefficient systems were also covered under this program. Note: Program available up to second quarter 2010.

Swimming in Savings (SiS) (Part of 'Energy Rewards Rebates') (2011)

This was designed to encourage IID residential customers and small homeowner associations to install qualified variable speed pool pump products.

Vending Misers (2011)

This was designed to reduce energy consumption of installed vending machines through a direct install of vending misers, cooler misers and snack misers at no cost to the participating customer.

Weatherization (2011)

IID and The Gas Company have partnered with community-based organizations and licensed contractors to offer no-cost energy-saving home improvements to eligible renters and homeowners.

2.2 Programs with no claimed savings for 2010 and 2011

Though other programs were offered during 2010 and 2011, there were no participants, thus no claimed savings. These programs include:

- Pumping Efficiency Program (PEP) (2011)
- Rates (2010 & 2011)
- Weatherization (2010)
- Payment Assistance (2011)

Table 2-1 Summary of expected kWh savings for all energy efficiency programs by year, by program.

Program Component	*Expected kWh Savings*
CESP	8,603,215
NCEEP	429,738
PEP	51,902
Audits	169,741
CFL Distribution	126,215
Energy Rewards Rebates	2,260,723
LIFE	313,085
QAMP	9,192,223
2010 Total	**21,146,842**
CESP	3,530,106
NCEEP	495,257
AC Trade-Up	581,624
Audits	372,785
CFL Exchange	144,158
Energy Rewards Rebates & SiS	2,587,787
Holiday Lights Exchange	3,075
LIFE	1,662
Lighting Retrofit: IID Facilities	222,690
Open for Business Direct Install	3,064,543
Vending Misers	472,428
Weatherization	119,259
2011 Total	**11,595,374**
Total	**32,742,216**

3. Estimation of Gross Savings

This chapter addresses the general methodology for estimation, and results of gross kWh savings and kW reductions resulting from measures installed in facilities and homes of customers that received custom or prescriptive incentives under the energy efficiency programs during the period 2010 through 2011. Section 3.1 describes the methodology used for estimating gross savings for CESP and NCEEP measures and section, details data collection and results. Section 3.1.3 discusses gross realized savings. Individual reports for each site sampled can be found in Appendix A. Section 3.2 describes the methodology used for estimating gross savings for prescriptive measures and section 3.2.3 discusses the results.

3.1 Methodology for estimating gross savings for custom projects

3.1.1 Sampling Plan for CESP and NCEEP.

For an in depth analysis of CESP and NCEEP (Custom) components of the energy efficiency programs, ADM selected a sample, conducted on-site measurement and verification and performed in-house custom analyses of each site sampled.

Inspection of data on kWh savings for individual projects provided by IID indicated that the distribution of savings was generally positively skewed, with a relatively small number of projects accounting for a high percentage of the estimated savings. Estimation of savings for each program component is based on a ratio estimation procedure, which allows precision/confidence requirements to be met with a smaller sample size. Data provided by IID showed that during the period 2010 through December 2011, there were 53 Custom incentive projects for CESP and NCEEP programs, which were expected to provide a total savings of 13,110,218 kWh. ADM selected a sample with a sufficient number of projects to estimate the total achieved savings with 10% precision at 90% confidence. For the Custom sample, the actual precision is ±9.90%.

> Please note: Originally IID reported a 2011 CESP and NCEEP savings figures of 3,283,014 kWh and 490,693 kWh respectively. However upon review of the program's documentation, ADM discovered projects that had been completed but their savings not added to the total. At IID's request these projects' expected savings were included and the total expected savings figure increased to 3,530,106 kWh for the 2011 CES Program and 495,257 kWh for the NCEE Program. These program's realizations rates are calculated with respect to these numbers.

component sample by stratum. **Error! Reference source not found.**shows the sample and total expected savings by stratum.

1 shows the number of projects and expected energy savings of the Custom programs' component sample by stratum. **Error! Reference source not found.**shows the sample and total expected savings by stratum.

Table 3-1 Population statistics used for sample design for Custom components

	Stratum 1	*Stratum 2*	*Stratum 3*	*Stratum 4*	*Stratum 5*	*Totals*
Strata boundaries (kWh)	< 10,000	10,001 - 100,000	100,001 - 500,000	500,001 - 1,000,000	> 1,000,00	
Number of projects	19	16	12	4	2	53
Total kWh savings	73,5	667,031	3,142,162	3,457,042	5,770,	13,110,
Average kWh Savings	3,87	41,689	261,847	864,261	2,885,	247,363
Standard deviation of kWh	3,83	24,309	124,567	92,660	90,105	579,430
Coefficient of variation	0.99	0.583	0.476	0.107	0.031	1.82
Final design sample	4	4	3	2	2	15

Table 3-2 Expected savings for Custom incentive sampled projects by stratum

Stratum	*Sample Expected Savings*	*Total Expected Savings*
1	8,451	73,526
2	219,009	667,031
3	686,895	3,142,162
4	1,846,003	3,457,042
5	5,770,457	5,770,457
Total	**8,530,815**	**13,110,218**

After the samples of projects were selected, ADM reviewed the documentation provided by IID pertaining to the projects. The first step in the evaluation effort was to review this documentation and other program materials that were relevant to the evaluation effort.

For each project, the available documentation (e.g., audit reports, savings calculation work papers, etc.) for each rebated measure was reviewed, with particular attention given to the calculation procedures and documentation for savings estimates. Documentation that was reviewed for all projects selected for the sample included program forms, data bases, reports, billing system data, weather data, and any other potentially useful data. Each application was reviewed to determine whether the following types of information had been provided:

- Documentation for the equipment changed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Documentation for the new equipment installed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Information about the savings calculation methodology, including (1) what methodology was used, (2) specifications of assumptions and sources for these specifications, and (3) correctness of calculations

If there was uncertainty regarding a project, or apparently incomplete project documentation, ADM staff contacted the site contact to seek further information to ensure the development of an appropriate project-specific M&V plan.

3.1.2 On-Site Data Collection Procedures

On-site visits were used to collect data that were used in calculating savings impacts. The visits to the sites of the sampled projects were used to collect primary data on the facilities participating in the program.

The activities specified above produced two estimates of gross savings for each sample project: an expected gross savings estimate (as reported in the project documentation and program tracking system) and the verified gross savings estimates developed through the M&V procedures employed by ADM. ADM developed estimates of program component-level gross savings by applying a ratio estimation procedure in which achieved savings rates estimated for the sample projects were applied to the program component-level expected savings.

Overall Custom *ex post* savings for both years is 11,527,316 kWh and 2,874.80 kW. These numbers are equal to 88% and 116% of *ex ante* estimates, respectively.

Table 3-3 show expected savings, realized savings and realization rate by site. Table 3-4 shows expected and realized savings by stratum for both sampled and non-sampled projects. Tables 3-5 and 3-6 show expected and realized savings by program.

Table 3-3 Expected and realized savings for Custom sampled projects

Project	*Stratum*	*Expected Savings*	*Realized Savings*	*Realization Rate*
CESP 11-Pharmacy	1	268	10,345	3859%
CESP 11-Pharmacy	1	657	11,781	1792%
CESP 11-Fire Station	1	886	22,548	2545%
CESP 11-Gas Station	2	6,640	8,707	131%
CESP 11-School Facility	2	22,430	48,420	216%
CESP 11-Retail Center	2	22,898	24,046	105%
NCEEP 11-Childcare/Preschool	2	84,761	84,761	100%
CESP 11-Restaurant	2	88,920	42,057	47%
CESP 11-Auto Dealership	3	142,048	149,223	105%
CESP 11-Grocery Store	3	237,220	273,487	115%
CESP 10-Agriculture Facility	3	307,627	-	0%
CESP 11-Furniture Showroom	4	918,672	1,018,525	111%
CESP 11-Hospital	4	927,331	940,137	101%
CESP 10-Municipal Facility	5	2,821,514	2,821,514	100%
CESP 10-Casino	5	2,948,943	2,314,230	78%
Non-Sampled	all	4,579,403	3,757,534	82%
Total	**all**	**13,110,218**	**11,527,316**	**88%**

Table 3-4 Expected and realized savings for Custom sampled and non-sampled projects by stratum

Stratum	*Sample Expected Savings*	*Total Expected Savings*	*Sample Realized Savings*	*Total Realized Savings*	*Realization Rate*
1	8,451	73,526	53,380	464,421	632%
2	270,911	667,031	246,512	606,955	91%
3	686,895	3,142,162	422,710	1,652,175	53%
4	1,846,003	3,457,042	1,958,662	3,668,020	106%
5	2,948,943	5,770,457	2,624,578	5,135,744	89%
Total	**5,761,203**	**13,110,218**	**7,769,782**	**11,527,316**	**88%**

Table 3-5 Summary of total kWh savings for Custom energy efficiency programs by program.

Program Component	*Total Expected kWh Savings*	*Total Realized Gross kWh Savings*	*Total Gross Realization Rate*	*kW Reduction*
CESP	12,133,321	10,668,367	88%	2,232.09
NCEEP	924,995	813,313	88%	642.71

Table 3-6 Summary of kWh savings for Custom energy efficiency programs by year, by program.

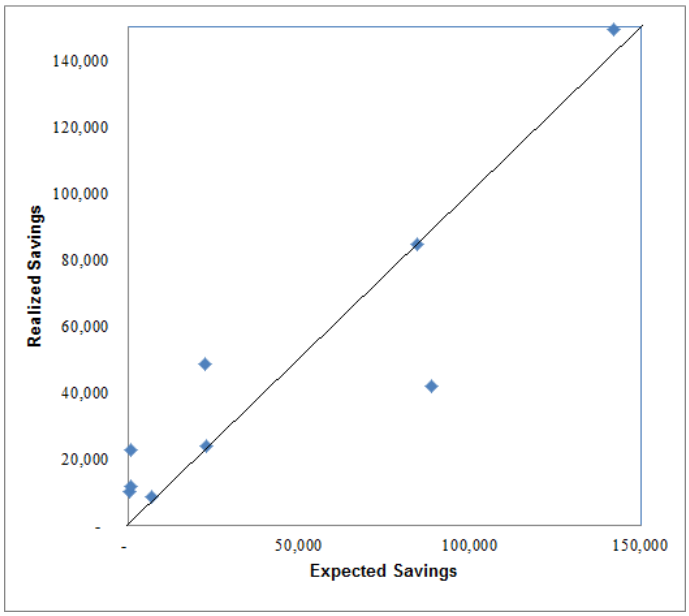
Program Component	*Expected kWh Savings*	*Realized Gross kWh Savings*	*Gross Realization Rate*	*kW Reduction*
CESP	8,603,215	7,564,479	88%	1,443.55
NCEEP	429,738	377,852	88%	500.72
2010 Total	**9,084,855**	**7,942,332**	**87%**	**1,944.27**
CESP	3,530,106	3,103,888	88%	788.54
NCEEP	495,257	435,461	88%	141.99
2011 Total	**4,025,363**	**3,539,348**	**88%**	**930.53**
Total	**13,110,218**	**11,481,680**	**88%**	**2,874.80**

3.1.3 Discussion of Gross Savings Analysis of Custom Programs

For the Custom incentive projects, sample project realization rates and expected kWh savings are plotted in Figure 3-1. There is an association between realization rates and expected kWh savings. Projects with lower *ex ante* savings, the first two strata, tend to have much higher realization rates than projects in other strata. This relationship is illustrated in Figure 3-1. With the exception of one site, all sites with high realization rates are lighting sites. The other sites' realization rates vary by site-specific factors.

Project-Level Reports can be found in Appendix A.

Figure 3-1 Custom incentive sample project realization rate versus expected kWh savings



Note: For presentation purposes, projects with very high expected savings are omitted from this figure.

3.2 Methodology for Estimating Gross Savings for Prescriptive Projects

The methodology used for estimating gross savings is described in this section.

3.2.1 Review of Documentation

IID provided documentation pertaining to the projects. The first step in the evaluation effort was to review this documentation and other program materials that were relevant to the evaluation effort.

For each project, the available documentation (e.g., audit reports, savings calculation work papers, etc.) for each rebated measure was reviewed, with particular attention given to the calculation procedures and documentation for savings estimates. Documentation that was reviewed for all projects included program forms, data bases, reports, billing system data, weather data, and any other potentially useful data. Each application was reviewed to determine whether the following types of information had been provided:

- Documentation for the equipment changed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Documentation for the new equipment installed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Information about the savings calculation methodology, including (1) what methodology was used, (2) specifications of assumptions and sources for these specifications, and (3) correctness of calculations

3.2.2 Analytical Desk Review

For sites that did not require and M&V visit ADM performed a review of the deemed savings values (savings calculations for installed measures using deemed (per unit) savings) used to estimate energy savings by measure. The review included reviewing measures associated with their respective programs according to IID's Energy Efficiency Tool (E3 Tool). Documentation provided to ADM by IID was reviewed by verifying invoices, re-calculating claimed savings using *ex ante* assumptions (i.e. fixture quantities, motor horse-powers, EFLHs, etc). In this review ADM compared the applied values to the 2011 Database for Energy Efficient Resources (DEER 2011) deemed savings estimates. In addition to reviewing DEER deemed savings estimates, ADM performed an engineering review of key assumptions used in weather sensitive measure algorithms (i.e. insulation, duct sealing, etc.). ADM developed correction factors necessary to ensure that the deemed savings used by the evaluation are appropriate for IID Territory in Southern California.

If there was uncertainty regarding a project, or apparently incomplete project documentation, ADM staff contacted the implementation contractor to seek further information to ensure the development of an appropriate project-specific M&V plan.

The evaluation reviewed the energy savings algorithms to verify that the assumptions were reasonable and the algorithm was correct for assigning ex ante gross kWh and kW savings per measure. ADM reviewed and verified the mathematical soundness of the savings calculations for each measure. The measure algorithm's components were verified with the savings assumptions provided by the implementation contractor. The calculations were checked to ensure that the reported results could be replicated. Once the calculation methods were verified, the reasonableness of the calculation was assessed. The assessment of reasonableness of the savings estimates was based on the reputable measure savings evaluation from other sources and ADM's own engineering calculators for similar measures.

Energy savings was calculated using the following savings algorithms:

Per Unit kWh Savings = HOU*(Baseline Wattage – Retrofitted Wattage)/1000

Where:

HOU = Hours of Use

Annual kWh Savings = Program units * Per Unit kWh Savings

Per Unit kW Savings = (Baseline Wattage – Retrofitted Wattage) /1000

Annual kW Savings = Program units * Per Unit kW Savings

Table 3-8 summarizes expected and realized savings by year, by program, for prescriptive programs.

Table 3-7 Summary of expected and realized kWh savings for prescriptive energy efficiency programs by year, by program.

Program Component	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*	*kW Reduction*
PEP	8,603,215	7,512,802	87%	0.00
Audits	169,741	177,726	105%	67.67
CFL Distribution	126,215	119,195	94%	145.41
Energy Rewards Rebates	2,260,723	2,783,555	123%	14.89
LIEE	313,085	313,085	100%	149.80
QAMP	9,192,223	9,192,223	100%	2,590.95
2010 Total	**20,665,202**	**20,098,586**	**97%**	**2,968.72**
AC Trade-Up	581,624	581,624	100%	245.21
Audits	372,785	359,134	96%	135.30
CFL Exchange	144,158	135,954	94%	172.09
Energy Rewards Rebates & Swimming in Savings	2,587,787	3,496,860	135%	122.22
Holiday Lights Exchange	3,075	3,075	100%	7.12
LIEE	1,662	1,662	100%	1.11
Lighting Retrofit: IID Facilities	222,690	312,268	140%	64.35
Open for Business Direct Install	3,064,543	3,010,361	98%	697.07
Vending Misers	472,428	472,428	100%	0.00
Weatherization	119,259	100,237	84%	73.30
2011 Total	**7,570,011**	**8,473,603**	**112%**	**1,517.77**
Total	**28,235,213**	**28,572,189**	**101%**	**4,486.49**

3.2.3 Discussion of Prescriptive Gross Savings Projects

Audits

Using SCE workpapers, ADM verified that average energy savings fornon-residential energy audits is higher than the savings value used to calculate 2010 *ex ante* estimates, resulting in higher energy savings than expected The DEER 2011 CFL energy savings which ADM used were slightly lower than savings values used in *ex ante* calculations, resulting in slightly low realization rates for both 14W and 19W CFL measures in both year's programs. Realization rates are 105% and 96% for 2010 and 2011, respectively.

CFL Distribution/Exchange

ADM determined via the 2011 DEER database that current deemed kWh savings values in the IID territory climate zone are slightly more than the values used to calculate 2010 *ex ante* values and slightly less than 2011 *ex ante* values, resulting in 112% and 94% realization rates, respectively.

Energy Rewards Rebates

ADM determined via the 2011 DEER database that current deemed kWh savings values in the IID territory climate zone are, on average, higher than those used to calculate *ex ante* values. ADM

reviewed pool pump VSD savings from the Swimming in Savings Program using in-house studies to assess *ex ante* savings calculations. ADM found that pool pump VSDs measure likely saved much more energy than expected, roughly 269% of *ex ante* estimates. The realization rate for 2010 is 123% and 2011 is 135%.

Lighting Retrofit: IID Facilities

After interviewing facility staff, ADM determined that lighting operating hours were higher than those assumed in *ex ante* calculations, nor was a heating and cooling interaction factor included in said calculations, resulting a high realization rate of 140%.

Open for Business Direct Install

ADM determined via the 2011 DEER database that for many measures in the Open for Business Direct Install program, current deemed kWh savings values in the IID territory climate zone are slightly less than the values used to calculate *ex ante* values. The realization rate for this program is 98%.

Weatherization

ADM determined via the 2011 DEER database that for many measures in the Weatherization program, current deemed kWh savings values in the IID territory climate zone are slightly less than the values used to calculate *ex ante* values, resulting in an 84% realization rate.

4. Estimation of Net Savings

This chapter reports the results from estimating the net impacts of energy efficiency programs offered by IID during 2010 and 2011, where net savings represents the portion of gross savings achieved by program participants that can be attributed to the effects of the program. The total number of respondents did not create a statistically significant sample, but the findings in this section were used to corroborate deemed net to gross values.

4.1 Procedures Used To Estimate Net Savings

The basic issue in net savings analysis is determining what part of gross savings achieved by program participants can be attributed to the effects of the program. The savings induced by the program are the “net” savings that are attributable to the program.

Net savings may be less than gross savings because of free ridership impacts, which arose to the extent that participants in a program would have adopted energy efficiency measures and achieved the observed energy changes even in the absence of the program. Free riders for a program are defined as those participants that would have installed the same energy efficiency measures without the program.

The goal of the net-to-gross analysis was to estimate the impacts of energy efficiency measures attributable to the energy efficiency programs that were net of free ridership. That is, because the energy savings realized by free riders are not induced by the program, these savings should not be included in the estimates of the program's actual impacts. Without adjustment for free ridership, some savings that would have occurred naturally would be attributed to the program. The measurement of the net impact of the program requires estimation of the marginal effect of the program over and above the "naturally occurring" patterns for installation and use of energy efficient equipment.

Information collected from a sample of program participants through a customer survey was used for the net-to-gross analysis. Appendix B provides a copy of the survey instrument. Based on review of this information, the preponderance of evidence regarding free ridership inclinations was used to attribute a customer’s savings to free ridership.

Several criteria were used for determining what portion of a customer’s savings for a particular project should be attributed to free ridership. The first criterion was based on the response to the question: “Would you have been financially able to install the equipment or measures without the financial incentive from the energy efficiency program?” If a customer answered “No” to this question, a free ridership score of 0 was assigned to the project. That is, if a customer required financial assistance from the energy efficiency program to undertake a project, then that customer was not deemed a free rider.

For decision makers that indicated that they were able to undertake energy efficiency projects without financial assistance from the program, three factors were analyzed to determine what percentage of savings may be attributed to free ridership. The three factors are:

- Plans and intentions of firm to install a measure even without support from the program
- Influence that the program had on the decision to install a measure
- A firm's previous experience with a measure installed under the program

For each of these factors, rules were applied to develop binary variables indicating whether or not a participant's behavior showed free ridership. These rules made use of answers to questions on the decision maker survey questionnaire. (A copy of the questionnaire is provided as Appendix B.)

The first factor required determining if a participant stated that his or her intention was to install an energy efficiency measure even without the program. The answers to a combination of several questions were used with a set of rules to determine whether a participant's behavior indicates likely free ridership. Two binary variables were constructed to account for customer plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the energy efficiency program?"
- The respondent answered "definitely would have installed" to the following question: "If the financial incentive from the energy efficiency program not been available, how likely is it that you would have installed [Equipment/Measure] anyway?"
- The respondent answered "did not affect timing of purchase and installation" to the following question: "How did the availability of information and financial incentives through the energy efficiency program affect the timing of your purchase and installation of [Equipment/Measure]?"
- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the energy efficiency program affect the level of energy efficiency you chose for [Equipment/Measure]?

The second, less restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the Energy efficiency program?"
- Either the respondent answered "definitely would have installed" or "probably would have installed" to the following question: "If the financial incentive from the Energy efficiency program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?"
- Either the respondent answered "did not affect timing of purchase and installation" to the following question: "How did the availability of information and financial incentives through the Energy efficiency program affect the timing of your purchase and installation of [Equipment/Measure]?" or the respondent indicated that that while program information and financial incentives did affect the timing of equipment purchase and installation, in the absence of the program they would have purchased and installed the equipment within the next two years.
- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the Energy efficiency program affect the level of energy efficiency you chose for [Equipment/Measure]?

The second factor required determining if a customer reported that a recommendation from a program representative or past experience with the program was influential in the decision to install a particular piece of equipment or measure.

The criterion indicating that program influence may signify a lower likelihood of free ridership is that either of the following conditions are true:

- The respondent answered "very important" to the following question: "How important was previous experience with the Energy efficiency program in making your decision to install [Equipment/Measure]?
- The respondent answered "yes" to the following question: "Did a representative of the Energy efficiency program recommend that you install [Equipment/Measure]?"

The third factor required determining if a participant in the program indicated that he or she had previously installed an energy efficiency measure similar to one that they installed under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had installed a similar measure is considered to have a likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answered "yes" to the following question: "Before participating in the energy efficiency program, had you installed any equipment or measure similar to [Rebated Equipment/Measure] at your facility?"

- If a responded answered "no " to the following question: "Would you have been financially able to install [Rebated Equipment/Measure] without the financial incentive from the program?" a free ridership score of 0 was assigned to the project. That is, if a participant required financial assistance from the energy efficiency program to undertake a project, then that participant was judged to not be a free rider.

- Under this criterion, the other free ridership scoring criteria were applied only to projects for participants who answered "Yes" to the question: "Would you have been financially able to install the equipment or measures without the financial incentive from the energy efficiency program?" However, respondents who answered "No" to this question would be judged to have zero free ridership even if the other free ridership criteria were applied, due to the nature of their specific survey responses.

- **Error! Reference source not found.**1 shows the percentage of survey respondents who relayed the following: They had plans and intentions to install the measures without any program incentive (under two alternative definitions as described in the preceding section), that the program influenced their decision to install the measure, or that they previously installed a similar energy efficiency measure without an energy efficiency program incentive during the last three years. Percentages reported are averages weighted by project gross realized savings.

Table 4-1 Weighted average indicator variable values

Had Financial Ability	*Had Plans and Intentions to Install Measure without the program (Definition 1)*	*Had Plans and Intentions to Install Measure without the program (Definition 2)*	*The program had influence on Decision to Install Measure*	*Had Previous Experience with Measure*
19	10	15	6	3

- **Error! Reference source not found.**3 shows the number of respondents that are associated with different combinations of free ridership indicator variable values.

Table 4-2 Estimated free-ridership

Had Plans and Intentions to Install Measure without the program? (Definition 1)	*Had Plans and Intentions to Install Measure without the program? (Definition 2)*	*The program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Number of Respondents*	*Free Ridership Score*
Y	N/A	Y	Y	3	100%
Y	N/A	N	N	5	100%
Y	N/A	N	Y	0	100%
Y	N/A	Y	N	1	67%
N	Y	N	Y	0	67%
N	N	N	Y	0	33%
N	Y	N	N	2	33%
N	Y	Y	N	0	0%
N	N	N	N	0	0%
N	N	Y	N	0	0%
N	N	Y	Y	0	0%
Required program incentive to implement measures.				28	0%
Total				29	24%

- Total free ridership is 24%. To calculate the net to gross ratio, this number is subtracted from 100%. The net to gross ratio is 76%.
- The realized energy savings of the energy efficiency program during 2010 and 2011 are summarized by program component in **Error! Reference source not found.**3.

Table 4-3 Summary of kWh savings for all energy efficiency programs by year, by program.

Program Component	*Expected kWh Savings*	*Realized Gross kWh Savings*	*Gross Realization Rate*	*Realized Net kWh Savings*	*Net to Gross Ratio*
CESP	8,603,215	7,564,479	88%	6,051,584	80%
NCEEP	429,738	377,852	88%	302,282	80%
PEP	51,902	51,902	100%	41,522	80%
Audits	169,741	177,726	105%	142,181	80%
CFL Distribution	126,215	141,240	112%	112,992	80%
Energy Rewards Rebates	2,260,723	2,783,555	123%	2,226,844	80%
LIFE	313,085	313,085	100%	250,468	80%
QAMP	9,192,223	9,192,223	100%	7,353,779	80%
2010 Total	**21,146,842**	**20,602,063**	**97%**	**16,481,651**	80%
CESP	3,530,106*	3,103,888	88%	2,576,227	83%
NCEEP	495,257*	435,461	88%	365,787	84%
AC Trade-Up	581,624	581,624	100%	494,380	85%
Audits	372,785	359,134	96%	308,855	86%
CFL Exchange	144,158	135,753	94%	122,178	90%
Energy Rewards Rebates & SiS	2,587,787	3,496,860	135%	3,077,237	88%
Holiday Lights Exchange	3,075	3,272	106%	2,781	85%
LIFE	1,662	1,662	100%	1,578	95%
Lighting Retrofit: IID Facilities	222,690	312,268	140%	296,655	95%
Open for Business Direct Install	3,064,543	3,010,361	98%	2,859,843	95%
Vending Misers	472,428	472,428	100%	448,807	95%
Weatherization	119,259	100,237	84%	95,225	95%
2011 Total	**11,595,374**	**12,012,947**	**104%**	**10,649,553**	95%
Total	**32,742,216**	**32,615,010**	**100%**	**27,131,203**	95%

*This number has been modified at IID's request. Please refer to section 3.1.1

5. Conclusions and Recommendations

The process evaluation of the Imperial Irrigation District (IID) Program Portfolio includes an assessment of the following areas:

- Program Design;
- Program Administration; and
- Program Implementation and Delivery.

The process evaluation phase consists of the following activities:

- Telephone interviews with utility staff;
- Telephone interviews with participating installation and implementation contractors; and
- Review of program literature other relevant documentation related to program structure, design, and delivery.

The process evaluation focuses on general program trends, design features, and operational characteristics. Specifically, topics that the process evaluation seeks to address include:

- Whether the programs and/or portfolio provide the education, training, marketing, or outreach needed to address market barriers to the adoption of energy efficiency measures;
- Whether the programs and/or portfolio, have adequate budgetary, management, and program delivery resources to plan, design, and operate energy efficiency programs;
- Whether the programs and/or portfolio, reasonably address all major end-uses of electricity or natural gas, or electricity and natural gas, as appropriate;
- Whether such programs take advantage of opportunities to address the comprehensive needs of targeted customer sectors or to leverage non-utility program resources; and
- Whether the programs and/or portfolio enables the delivery of all achievable, cost-effective energy efficiency within a reasonable period of time and maximizes net benefits to customers and to the utility system.

Additional topics were identified and discussed as appropriate during the in-depth interviews conducted with IID staff and participating contracting firms.

5.1 Summary of Key Findings

- The primary sources of information for the process evaluation were in-person interviews that were conducted with Imperial Irrigation District (IID) staff members and contractors involved with the energy efficiency programs for the purposes of developing structural, operational, and internal program management perspectives. In order to gather information regarding the operational efficiency and program delivery process for the portfolio of programs, in-depth telephone interviews were conducted with four IID staff members who are responsible for

managing specific programs or are involved in documentation, delivery, marketing, and other aspects of program operation.

Additionally, the evaluators interviewed three contractors who have worked with one or more IID energy efficiency programs by conducting audits, processing application documents, working with customers, and otherwise supporting the programs. Interview questions were designed to provide insight into program design, implementation, and continued operation, as well as to document notable changes to program design or structure.

The following section presents a summary of key findings from the process evaluation of the IID portfolio of energy efficiency programs for 2010 and 2011. These findings are based on a combination of research activities including customer surveys, interviews with program staff, and reviews of program tracking data and other documentation.

Key trends and findings identified through the process evaluation include:

5.1.1 Marketing, Outreach, and Reduction of Barriers to Efficiency

It appears that the IID energy efficiency portfolio of programs has sufficient structures in place for providing energy efficiency education, training, marketing, and outreach to its customers and contractors. These efforts likely reduce barriers to energy efficiency in the market by informing customers of their opportunities and allowing vendors and contractors to independently promote programs or further educate customers.

It may be useful for IID to work more closely with equipment vendors and contractors in the future, and possibly develop a trade ally network where contractors can actively receive information regarding program updates and planned changes with IID staff members. Additionally, this would provide a list of contractors for customers to reference when considering a project and these contractors would be more likely to familiarize themselves with IID program offerings and participation requirements. Key findings related to individual programs and the overall portfolio include:

- **Residential and Small Business Audit Program:** Although the audit program provides participants with specific information about their home or facility, the program contractor explained that the purpose of the audit survey is more focused on providing information and outreach than providing fully detailed building diagnostics. This allows the customer to take further action by conducting their own additional research and determining which energy efficiency options are most appropriate for their needs. One primary program objective is to direct customers towards other IID incentive and rebate programs, thereby further encouraging them to make follow-up energy efficiency improvements.
- **New Construction and Custom Energy Solutions Program:** IID marketing representatives are responsible for reaching out to customers and informing them of the available energy efficiency incentives and other utility programs. These representatives communicate with the customer base in order to identify potential projects for individual customers, as well as to

gauge overall program awareness and to obtain feedback from customers about their interests. IID marketing representatives are a primary source of promoting customer awareness and facilitating customer participation in several of the IID commercial programs such as the New Construction Program and the Custom Energy Solutions Program.

- The commercial and residential programs are marketed through the use of booths at industry events and trade shows. These informational booths typically market the full scope of IID programs, and place an emphasis on the commercial and industrial business sectors. IID staff explained that this type of marketing is tailored based on the specific type of event, and that the utility typically promotes the commercial and industrial programs at roughly 10 such events per year.
    - IID also distributes program information through monthly bill inserts, and promotes programs through radio and other public advertising channels such as billboards.
- In terms of the program participant group, IID staff reported that the commercial programs have been utilized by agricultural, industrial, and small commercial companies and that many participants have represented large production facilities. These facilities often have large lighting loads and are seeking incentives for facility-wide lighting retrofits. The firmographic characteristics for the commercial incentives program may be influenced by the program marketing structure. IID staff explained that at the beginning of the program year, customers are ranked in order of their overall energy use. Marketing representatives then contact the top 20 customers and inform them of the incentive opportunities. Following this, the process is continued for the next group of high-use facilities. This allows the program to provide direct outreach to facilities that likely have a high potential for energy savings, and would likely correlate with large production facilities and their in-depth lighting projects.
- In terms of working directly with vendors and installation contractors, IID staff reported that the utility does not typically work closely with these companies with regard to program promotion or operation. Contractors within the service territory may independently decide to promote an IID program or actively incorporate the available incentives into their business models, but this process is not directly facilitated by IID. Interviewed staff noted that they sometimes notify contractors of new incentives, or that vendors may learn about programs through trade shows. Additionally, IID has sent mass emails to contractors in the past in order to inform them of program changes or new incentive opportunities.
- Contractors explained that a contractor or vendor-supported marketing strategy may be beneficial in increasing program awareness within the customer base, and that this type of marketing structure is often implemented for audit programs in other service territories.

5.1.2 Program Resources

Based on information gained through discussions with program management staff, IID currently has sufficient staffing, budgetary, and program operation resources to plan, design, and deliver its energy efficiency programs. IID staff members and program contractors consistently noted that there had been some reorganization of staff in 2010 and 2011. This had involved hiring additional

staff members and making changes to the responsibilities for existing roles. The addition of new staff appears to have positively contributed to program efficiency and performance, as well as more clearly defined the programs and tasks associated with each department and individual. Although there may have been some budgetary, staffing, or other resource needs during the 2010 and 2011 program years, the interview findings suggest that the majority of these issues have been addressed and resolved as of the beginning of the 2012 program year. Further findings related to specific programs and the portfolio as a whole include:

- **Direct Install Program**: IID staff reported that the internal resources are sufficient to operate and deliver the core commercial and industrial programs. The marketing representatives are trained in facility inspections and have gained sufficient experience over the course of the programs. Additionally, staffing has been increased over time in order to align the available resources with program demands. The participation rates and overall successful performance for programs such as Direct Install and Custom Energy Solutions suggest that internal staffing, budget, and experience are sufficient for effective program management.
- **The Custom Energy Solutions Program:** The equipment planning and implementation phase has been directed either by IID program specialist staff or by program contractors, depending on the type and complexity of the project. For example, straightforward lighting measures may be facilitated by an IID staff member, while an in-depth HVAC implementation may be referred to the program contractor. The allocation of program staffing depends on program participation levels and specific project types, which allows for flexibility and effective resource management. IID staff has worked in conjunction with program contractors in the incentive approval process for some projects, where potential savings are verified and the incentive level is determined based on project characteristics.
- **Residential and Small Business Energy Audits:** When asked how the Residential and Small Business Energy Audit Programs compare to the structure of similar programs in other areas, the contractor explained that they had worked with several such programs and that their role is typically more in-depth, involving tasks such as program marketing and customer-follow up procedures. While their role had been limited to conducting the energy use survey with audit program participants, this is an instrumental program task that likely benefits from contractor experience and knowledge. IID was able to perform the remaining program processes such as marketing and customer support through the use of program specialists and other staff members.
- When asked about program budgets, IID staff reported that participation availability is typically based on the available budget throughout the year. Although the objective for several programs is to operate throughout the calendar year, prescriptive program budgets are sometimes expended earlier than expected. This causes IID to defer applicants to the following program year, or to create a waiting list, such as with the Direct Install Program.

5.1.3 Program and Portfolio Scope

It appears that the current portfolio of IID energy efficiency programs reasonably addresses all major end-uses of energy efficiency measures for the residential and commercial customer

population. The portfolio includes various types of programs that offer a wide range of incentives for energy efficiency improvements, and IID actively seeks to evaluate and adopt new cost-effective measure incentives as they become available or feasible. This structure has been able to provide customers with a comprehensive set of opportunities for improving energy efficiency within their home or business, and allows customers to select their own method of energy reduction based on the wide scope of available programs.

IID has staff members who are responsible for researching new potential energy efficiency initiatives and determining the savings potential and costs associated with these programs. Program modification and development are core aspects of continued improvement within energy efficiency portfolios, and it is typically highly beneficial to have a staff member responsible for this aspect of program operation. As technologies develop and customer needs change, it will be important to continually monitor available energy efficiency opportunities in order to align utility initiatives with the current market in its service territory. Specific findings related to this topic for the portfolio as a whole and for individual programs include:

- **Residential and Small Business Energy Audits**: When asked whether there were any notable trends in customer equipment choices or energy use, contractor staff explained that many homes contained incandescent lighting or had single-speed pool pumps, and that these are common issues in IID customer homes. Interviewed staff noted that there is likely high potential for converting customer lighting to LEDs, and that this may be a valid focus of a future energy efficiency initiative from IID. Additionally, the contractor noted that there are likely opportunities for insulation and HVAC upgrades in customer homes and small businesses.
    - Although these items represent several energy efficiency trends and potential measure offering opportunities, the program contractor explained that their role in the audit programs was to focus on energy efficiency improvements that customers would be able to implement on their own. Thus, in homes with more complicated or in-depth project potential, the contractor would typically refer customers to the Home Performance with Energy Star Audit. This would allow the customer to receive further information regarding the potential projects, and seek assistance through program staff and associated contractors.
    - The program typically focuses on recommendations for basic or low-cost measures such as lighting, thermostats, and some appliance recommendations. Recommendations for other equipment types are made as appropriate based on discussions with the customer and the overall findings of the home or facility inspection. In contrast to the residential energy audit process, the program contractor explained that the commercial audit component was more focused on lighting efficiency. The commercial audit involved a survey of the facility's existing lighting and provided participants with information regarding retrofits such as switching from T12 to T8 lights or implementing LEDs and CFLs.

- **The Custom Energy Solutions Program**: IID staff reported that the measures most commonly installed through the CESP include lighting and HVAC improvements, although a small number of pumps and motors have also been implemented.

- **The Open for Business Direct Install Program**: This program is designed to provide commercial facilities with specific energy efficiency measures that are provided at no-cost to the customer. Measures offered through the program include CFLs, occupancy sensors, T8 lighting, and vending machine controls. The program involves identifying optimal energy efficiency measures and delivering and installing the measures for participating customers.

- **Residential Weatherization Program:** The purpose of the Residential Weatherization program is to provide no-cost, relatively high-savings measures to income qualified IID residential customers through a home visit and installation process. The measures offered through the program include CFLs, occupancy sensors, and building shell improvements. IID staff reported that the 2012 program year included an expanded measure list, but that the measures for the 2011 year were limited to the basic items listed above.

- IID staff reported that the energy efficiency programs continually receive updates based on developments and requirements within energy efficiency standards. This involves comparing IID programs with similar programs in other areas, reviewing industry literature, and monitoring measures for cost effectiveness and savings levels. This allows IID to stay current with developing technologies and industry standards, while considering new opportunities in energy efficiency in the commercial and residential markets. Based on IID program portfolio design in the past, it appears that the utility readily adopts new energy efficiency initiatives and incorporates them into existing programs if they prove to be successful and cost effective.

5.1.4 Effectiveness in Addressing Customer and Market Needs

Based on information gathered through in-depth interviews with program contractors, and secondary feedback obtained regarding customer perspectives, it appears that IID is for the most part effectively meeting the needs of its customer and contractor population. Additionally, IID staff reported that the utility staff members have been able to work together effectively and efficiently, and that the cooperative environment has been beneficial for IID staff as a whole. Although some contractors mentioned that a portion of customers currently have energy efficiency needs that cannot be met by the existing set of IID programs, this appears to represent a small percentage of the customer base. Contractors reported positive working relationships with IID, and that the utility had been responsive to requests for further information or discussions regarding any program issues. Further findings regarding program and portfolio success in meeting customer and contractor needs include:

- Residential and Small Business Energy Audits: Contractor staff reported that the audit programs had been tailored to meet IID specifications and interests, and that this likely allowed the programs to better serve IID's specific customer population. Utility service territories may have significantly different customer populations in terms of facility characteristics and

business types, demographics, energy efficiency familiarity, and other factors. Modifying standard programs to fit the specific customer base or to align with utility energy efficiency priorities typically contributes to successful program performance.

  - With regard to whether the program is fully able to meet customer needs, the contractor stated that the energy efficiency audits appear to be well-received by participating customers and that they likely have been able to make significant energy efficiency improvements as a result. However, there were also instances where upgrading a customer's equipment would be very difficult, such as when a customer has installed obsolete or atypical technology that would not be compatible with some measures or improvements. The contractor explained that there has recently been a trend towards providing a common platform for energy upgrades, such as standardized ballasts, and that this will allow customers to easily follow-through with the recommendations that result from these audits.

- While one of IID's main priorities is to offer cost effective programs that have the highest savings potential, it is useful to continually consider feedback from contractors and customers when making decisions about future program design and measure offerings. As program contractors may have insight into these areas but may not actively consult IID regarding their feedback, it may be beneficial for IID staff to have regular conversations with implementation contractors regarding their experiences with the program(s) and provide an opportunity for contractors to share their suggestions or recommendations for future program years.
- Interviewed program staff reported that IID occasionally designs and implements new initiatives based on the needs of the customers and communities within its service territory. For example, the Community Lighting Program that was implemented in 2011 was designed to provide commercial and industrial customers with dusk-to-dawn outdoor lighting. One-time initiatives are often challenging, as they require program staff to learn new processes and may require staff to absorb new responsibilities. However, when these programs are reviewed for cost-effectiveness and are fairly straightforward, they are often beneficial in both expanding the utility's energy efficiency portfolio and contributing to customer satisfaction.

5.1.5 Communication Effectiveness

Communication among utility staff, implementation contractors, participant and non-participant customers, and equipment vendors is an important aspect of effective energy efficiency program operation and performance. Program contractors reported that working relationships with IID have been positive and straightforward, and that there have been few issues over the past few years. It appears that IID's efforts to receive feedback from customers regarding their energy efficiency activity or program satisfaction are somewhat limited, as not all programs include an internal survey or feedback instrument.

Although IID maintains channels for customer feedback such as telephone support lines, it may be useful to incorporate more direct forms of communication with customers in order to follow-up

with them regarding their perspectives and experiences with IID programs. Additionally, following-up with audit recipients who may not have performed energy efficiency improvements may encourage customers to proceed with projects, or allow IID to identify any existing customer barriers to energy efficiency involvement. Further findings related to communication within the portfolio and specific programs include:

- **Residential and Small Business Energy Audits:** Contractor staff reported that working with IID was effective and straightforward, and that there had been very few issues with regard to program communication and collaboration. The Residential and Small Business Energy Audits Programs utilized a website where IID was able to input information regarding customers who had requested the energy audit surveys, which contributed to data management and efficiency. This allowed the program contractor to develop full sets of information regarding which customers to schedule for audit appointments.
    - IID maintains a dedicated telephone line that allows potential participants to call and request additional information or sign up for an audit appointment. Customers who sign up for audits are recorded in the audit data tool that is later accessed by the onsite survey crew for scheduling. When the audit reports are returned to IID, a staff member inputs the collected information into a database for record-keeping and participant tracking purposes.

- **Direct Install Program:** When asked about customer feedback and satisfaction, IID staff reported that there have been very few if any negative responses from customers who have participated in the commercial and industrial programs. During the post-verification process, some customers express their satisfaction with the program and provide positive commentary related to their experiences working with IID staff.

- Program implementation contractors reported that the process of working with IID has improved significantly since the 2010 year. According to interviewed contractors, IID underwent some staffing and organizational changes that increased overall resources and contributed to operational efficiency and communication. Although contractors mentioned that the reorganization has caused some challenges and a learning curve when working with new staff members, the process has been beneficial overall. In general, contractor staff reported that the existing program management staff members have been very helpful and effective in promoting the programs, working with customers, and assisting contractors with questions or operational issues.

5.1.6 Internal Measurement and Verification Procedures

IID has established quality assurance processes for its portfolio of energy efficiency programs. These processes include engineering reviews of savings estimates, application information verification, internal customer feedback efforts, and pre- and post-inspections. Each of these activities contributes to consistency and accuracy in savings estimates, incentive payments, and measure implementation. It appears that the existing evaluation and verification efforts for IID

programs are sufficient for minimizing operational issues and data errors. Moving forward, it will be important to continue performing these quality assurance procedures and to monitor and respond to any issues that are identified as a result. Specific findings related to internal measurement and verification procedures for individual programs and the program portfolio include:

- **Energy Rewards Program:** The program contractor conducts documentation and incentive reviews for the Energy Rewards Program and handles inbound customer telephone calls regarding program details. Additionally, the program contractor conducts outreach efforts to participants and requests additional facility or project information when needed. IID conducts a quality assurance process for this program and reviews between 10% and 25% of the projects for accuracy and program eligibility. Program contractor staff reported that they conduct field verification for between 7% and 10% of applicants in order to verify facility location and other details. Additionally, program contractor staff reported that if a participant does not qualify for an Energy Rewards rebate but may qualify for an alternative IID program, the contractor refers the customer information to the appropriate IID staff member.
- **Residential and Small Business Energy Audits:** IID staff reported that after the audit had been completed, IID would conduct a follow-up conversation with a sample of participants in order to gauge their energy efficiency activity and perspective on the program. IID staff reported that customers have primarily implemented straightforward improvements such as lighting, rather than in-depth or costly projects. IID staff noted that there is currently no direct verification of savings for the audit programs, and that the program utilizes a 2010 KEMA report to estimate an average savings number per audit and then extrapolate this to the participant population.
- **New Construction and Custom Energy Solutions Program:** These programs involve a pre-inspection of customer facilities in order to document the existing measures and develop an implementation plan. IID staff reported that customers either independently perform the project implementation phase of the program or work directly with IID to ensure that measures are effectively chosen and installed. After the expected energy savings are determined, IID conducts an engineering review process to verify that the savings are accurate, making modifications if necessary. After the projects are implemented, IID conducts a post-inspection of participant facilities. This involves taking photos of the facility and discussing the project details with customers. Additionally, IID staff request project invoices in order to verify project costs. As the CESP guidelines specify that the incentive cannot exceed 50% of the measure cost, the cost verification ensures that the incentive level is appropriate.
- **Direct Install Program:** This program includes a quality assurance follow-up phase in order to determine the quantity of measures installed and verify proper installation. The quality assurance phase also verifies the participant business sector and other facility characteristics for data consistency purposes.
- **Residential Weatherization Program**: Participants for the weatherization program are chosen based on a gas utility provider list of eligible customers who meet the stipulated income guidelines. The program contractor conducted the measure implementation as well as the post-

verification stages for the weatherization program. IID performs quality assurance follow-ups with 10% of participant homes in order to verify the quantity and installation quality of the included measures.

- **A/C Trade Up Program:** The rebate processing procedure for the A/C Trade Up Program involved a documentation review by IID staff or contractor staff in order to ensure that the measure qualifies for a rebate under the program guidelines. If the documentation is approved, the project data are submitted to IID with a check request over an FTP system. Program contractor staff reported that the process of issuing checks initially took approximately six to eight weeks, but later increased to up to 12 weeks. This change may have been due to modifications to IID operational structure, as contractor staff noted that an additional review process has recently been added.

5.1.7 Program Performance

According to IID staff, programs that have been offered continuously over the course of several program years tend to operate and perform particularly well. This is due to the fact that these programs may be improved and adjusted over time as needed, and such programs have likely progressed beyond the initial challenges associated with program initiation. IID staff mentioned that there is always a learning curve for new programs, and that the majority of programs that have been running for more than one or two years have become stable and efficient in operation.

Additionally, adding new staff members responsible for program management and operation has likely benefited the programs in terms of operational efficiency and savings performance in recent years. Examples of performance trends and issues within specific IID energy efficiency programs include:

- **Commercial and Industrial Programs:** IID staff mentioned that commercial and industrial program performance has continually improved over the past few years. This is likely related to a steady increase in program awareness, as well as changes in internal structuring. For example, IID staff mentioned that marketing representatives in 2011 were responsible for additional tasks such as conducting energy audits. Over time, the marketing representative role was more streamlined and specialized, allowing these staff members to focus on program promotion. This likely improved utility-to-customer working relationships and contributed to overall program awareness. Program staff also mentioned that participation is often most active during the end of the year when commercial customers are seeking to expend their remaining budgets.
- **Prescriptive Rebates**: IID staff reported that the objective of the prescriptive rebates is to allow customers to choose their own measures and equipment based on the needs of their facilities. Contractors have actively promoted specific measures based on the available incentive levels, which may skew the distribution of measure adoption towards measures that are most beneficial to equipment contractors. IID staff also reported that other utilities and programs have offered additional incentives for some of the measures that IID incentivizes, which in some cases has allowed customers to completely offset the costs of their equipment.

In these cases, contractors may promote only these measures to customers rather than explaining the full scope of available incentive rebates. When multiple incentives are offered for the same measure, it is important to continually monitor the cost effectiveness of the measure and ensure that there is no double counting of savings by other utilities.

- **Vending Miser Program:** The Vending Miser Program is intended to increase the efficiency of existing vending machines by installing vending, cooling, and snack misers. These measures are provided at no-cost to the participant. IID staff reported that there had been some challenges in obtaining the vending measures, and that this had delayed program implementation in 2011. Additionally, staff indicated that some participants were not fully aware of the program details and did not express interest in completing the direct install process. Thus, the program was unable to meet its savings goals in 2011 or 2012. After 2011, the vending miser program was incorporated into the commercial Direct Install Program.

5.1.8 Program Design and Operational Changes

Over the course of the past several years, the IID energy efficiency portfolio has experienced several changes related to specific programs as well as the operational structure. Based on information provided by interview respondents, these changes have primarily resulted in increased program performance and operational efficiency, as well as an increased portfolio scope. Specific examples of modifications to the energy efficiency portfolio include:

- **Residential and Small Business Energy Audits:** Although IID used a contractor for scheduling appointments and administering the audits initially, this was converted to an in-house process in 2012. IID staff reported that conducting these tasks in-house has required a substantial increase in staffing resources and has placed additional responsibilities on existing staff members. Interviewed staff explained that the processes may be reassigned to a new program contractor, but that the scheduling and audit duties would be performed by utility staff until a new contractor is chosen.
    - IID staff mentioned that further changes may be made to the audit programs in the future, such as switching from paper questionnaires to electronic or handheld tablet-based surveys. Additionally, it is unclear whether a new contractor will soon be assigned to the audit programs, but this would result in significant changes to IID staff responsibilities and overall program structure.

- **New Construction and Custom Energy Solutions Program:** IID program staff noted that the CESP and NCEEP programs were fairly straightforward and unchanged during the 2010 and 2011 program years, although the incentives for lighting have increased over time and were raised for the 2012 program year.
- Over time, several modifications have been made to programs within the IID energy efficiency portfolio. For example, there were initially some concerns with the A/C Trade Up Program incentive which was offered for one year. The incentive for this program was fairly high, and some contractors were incorporating the incentive amount into their pricing structure and charging higher than typical fees to customers. In response, IID recommended that customers

receive price quotes from several contractors before committing to a project. A similar incentive issue occurred with an attic insulation incentive that was later introduced in 2012, where IID staff was required to ensure that the prescriptive rebate does not exceed 50% of the measure cost. Continually monitoring incentive levels, measure offerings, and other program structure details over time is necessary in order to improve program performance, customer satisfaction, and overall operational effectiveness.

- A recent addition of a shade screen program (2013 program) has gained substantial interest in the residential population, as it is an appealing measure for many customers. Although this new program is a standalone component, customers will be able to participate in both the shade screen program and weatherization programs pending their eligibility. Another addition to the Weatherization program in 2012 was a satisfaction and feedback survey that is administered to a sample of program participants. IID follows up with 10% of weatherization participants and reports any identified issues to the program contractor. IID staff stated that the contractor has been very responsive to any requested changes or other issues that arise through the post-verification or customer feedback process.

Appendix A: Project-Level Analyses

CESP 11- Pharmacy

Pharmacy retrofitted (18) fluorescent T8s and T10s with LED light strips in their cooler and freezer cases. The exceptionally high realization rate is due to a slightly larger change in connected load and significantly higher operating hours than those assumed in *ex ante* calculations.

Lighting Retrofit Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
	Old	*New*	*Old*	*New*					
T8 to LED (cooler)	10	10	25	24	8,760		113	1.29	
T10 to LED (freezer)	8	8	135	24	8,760		11,668	1.50	
Total						657	11,781		1792%

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Lighting Retrofit	657	11,781	1729%	0.90
Total	657	11,781	1729%	0.90

CESP 11- Pharmacy #10703

Pharmacy retrofitted (27) fluorescent T8s with (18) LED light strips in their cooler and freezer cases. The exceptionally high realization rate is due to a slightly larger change in connected load and significantly higher operating hours than those assumed in *ex ante* calculations.

Lighting Retrofit Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
	Old	*New*	*Old*	*New*					
T8 to LED (cooler)	6	4	25	24	8,760		610	1.29	
T8 to LED (cooler)	9	6	28	24	8,760		1,220	1.29	
T8 to LED (freezer)	12	8	70	24	8,760		8,515	1.50	
Total						268	10,345		3859%

Verified Gross Savings/Realization Rates

Measure Category	kWh Savings			kW Savings
	Expected	Realized	Realization Rate	
Lighting Retrofit	268	10,345	3859%	.81
Total	268	10,345	3859%	.81

CESP 11- Fire Station

The Fire Station retrofitted (32) 4L T12 high output fixtures with (12) 6L T5 high output fixtures in their facility. The reduction in connected load and operating hours were greater than those assumed in *ex ante* calculations, resulting in a very high realization rate.

Lighting Retrofit Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Expected kWh Savings	Realized kWh Savings	Heating Cooling Interaction Factor	Realization Rate
	Old	New	Old	New					
4L 4' T12 HO to 6L T5HO	32	12	270	360	5,931	889	22,548	1.00	2536%
Total						889	22,548		2536%

Verified Gross Savings/Realization Rates

Measure Category	kWh Savings			kW Savings
	Expected	Realized	Realization Rate	
Lighting Retrofit	889	22,548	2536%	4.32
Total	889	22,548	2536%	4.32

CESP 11- Gas Station

Gas station retrofitted (11) fluorescent cooler doors lamps with LED strips. The high realization rate is due to *ex ante* calculations not including a heating and cooling interaction factor.

Lighting Retrofit Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Expected kWh Savings	Realized kWh Savings	Heating Cooling Interaction Factor	Realization Rate
	Old	New	Old	New					
T8 to LED	9	9	85	32	8,760	4,217	5,516	1.32	131%
T8 to LED	4	4	85	16	8,760	2,422	3,191	1.32	132%
Total						6,640	8,707		131%

Verified Gross Savings/Realization Rates

Measure Category	kWh Savings			kW Savings
	Expected	Realized	Realization Rate	
Lighting Retrofit	6,640	8,707	131%	0.75
Total	6,640	8,707	131%	0.75

CESP 11- School Facility

The school facility delamped (115) halogen lamps and retrofitted the remaining (612) with LED light strips. The high realization rate can be attributed to verified higher hours of operation than those assumed in *ex ante* calculations.

Lighting Retrofit Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Expected kWh Savings	Realized kWh Savings	Heating Cooling Interaction Factor	Realization Rate
	Old	New	Old	New					
HalogentoT8	612	612	32	18	3,604	8,078	33,872	1.10	419%
Delamping	115	-	32	-	3,604	14,352	14,548	1.10	101%
Total						22,430	48,420	.	216%

Measure Category	kWh Savings			kW Savings
	Expected	Realized	Realization Rate	
Lighting Retrofit	22,430	48,420	216%	12.25
Total	22,430	48,420	216%	12.25

CESP 11- Retail Store

Retail store #622 retrofitted (15) 8’ 2L F96 T8s with 4’ 2L F32RW T8s and (220) 4’ 4L T8s with 4’ 2L F32RW T8s. Additionally, (13) occupancy sensors were installed to control a portion of the newly-installed lighting.

Lighting Retrofit Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Expected kWh Savings	Realized kWh Savings	Heating Cooling Interaction Factor	Realization Rate
	Old	New	Old	New					
F96T8 8' 2L 59W to F32T8 4' 2L 28W	2	2	111	48	5,700		796	1.11	
F96T8 8' 2L 59W to F32T8 4' 2L 28W	13	13	111	48	5,700		5,176	1.11	
F32T8 4' 4L 32W to F32T8 4' 4L 28W	220	220	110	97	5,700		18,074	1.11	
Total							24,046		

Lighting Controls Savings Calculations

Measure	*Quantity*	*Controlled Wattage*	*Hours*		*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
			Old	*New*				
Controls	13	48	5,700	3,990		1,183	1.11	
Total						1,183		

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Lighting Retrofit		24,046		3.81
Sensors		1,183		-
Total	22,898	24,046	105%	3.81

NCEEP 11- Childcare/Preschool

Childcare/Preschool is a newly constructed one-story childcare and preschool facility. The building achieved savings over the baseline mainly through improvements to the building envelope, including an increase in wall insulation from R-21 to R-19+ R4 continuous and roof insulation R-38 to R-38+ R11 continuous , improved window performance from 0.35 SHGC/0.40 U to 0.28 SHGC/0.56 U, and window overhangs for external shading. In addition, lighting energy was reduced through use of more efficient fixtures than required and through controlling lighting schedules for many fixtures via the energy management system (EMS). Fan motors are premium efficiency, rather than the required high efficiency motors.

ADM reviewed all site documentation and performed an M&V site visit. After carefully reviewing all *ex ante* savings calculations, ADM found them to be sound and accurate.

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Entire Site	84,761	84,761	100%	431.00
Total	84,761	84,761	100%	431.00

CESP 11- Restaurant

Restaurant installed an energy management system to control HVAC and lighting usage. Controls did not reduce electricity consumption as much as *ex ante* estimates predicted. Though a 1.64 reduction in kW was observed, it was statistically insignificant.

Regression Results kWh

Intercept	34,786.37***
	(1,196.18)
Pre/Post install	-3,504.77***
	(801.74)
CDD	18.88***
	(2.01)
HDD	-3.72
	(4.01)
Observations	35
R-Squared	0.90

Standard errors in parenthesis.

*** to indicate that the p is statistically significance at the 0.01 level

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
EMS	88,920	42,057	47%	0
Total	88,920	42,057	47%	0

CESP 11- Auto Dealership

Auto dealership retrofitted (88) HID lamps with linear fluorescent lamps in their car lot.

Lighting Retrofit Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
	Old	*New*	*Old*	*New*					
MH to T8	15	15	458	221	2,985		10,612	1.00	
MH to T8	10	10	458	86	2,548		9,479	1.00	
MH to T8	43	43	1,080	240	2,548		92,034	1.00	
MH to T8	20	20	1,080	352	2,548		37,099	1.00	
Total						142,048	149,223		105%

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Lighting Retrofit	142,048	149,223	105%	57.96
Total	142,048	149,223	105%	57.96

CESP 11- Grocery Store

Grocery store retrofitted (240) T12 lamps with (74) T8 lamps at their Coachella Ranch Market location. The verified reduction in connected load was less than that assume din *ex ante* calculations.

Lighting Retrofit Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
	Old	*New*	*Old*	*New*					
T12 to T8	240	74	173	128	5,475	237,221	194,737	1.11	82%
Total						237,221	194,737		82%

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
	237,221	194,737	82%	32.05
Total	237,221	194,737	82%	32.05

CESP 10- Agriculture Facility

Agriculture facility documentation indicated that the site planned to install an oversized condenser and VFDs on evaporator supply fans resulting in an *ex ante* savings estimate of 307,627 kWh. However during their M&V site visit, ADM was informed that these retrofits had not yet taken place. Therefore, savings associated with this retrofit are zero kWh.

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
	307,627	0	0%	0
Total	307,627	0	0%	0

CESP 11- Furniture Showroom

Furniture showroom delamped and retrofitted (2,025) PAR 38 halogen lamps to (1,500) LED lamps and delamped (534) 2l T12 HO fixtures. A heating and cooling interaction factor was not included in *ex ante* calculations, resulting in a slightly high realization rate.

Lighting Retrofit Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Expected kWh Savings*	*Realized kWh Savings*	*Heating Cooling Interaction Factor*	*Realization Rate*
	Old	*New*	*Old*	*New*					
Halogen Par 38 to LED	187	1,500	90	16	4,000		(31,797)	1.11	
Halogen Par 38 to LED	1,838	-	60	-	4,000		489,067	1.11	
2L T12 F96 HO	534	-	237	-	4,000		561,256	1.11	
Total	1,500					918,672	1,018,525		111%

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Lighting Retrofit and delamping	918,672	1,018,525	111%	229.67
Total	918,672	1,018,525	111%	229.67

CESP 11- Hospital

The hospital retrofitted or installed the following energy saving measures:

- Chilled water supply temperature controls
- Installed/Repaired economizers
- Installed premium efficiency motors
- Replaced plumbing fixtures with low flow models
- Installed a VFD on the cooling tower
- Replaced inlet guide vanes with VFDs
- Replaced existing lighting with more efficient lighting
- Enabled VFDs for air handlers

ADM used project documentation, site visit data and billing data to develop an eQuest model for the site. *Ex Post* savings were very close to e*x ante* savings estimates, resulting in a 101% realization rate.

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
Overall site	927,331	940,137	101%	126.00
Total	927,331	940,137	101%	126.00

CESP 10- Casino

The casino replaced approximately 1400 tons of air-cooled direct-expansion air conditioning system with a new centralized chilled water plant. The chiller plant consists of two 900 ton electric centrifugal chillers and one 975 ton absorption chiller staged as backup. Three cooling towers serve the three chillers, as well as two 75 HP chilled water pumps, and two 50 HP condenser water pumps. *Ex ante* savings estimates were calibrated with a short period of billing data from a cooler than average year. Upon running eQuest simulations with a larger set of current billing data, ADM found site savings to be less than expected.

Verified Gross Savings/Realization Rates

Measure Category	*kWh Savings*			*kW Savings*
	Expected	*Realized*	*Realization Rate*	
	2,948,943	2,314,230	78%	421.00
Total	2,948,943	2,314,230	78%	421.00

Appendix B: Decision Maker Survey

As part of the evaluation work effort, a survey was made of a sample of decision makers for facilities that received rebates under one of IID's EE programs. That survey provided the information used in Chapter 3 to estimate free ridership for projects in the programs.

Each participant was interviewed using the survey instrument provided in Appendix B. The interviews were conducted by telephone. During the interview, a participant was asked questions about (1) his or her general decision making regarding purchasing and installing energy efficient equipment, (2) his or her knowledge of the program and (3) the influence that the program had on his or her decision to install EE measures (e.g., lighting measures, HVAC measures,).

Imperial Irrigation District

DECISION-MAKER SURVEY QUESTIONNAIRE

Hello, my name is _____. I am calling on behalf of **your utility company, Imperial Irrigation District.**

May I please speak to _____ *(Contact Person)?*

Hello, my name is _____. I am calling on behalf of your utility company, Imperial Irrigation District. Through its rebate programs IID has been working with firms and building owners to help them improve the energy efficiency of their operations. Because your company participated in their equipment rebate program, we are interested in receiving feedback from you regarding your experience with the program.

SECTION ONE - INTERVIEWEE SCREENING

SCRN-Q.1 According to our records your company participated in the rebates program for one or more projects at the following facility:

(Name of facility _____

According to our records your company participated in the rebates program for one or more projects in your home.

You are shown as the contact person. Is that correct?

(If contact seems confused, ask if they remember the rebate program. If necessary, describe program and distinguish from other programs.)

- ❑ Yes (GO TO SCRN-Q.2)
- ❑ No (GO TO SCRN-Q.2)

SCRN-Q.2 Many of our questions focus on your company's/home's decision to participate in the program and on your decisions to purchase and install energy efficient equipment for your facility. Are you the best person to talk to?

- ❑ No. Is there someone else who would be better for us to contact?

Who is that?

Name: _____

Title: _____

Phone Number: _____

(You are finished with this person.)

Thank you very much for your time

(START SHEET FOR NEW CONTACT PERSON ABOVE)
CALL THIS PERSON AND GO TO BEGINNING OF INTRODUCTION.

- ❑ Yes. "I am the best person to talk to". *Continue interview.*

*TO BEGIN, I HAVE SOME QUESTIONS REGARDING HOW **DECISIONS ABOUT ENERGY EFFICIENCY** IMPROVEMENTS ARE MADE FOR YOUR FACILITY.*

1. Which financial methods does your organization typically use to evaluate energy efficiency improvements for your facility? (READ ALL. YES, NO OR DK FOR EACH.) (CAN BE MULTIPLE RESPONSES)

- ❑ Initial Cost
- ❑ Simple payback *(Go to question 1.**a**)*
- ❑ Internal rate of return *(Go to question 1.**b**)*
- ❑ Life cycle cost *(Go to question 1.**c**)*
- ❑ Don't know *(Go to question 11)*

1.a What **payback** *length of time* do you normally require in order to consider an energy investment cost effective?
_____ Years *(Go to question 11.)*

1.b What **rate of return** do you normally require in order to consider an energy investment cost effective? _____%
(Expect answers 10 to 30 %.) (Go to question 11.)

1.c What **discount rate** do you normally use in determining the life-cycle costs of various equipment options?_____%
(Expect answers 3 to 30 %.) (Go to question 11.)

QUESTIONS 2 through 11 ASKED FOR EACH TYPE OF END USE EQUIPMENT OR MEASURE FOR WHICH CUSTOMER RECEIVED A FINANCIAL INCENTIVE. LISTED FROM PROGRAM RECORDS.:

I now have some questions about particular types of equipment for which you received financial incentives.

According to EPEs records, you received incentives for (insert Equipment/Measure _____

2. Before participating in the Business Custom Efficiency Program, had you installed any equipment or measure similar to [Rebated Equipment/Measure] at your facility?
   - ❑ Yes
   - ❑ No

3. Did you have plans to install [Equipment/Measure] before participating in the program?
   - ❑ No
   - ❑ Yes

   If Yes: 3a Would you have gone ahead with this planned installation even if you had not participated in the program?
   - ❑ Yes
   - ❑ No

4. How important was previous experience with the SPS Business Custom Efficiency Program in making your decision to install [Equipment/Measure]? Is it… (READ LIST)
   - ❑ Very important
   - ❑ Somewhat important
   - ❑ Only slightly important
   - ❑ Not important at all
   - ❑ Or you did not have previous experience with the program
   - ❑ Don't know *(DON'T READ)*

5. Did an SPS Energy Specialist or Account Representative recommend that you install [Equipment/Measure]?
   - ❑ No
   - ❑ Yes

   If Yes: 5a If the Lighting Efficiency Program representative had not recommended installing [Equipment/Measure], how likely is it that you would have installed [Equipment/Measure] anyway? You… (READ LIST)
   - ❑ Definitely would have installed
   - ❑ Probably would have installed
   - ❑ Probably would not have installed
   - ❑ Definitely would not have installed
   - ❑ Don't know *(DON'T READ)*

6. Would you have been financially able to install [Equipment/Measure] without the financial incentive from the Business Custom Efficiency Program?
   - ❑ Yes

- ❑ No
- ❑ Don't know

7. If the **financial incentive** from the Business Custom Efficiency Program had not been available, how likely is it that you would have installed [Equipment/Measure] anyway? You… (READ LIST)
   - ❑ Definitely would have installed
   - ❑ Probably would have installed
   - ❑ Probably would not have installed
   - ❑ Definitely would not have installed
   - ❑ Don't know *(DON'T READ)*

8. How did the availability of information and financial incentives through the Custom Efficiency Program affect the quantity (or number of units) of [Equipment/Measure] that you purchased and installed? Did you purchase and install more [equipment/measure] than you otherwise would have without the program?
   - ❑ Yes
     IF YES: 8a How much more? _____
   - ❑ No, Did not affect quantity purchased and installed

9. How did the availability of information and financial incentives through the Custom Efficiency Program affect the level of energy efficiency you chose for [Equipment/Measure]? Did you choose equipment that was more energy efficient than you otherwise would have chosen because of the program?
   - ❑ Yes
     IF YES: 9a How much more efficient? (could be expressed in different ways. Ask for percentage: e.g., 10% more efficient) _____
   - ❑ No, program did not affect level of efficiency that we chose for equipment

10. How did the availability of information and financial incentives through the Business Custom Efficiency Program affect the timing of your purchase and installation of [Equipment/Measure]? Did you purchase and install [equipment/measure] earlier than you otherwise would have without the program?
    - ❑ Yes
      ⬇
      IF YES: 10a When would you otherwise have installed the equipment? (READ IF NEEDED)
      - ❑ In less than 6 months later
      - ❑ In 6-12 months later
      - ❑ In 1-2 years later
      - ❑ In 3-5 years later
      - ❑ In more than 5 years later
    - ❑ No, did not affect timing of purchase and installation

11. When did you learn of the Business Custom Efficiency Program? (READ. ONE ONLY)
- ❑ You had participated in other energy efficiency incentive programs
- ❑ Before planning for replacing the equipment began
- ❑ During your planning to replace the equipment
- ❑ Once equipment had been specified but not yet installed
- ❑ After equipment was installed
- ❑ Some other time (When? _____)

- ❑ Don't know *(Don't Read)*