



A unit of American Electric Power

Southwestern Electric Power Company

**Louisiana Energy Efficiency
Program Portfolio PY1 Annual Report**

Docket No. R-31106

March 1, 2016

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1.0 Executive Summary

This report is provided to the Louisiana Public Service Commission (“LPSC”) as the review of the first year of Quick Start Energy Efficiency programs for the SWEPCO Louisiana (SWEPCO) service territory. Pursuant to LPSC Docket No. R-31106, this report is filed at 30 months in the timeline for implementation of Quick Start Energy Efficiency Programs. In order to comply with providing information as required by the rule, the Arkansas Public Service Commission (“APSC”) Standardized Annual Report Packet (“SARP”) was utilized. This report has two sections:

- A narrative report containing program descriptions; activity; savings; participation and trainings; Evaluation, Measurement and Verification (EM&V) overview; staffing levels; and information provided to consumers to promote programs
- A workbook detailing program budget, costs, savings and cost-benefit analysis

SWEPCO began implementation of programs on Nov. 1, 2014, with Program Year 1 (“PY1”) concluding on Oct. 31, 2015. In PY1, the following was achieved through the implementation of four programs in the portfolio:

	Target	Achieved	Percentage%
Demand Savings (kW)	1,640	1,344	82 %
Energy Savings (kWh)	6,053,246	7,129,259	118 %

Overall, the entire portfolio performed very well. After third party evaluations were applied to savings claimed, three of the four programs in the portfolio exceeded their energy-savings targets. Residential Solutions, which did not achieve energy-savings targets, achieved 99.1% of goal. In the first year of Quick Start programs:

- Customer awareness of the availability of programs was achieved via website development (<http://www.swepcogridsmart.com/louisiana/>), marketing materials creation, direct outreach from the Program team and direct outreach from participating contractors.
- Contractors were trained and actively participated in the programs. Evidence provided during process evaluation links program participation with positive economic growth for these contractors and local businesses.
- All programs met the Total Resource Cost test (TRC) and Utility Cost Test (UCT) requirements pursuant to LPSC Docket No. R-31106.
- 99.3% of incentive dollars were expended and programs remained within operating budgets.

2.0 Portfolio Impact

Program Savings

Program Name	Peak Demand Savings (kW)	Energy Savings (kWh)
Income Qualified Residential Solutions	130	419,452
Residential Solutions	610	2,533,743
Small Business Direct Install	316	1,246,605
Large Commercial Solutions	288	2,929,459
Total	1,344	7,129,259

Program Costs

Program Name	2015 Budget (\$)	2015 Actual (\$)
Income Qualified Residential Solutions	236,443	265,550
Residential Solutions	791,835	854,774
Small Business Direct Install	390,277	384,110
Large Commercial Solutions	506,138	490,432
Total	1,924,693	1,994,866

3.0 Portfolio Programs

3.1 Residential Solutions Program

3.1.1 Program Description

The Residential Solutions program encourages customers to install or implement energy efficiency improvements and measures in residential homes and multifamily properties. All residential SWEPCO customers are eligible to participate in the program.

The Residential Solutions program promotes energy efficiency by offering home energy surveys and/or deeper energy assessments to its residential customers through a participating trade ally. The program provides residential customers with access to contractors within the SWEPCO service area. The participating contractor helps the residential customer analyze their energy use, identify energy efficiency improvements and install low-cost measures in their home. Following the assessment, the contractor

will recommend home improvements to increase energy efficiency. The program provides incentives for installing ceiling insulation, duct sealing, air infiltration sealing, central air conditioning, heat pump systems and high-performance tune-ups for central air conditioning and heat pump systems. Multifamily housing is also eligible to participate for specific measures in the program. This approach enables SWEPCO to develop long-term customer relationships while capturing ongoing energy savings in the existing home market. Participating contractors must hold either a Building Performance Institute (BPI) or Home Energy Rating System (HERS) certification to participate in the program.

The Residential Solutions program utilizes participating contractors as the primary channel of direct marketing to customers. To do this, the program recruits active, local contractors specializing in insulation, weatherization and HVAC. Contractor trainings are provided by implementation staff. Training subject matter includes program protocols and technical expertise on efficiency equipment. Approved contractors are required to sign a participation agreement and abide by all protocols and reporting requirements. To certify that participating contractors are adhering to program rules and providing customers with quality products and installations, program staff conducts site inspections and request customer feedback for a sample of projects.

3.1.2 Program Highlights

In PY1, the program proved to be a success in terms of customer participation, contractor participation and savings goals.

- Energy savings were achieved with the successful installation of eligible measures for 888 unique households.
- 99.3% of the incentive budget was paid to twenty-one contractors approved to participate in the program.
- kWh Ex Ante savings exceeded the kWh goal by 1.4 %.¹
- As calculated by the Third Party Evaluator (TPE), a TRC of 2.05 was achieved and a UCT of 2.91 was achieved.²
- The program achieved a kWh realization rate of 97.4% and a kW realization rate of 114.6%.³

¹ Appendix A, ADM PY1 Evaluation Report, 2

² Appendix A, ADM PY1 Evaluation Report, iii

³ Appendix A, ADM PY1 Evaluation Report, 2

- Market transformation is occurring. Findings from the TPE showed that 36% of participants became aware of the program from family members, friends or colleagues.⁴
- When surveyed by the TPE, customers indicated that they were most satisfied with the quality of the contractor’s work, the time it took staff to address questions/concerns and the program overall.
- In addition to changes in the services provided, two respondents (participating contractors) said that participation in the program has led them to increase their staffing by two to three full-time employees. Two other contractors reported that to meet the needs to deliver the program services, they have hired between 10 and 12 full-time employees. One of these respondents also indicated that their firm opened a new office located in Louisiana.

3.1.3 Program Budget, Savings & Participants

Residential Solutions PY1											
Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants*		
Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
\$791,835	\$854,774	108%	2,565,240	2,533,743	99%	717	610	85%	6,782	6,412	95%

*Participants are defined as measures installed

3.1.4 Program Events & Training:

On October 21, 2014, SWEPCO held a kick-off event for local SWEPCO staff. The purpose of this meeting was to introduce employees to the Louisiana Energy Efficiency (EE) programs. This included 1) details of the programs available to Louisiana customers 2) key differences between Louisiana, Arkansas, and Texas programs and 3) Introduce implementer staff for communication purposes. Approximately 35 people were in attendance. Attendees included implementation staff and customer service representatives.

On October 29, 2014, a similar meeting was held to introduce interested local and area contractors to the SWEPCO Louisiana Quick Start programs. Information provided included key program participation details, important dates and requirements to become an approved contractor. There were 42 in attendance, representing 18 different companies.

⁴ Appendix A, ADM PY1 Evaluation Report, 42

3.1.5 Planned or Proposed Changes to Program & Budget

Upon a review of incentive budgets and an informal polling of contractors who offer installation of eligible measures, the program will no longer offer incentives for duct blaster or blower door testing. By discontinuing this incentive, more incentives are available to apply to measure installations.

There are no budget changes from the AEP SWEPCO Quick Start Energy Efficiency Portfolio Plan as filed with the LPSC are planned. PY2 budget is as follows:

Program	Rate Class	Administration and Planning	Promotion and Advertising	Delivery and Vendors	Participant Contributions (IMC)
Residential Solutions	Residential	\$70,867.18	\$7,874.13	\$303,453.00	\$850,430.00

3.2 Income Qualified Program

3.2.1 Program Description

The SWEPCO Low Income Program targets and offers comprehensive weatherization services to qualified low-income, single-family homes and low-rise, multifamily dwellings. Implementation occurs through local participating contractors who provide energy efficiency upgrades available to income-qualifying customers. The program's objective is to educate customers on how they are using energy, identify opportunities for energy savings specific to their home and prioritize a wide range of energy-conservation measures that will allow them to save energy immediately. To certify that participating contractors are adhering to program rules and providing customers with quality products and installations, program staff conducts site inspections and request customer feedback for a sample of projects.

The Income Qualified program provides customers with household incomes at or below 200% of the 2013 Federal income eligibility guidelines with home-energy upgrades at low or no cost. Customers are required to submit proof for each household member earning an income. Once the customer qualifies, the customer's home will be assigned to a participating contractor for weatherization services. The program offers these customers a free home-energy assessment through a qualified and participating contractor. The program offers audit and installation practices similar to national public weatherization grant programs. The participating contractor will assess building state, collect data and generate an energy efficiency improvement report for each home audited. Assessments and/or surveys are not required to install qualified measures. Qualifying customers are eligible to receive up to \$2,500 per home for home-improvement upgrades with measures included in the program.

Customer recruitment occurs through incoming customer inquiries and participating customers' direct outreach. Program staff is available to attend special community events to recruit participants. SWEPCO customer service representatives can also identify customers with high energy use to participate and refer them to the program.

3.2.2 Program Highlights

- Energy savings were achieved with the successful installation of eligible measures for 172 unique households.
- 98% of the incentive budget was paid to eighteen contractors approved to participate in the program.
- kWh Ex Ante savings exceeded the kWh goal by 46%.

- As calculated by the TPE, a TRC of 1.72 was achieved and a UCT of 1.79 was achieved.
- The Program achieved a kWh realization rate of 105% and a kW realization rate of 146%⁵.
- 75% of program participants surveyed were “very satisfied” with the program overall, while 25% were “satisfied”.⁶
- Four of the five survey respondents agreed that the recommendations (from contractors) were relevant and easy to understand, as well as agreeing that the energy consultant was courteous and professional.⁷
- Surveys by the TPE indicated that all survey respondents reported that the program either greatly increased their satisfaction with SWEPCO (60%) or increased their satisfaction somewhat (40%).⁸

3.2.3 Program Budget, Savings & Participants

Income Qualified Residential Solutions PY1											
Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants*		
Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
\$236,443	\$265,550	112%	273,895	419,452	153%	91	130	143%	678	849	125%

*Participants are defined as measures installed

3.2.4 Program Events & Training:

On October 21, 2014, SWEPCO held a kick-off event for local SWEPCO staff. The purpose of this meeting was to introduce employees to the Louisiana EE programs. This included 1) details of the programs available to Louisiana customers 2) key differences between Louisiana, Arkansas, and Texas programs and 3) Introduce implementer staff for communication purposes. Approximately 35 people were in attendance. Attendees included implementation staff and customer service representatives.

On October 29, 2014, a similar meeting was held to introduce interested local and area contractors to the SWEPCO Louisiana Quick Start programs. Information provided included key program participation details, important dates and requirements to become

⁵ Appendix A, ADM PY1 Evaluation Report, 2

⁶ Appendix A, ADM PY1 Evaluation Report, 52

⁷ Appendix A, ADM PY1 Evaluation Report, 53

⁸ Appendix A, ADM PY1 Evaluation Report, 48

an approved contractor. There were 42 in attendance, representing 18 different companies.

3.2.5 Planned or Proposed Changes to Program & Budget

Upon a review of incentive budgets and an informal polling of contractors who offer installation of eligible measures, the program will no longer offer incentives for duct blaster or blower door testing. By discontinuing this incentive, more incentives are available to apply to measure installations.

There are no budget changes from the AEP SWEPCO Quick Start Energy Efficiency Portfolio Plan as filed with the LPSC are planned. The PY2 budget is as follows:

Program	Rate Class	Administration and Planning	Promotion and Advertising	Delivery and Vendors	Participant Contributions (IMC)
Low Income	Residential	\$17,510.69	\$1,945.63	\$72,205.00	\$114,870.00

3.3 Small Business Direct Install Program

3.3.1 Program Description

SWEPCO Small Business Direct Install program offers enhanced incentives to small business owners to help overcome the first-cost barrier unique to the small business market. This barrier interferes with small business adoption of energy efficiency measures. By offering enhanced financial incentives, the program generates significant cost-effective energy savings for small businesses using added market-segmented strategies that encourage the adoption of diverse efficiency measures in target sub-sectors. The target market for the Program is small business customers in SWEPCO territory with a peak demand less than 100 kW. The most common customers in this type of program are offices, service shops, restaurants, lodging, retail and convenience stores.

The small business program offers technical assistance effective in removing market barriers for small business customers. This includes providing free walk-through facility assessments to educate the business owner on the value of energy efficiency. Incentives offered for energy efficiency measures utilize a streamlined approach for enrollment, installation and savings verification. The program develops and maintains a local trade ally network to provide additional outreach and customer participation.

Tools and training are provided to contractors to help quantify the energy savings and incentives for small business customers. Trained and qualified contractors are provided

auditing software that enables contractors to complete assessments on-site. The software summarizes energy savings, estimates incentives, calculates financial paybacks and generates a customer proposal/project application. Technical support and ongoing training for the software are provided by the program as well. To ensure that participating contractors are adhering to program rules and providing customers with quality products and installations, program staff conducts site inspections and request customer feedback for a sample of projects.

In addition to lighting retrofit measures, the program includes direct installation of low-cost energy efficiency measures. These measures include low-cost CFLs/other low-cost lighting measures as well as low-flow devices for electric hot water. A qualified network of contractors offers facility surveys, generates a customer proposal and receives a commitment from the customer through a signed project application that is submitted to the SWEPCO team for approval.

3.3.2 Program Highlights

- Energy savings were achieved with the successful installation of eligible measures for 52 unique accounts.
- 99.1% of the incentive budget was paid to Fifty two contractors approved to participate in the program.
- kWh Ex Ante savings exceeded the kWh goal by 1%.
- The program achieved a kWh realization rate of 102% and a kW realization rate of 103%⁹
- None of the contractors interviewed by the TPE indicated dissatisfaction with the program.¹⁰
- 50% of program respondents indicated that they learned about the program through participating contractors, which is consistent with program design.¹¹
- 88% of program respondents were motivated to participate by saving money on energy bills.¹²
- All contractors surveyed by the TPE stated that the training they received met their needs for understanding the program.¹³

⁹ Appendix A, ADM PY1 Evaluation Report, 2

¹⁰ Appendix A, ADM PY1 Evaluation Report, 52

¹¹ Appendix A, ADM PY1 Evaluation Report, 42

¹² Appendix A, ADM PY1 Evaluation Report, 43

3.3.3 Program Budget, Savings & Participants

Small Business Direct Install PY1											
Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants*		
Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
\$390,277	\$384,110	98%	1,209,420	1,246,605	103%	310	316	102%	4,802	5,047	105%

*Participants are defined as measures installed

3.3.4 Program Events & Training:

- Sept. 30, 2014—SWEPCO Employee Kickoff Meeting
 - Purpose: To introduce SWEPCO employees to EE programs. This included introductions to the program team, the purpose of EE programs from a utility perspective, the programs available to SWEPCO customers and basic rules by each EE program.
 - Attendance: Approximately 35 people were in attendance. Attendees included implementation staff and customer service representatives.
- March 24, 2015—LED Seminar
 - Topic: LED technology, advanced lighting controls, energy savings and financial comparisons between lighting technologies
 - Attendance: Sixty-four attendees from 30 separate organizations
- In-person training provided by program staff to 15 contractor organizations with a total training time of approximately 30 hours

3.3.5 Planned or Proposed Changes to Program & Budget

There are no program or budget changes from the AEP SWEPCO Quick Start Energy Efficiency Portfolio Plan as filed with the LPSC are planned. The PY2 budget is as follows:

Program	Rate Class	Administration and Planning	Promotion and Advertising	Delivery and Vendors	Participant Contributions (IMC)
Small Business	Non-residential	\$30,130.65	\$3,347.85	\$114,087.14	\$238,712.95

¹³ Appendix A, ADM PY1 Evaluation Report, 11

3.4 Commercial and Industrial Solutions Program

3.4.1 Program Description

The SWEPCO Large Commercial and Industrial (C&I) program is designed to support larger commercial and industrial customers with a peak demand of 100 kW and higher by identifying electric energy-savings opportunities and overcoming the market barriers to implementing cost-effective, energy-efficient investments. The program promotes both prescriptive and custom measures. Prescriptive measures have deemed savings per the Arkansas TRM 3.0. Incentives for eligible measures are paid on a \$/kWh saved per-project basis.

The program helps customers identify projects that they might not otherwise undertake or have the staff expertise to identify. These projects may include direct install, process improvements, other system-level custom projects and/or projects involving unique equipment not part of the prescriptive offerings. Program staff pre-inspects and pre-approves projects eligibility and provides M&V services or review as needed. All project savings are verified via post inspection and/or a thorough review of M&V data (where applicable).

The program is promoted to key trade allies (e.g., engineering firms, energy service providers, contractors) so they can promote participation to their customers. The primary promotional channels for the program are direct outreach from program staff, SWEPCO customer service representative outreach to customers and customer inquiry follow-up.

3.4.2 Program Highlights

- kWh Ex Ante savings exceeded the kWh goal by 47%.
- Energy savings were achieved with the successful installation of eligible measures for 18 unique accounts.
- 99.9% of the incentive budget was paid to businesses or contractors.
- Fifteen energy assessments provided by the program with an identified value of 315.56 kW savings and 1,777,902 kWh savings, and a conversion rate of 73% to actual projects
- The program achieved a kWh realization rate of 99.7% and a kW realization rate of 99.6%.¹⁴

¹⁴ Appendix A, ADM PY1 Evaluation Report, 2

- 75% of respondents thought the program provided clear information on how to complete the application, and none reported that the information was unclear.¹⁵
- When interviewed by the TPE, one contractor stated that as a result of SWEPCO’s program, their business began pushing lighting upgrades and has expanded its business.¹⁶
- The TPE concluded that in the first year of Quick Start that the program had robust quality control and verification procedures in place in PY1.¹⁷

3.4.3 Program Budget, Savings & Participants

Large Commercial Solutions PY1											
Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants*		
Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
\$506,138	\$490,432	97%	2,004,691	2,929,459	146%	522	288	55%	6,186	4,706	76%

*Participants are defined as measures installed

3.4.4 Program Events & Training:

- Sept. 30, 2014—SWEPCO Employee Kickoff Meeting
 - Purpose: To introduce SWEPCO employees to EE programs. This included introductions to the program team, the purpose of EE programs from a utility perspective, the programs available to SWEPCO customers and basic rules by each EE program.
 - Attendance: Approximately 35 people were in attendance. Attendees included implementation staff and customer service representatives
- March 24, 2015—LED Seminar
 - Topic: LED technology, advanced lighting controls, energy savings and financial comparisons between lighting technologies
 - Attendance: Sixty-four attendees from 30 separate organizations.

¹⁵ Appendix A, ADM PY1 Evaluation Report, 130

¹⁶ Appendix A, ADM PY1 Evaluation Report, 133

¹⁷ Appendix A, ADM PY1 Evaluation Report, 11 & 134

3.4.5 Planned or Proposed Changes to Program & Budget

To promote a higher kW:kWh ratio than what was achieved in PY1, the program team plans to implement a tiered maximum incentive by kW achieved. Additionally, the maximum incentive will be raised from \$25,000 to \$30,000.

Tier Level	Maximum Incentive
Tier 1: 0 kW to <10 kW	\$10,000
Tier 2: 10 kW to <20 kW	\$20,000
Tier 3: 20 kW and over	\$30,000

No budget changes from the AEP SWEPCO Quick Start Energy Efficiency Portfolio Plan as filed with the LPSC are planned. The PY2 budget is as follows:

Program	Rate Class	Administration and Planning	Promotion and Advertising	Delivery and Vendors	Participant Contributions (IMC)
Large C&I	Non-residential	\$38,728.84	\$4,303.20	\$157,759.60	\$548,912.18

4.0 Evaluation, Measurement & Verification

4.1 Overview

For PY1 an independent, third-party evaluator was selected to evaluate ex ante savings for each program. Two standards were used to evaluate these savings. For deemed savings measures, adherence to prescriptive savings as specified in Arkansas TRM V3.0 was evaluated. For measures not addressed in AR TRM V3.0 requiring measurement and verification, adherence to International Performance Measurement and Verification Protocols (IPMVP) was assessed.

4.2 Program Evaluation

Residential Solutions and Income Qualified Programs—EM&V Procedures

The evaluation approach for both of these programs was very similar. The programs provided comprehensive energy savings through on-site technical assessments and recommendations for lighting, HVAC and building envelope improvements. To evaluate energy savings, the TPE conducted on-site verification. In addition to on-site verification, energy-savings calculation verifications were completed as well as standard process evaluation activities (e.g., satisfaction surveying, contractor interviewing). The TPE reviewed the implementation plan, marketing materials and outreach efforts associated with reaching the target market for the programs. Upon completion of the review, the TPE prepared a sampling plan as part of a preliminary measurement and valuation plan for the programs.

As part of the deem-and-verify approach, on-site visits to a sample of participants were required to obtain primary data to verify installation rates. This site evaluation plan specified the specific measurements, equipment, duration and calculations for each energy-conservation measure. An early sample was taken shortly after initiation of the program, and this data was used in the process evaluation report as well as for real-time feedback on the success of the program.

The data collected from the tracking system and on-site visits was used to support two estimates of program impacts: an ex ante gross impacts estimate (from the tracking system) and the ex post “verified” gross impacts estimate from the documentation review and on-site evaluation efforts.

Large Commercial & Industrial Program—EM&V Procedures

Small and large commercial market sectors received incentives based on prescriptive measures. Custom measures were not completed in PY1; however, for future program

years, the evaluation procedures are covered here. The TPE's general approach to conducting program EM&V was to develop samples for each program channel, with projects selected by expected kWh savings. Using this process, the TPE selected most, if not all, of the largest projects and a sample of smaller projects.

Custom Track

If custom measures are installed in the future, the TPE will conduct EM&V in real-time in partnership with SWEPCO. The TPE will perform real-time monitoring on a census of custom projects. This will have the net effect of being less costly than traditional M&V (where the evaluator would draw a separate sample for on-site monitoring) in that it removes duplication of effort. Customers will only be subjected to one round of on-site verification and monitoring, minimizing the time and hassle on the part of the participating customer.

Prescriptive Track

The EM&V of the prescriptive track within the program applied a simplified approach that utilized Arkansas TRM V3.0 deemed savings specifications. As part of the evaluation, the TPE carefully reviewed the analyses and calculations that were used to develop deemed or stipulated savings values for the measures that are incentivized through the program. The TPE evaluated the analysis for each measure, according to the degree to which the savings calculations are supported and defensible and documentation is adequate. To facilitate review of savings calculations, the TPE recorded whether the methodology used for the calculation was appropriate, assumptions used were reasonable and appropriate and savings calculations were done correctly.

Small Business Program—EM&V Procedures

The program provided customers with no- and low-cost energy efficiency improvements. The measures were prescriptive with established deemed savings values in the Arkansas TRM V3.0. As a result, the EM&V effort for small businesses focused around independent verification inspections for a sample of participating facilities. One difference in how impact evaluation was conducted for the program, however, is that a sampling approach was dependent on the trade ally rather than project size for the following reasons:

- Projects in the program will typically have less variation than in programs such as the Large C&I Solutions program. There is typically a more limited menu of measures, and most facilities are of relatively similar size.

- This program is reliant upon a mix of participating trade allies and implementation staff in engaging customers and installing measures. The risk associated with direct-install programs is that a QA/QC failure shortfall from an installing contractor can be multiplied to a large number of projects should it go unnoticed. By sampling by installer, the program mitigates this issue by identifying specific issues with each contractor.

When conducting the process evaluation of the program, a primary focus was on the training of the participating contractors. The process evaluation included a review of the training procedures of the participating contractors and a review of the trade ally agreements. This ensured there are the necessary QA/QC safeguards and that contractors are properly incentivized to provide the types of outreach and installations that SWEPCO needs.

4.3 Cost Benefit – Third Party Evaluator Results

Program	Verified Peak Demand Reduction (kW)	Verified Annual Energy Savings (kWh)	Lifetime Energy Savings (MWh)	Total Non-Incentive Expenditures	Total Incentives	TRC (b/c ratio)	UCT (b/c ratio)
Residential Solutions	610.11	2,533,743	43,026	\$492,555	\$362,219	2.05	2.91
Income Qualified	129.87	419,452	8,028	\$157,999	\$107,551	1.72	1.79
Small Business Solutions	315.67	1,246,605	15,004	\$193,402	\$190,708	2.18	2.31
Large Commercial & Industrial	288.36	2,929,459	35,390	\$260,530	\$229,902	1.80	3.06
Total	1,344.02	7,129,259	101,448	\$1,104,486	\$890,380	1.96	2.68

5.0 Supplemental Requirements

5.1 Training

<u>Training</u>	<u>Sessions</u>	<u>Attendees</u>	<u>Man Hours</u>
External	41	231	434
Internal	1	35	88

5.2 Lost Revenue

LCFC PY1

In SWEPCO’s initial Quick Start filing, a level of LCFC was estimated for PY1 for each EECR customer class, residential and non-residential. The LCFC was determined by

multiplying the estimated class LCFC factor by the annual level of energy savings projected to be achieved through PY1 for each class. The estimated class LCFC factors for PY1 were calculated using the class energy-related revenues including the formula rate plan energy-related revenues/credits for the twelve-month period including the billing months of May 2013 through April 2014 divided by the class kWh for that same period.

SWEPCO has performed a true-up of the estimated PY1 LCFC based on the actual kWh savings achieved in PY1 and a re-determined class LCFC factor. The LCFC Factors were re-determined by dividing the actual PY1 period energy-related revenue, including related Formula Rate Plan revenue for each class, by the actual PY1 period kWh for each class. The PY1 period covered November 2014 through October 2015. The original estimate for PY1 LCFC was \$201,050. The actual LCFC for PY1 is \$250,326. The total under-recovery of the LCFC has been included in the calculation of the annual EECR rate redetermination through the prior period over/under amount (TUA).

LCFC PY2

An estimated level of LCFC has been determined for PY2 for each EECR customer class. The PY2 estimated LCFC was determined by multiplying the re-determined EECR class LCFC Factor (used in the PY1 LCFC true-up) by the annual level of energy savings projected to be achieved through PY2. The estimated level of PY2 LCFC is \$248,131 as shown in the table below. The estimated PY2 LCFC is included as part of the annual redetermination of EECR rates.

<u>Rate Class</u>	<u>Annual Gross Savings - kWh Savings PY2</u>	<u>Estimated PY2 LCFC Factor</u>	<u>LCFC PY2 Estimate</u>
Non residential	3,713,582	\$0.02218	\$82,367.23
Residential	3,104,194	\$0.05340	\$165,763.96
All Classes	6,817,776		\$248,131.19

5.3 Staffing

SWEPCO staffs the programs with 1.5 full-time equivalent employees. The Third Party Implementer staffs the program with an additional 3.5 full-time equivalent employees. Currently, there are no plans to change staffing levels for PY2.

5.4 Information Provided to Consumers to Promote EE

The programs utilized a direct marketing approach via program staff and participating contractors. Marketing materials were developed for use within the programs. Copies of this material can be accessed at <http://www.swepcogridsmart.com/louisiana/contractor-center.html>.

6.0 Appendix A – PY1 Evaluation Report by ADM

Evaluation of PY1 Energy Efficiency Programs Portfolio

Submitted to:
Southwestern Electric Power Company Louisiana

January 2016

Final Draft

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1. Executive Summary

This report is to provide a summary of the evaluation effort of the 2014-2015 (“Program Year 1” or “PY1”) Energy Efficiency (EE) portfolio by Southwestern Electric Power Company (SWEPCO), Louisiana. This evaluation was led by ADM Associates Inc. (“ADM”, “The Evaluators”). This report provides verified gross and net savings estimates for evaluated programs.

1.1 Summary of SWEPCO Energy Efficiency Programs

In PY1, the SWEPCO EE portfolio contained the following programs:

- Residential Solutions;
- Income Qualified;
- Small Business Direct Install; and
- Large Commercial and Industrial Solutions.

1.2 Evaluation Objectives

The goals of the PY1 EM&V effort are as follows:

- For prescriptive measures, verify that savings are being calculated according to appropriate Arkansas TRM V3.0, adapted for Louisiana weather, guidelines.
- For custom measures, this effort comprises the calculation of savings according to accepted protocols (such as IPMVP). This is to ensure that custom measures are cost-effective and provide reliable savings.
- Conduct process evaluation of all SWEPCO programs and of the portfolio overall. This is to provide a comprehensive review of program operations, marketing and outreach, quality control procedures, and program successes relative to goals. From this, the Evaluators are to provide program and portfolio-level recommendations for SWEPCO. Process evaluation activities include interviews of key program actors, surveys of participants and non-participants, literature reviews and best-practices assessments, and documentation of program activities, successes, and shortcomings.

1.3 Impact Findings

Table 1-1 and 1-2 present the gross impact by program.

Table 1-1 Gross Impact Summary

Program	Annual Energy Savings (kWh)		Realization Rate	Peak kW		Realization Rate
	Ex Ante	Ex Post		Ex Ante	Ex Post	
Residential Solutions	2,600,477	2,533,743	97.43%	532.32	610.11	114.61%
Income Qualified	398,666	419,452	105.21%	89.20	129.87	145.59%
Small Business Direct Install	1,216,343	1,246,605	102.49%	306.80	315.67	102.89%
Large Commercial and Industrial	2,939,410	2,929,459	99.66%	289.42	288.36	99.63%
Total	7,154,896	7,129,259	99.64%	1,217.74	1,344.02	110.37%

The contribution to portfolio savings by program is summarized in Figure 1-1

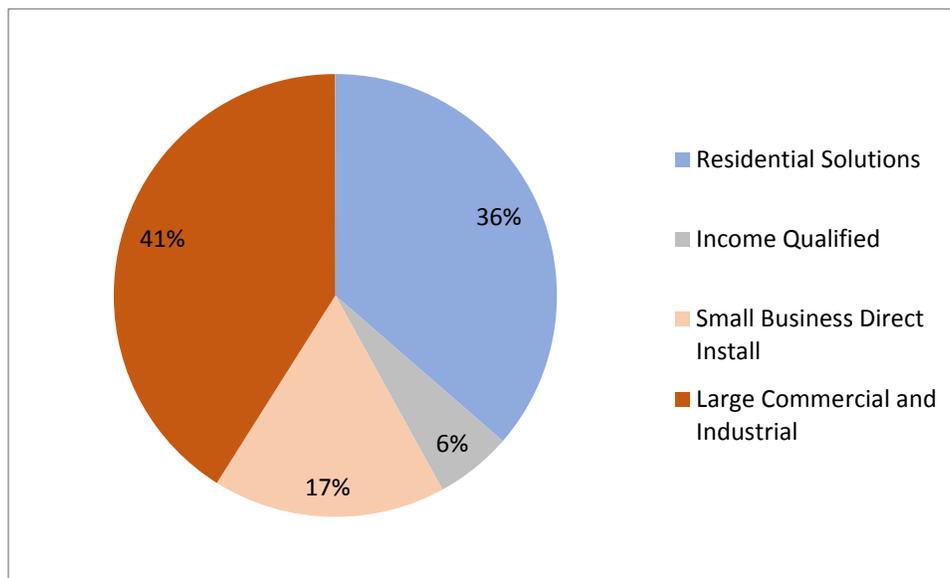


Figure 1-1 Contribution to Portfolio Savings by Program

Figure 1-2, Figure 1-4 and summarize the share of savings by measure category for Residential Solutions, Income Qualified and Small Business, respectively.

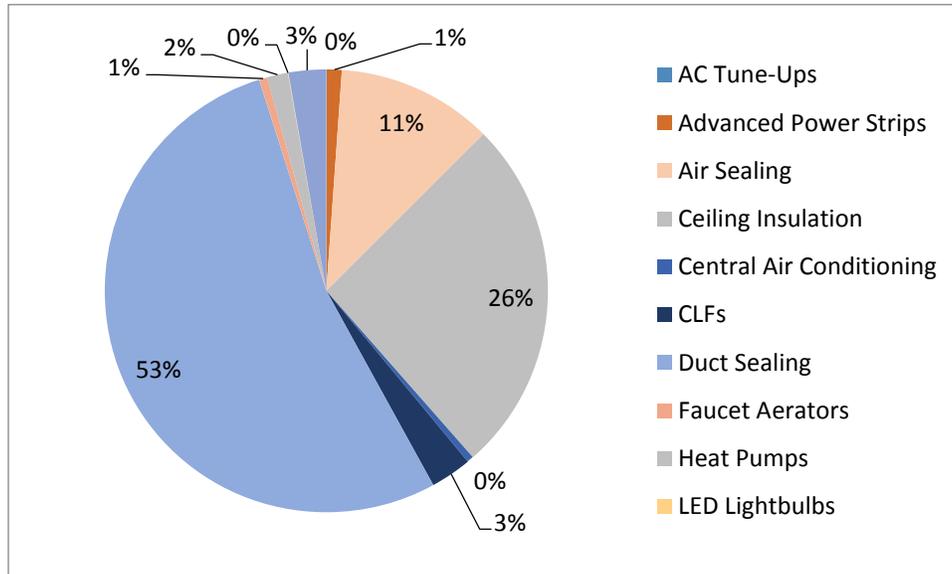


Figure 1-2 Savings Share by Measure – Residential Solutions

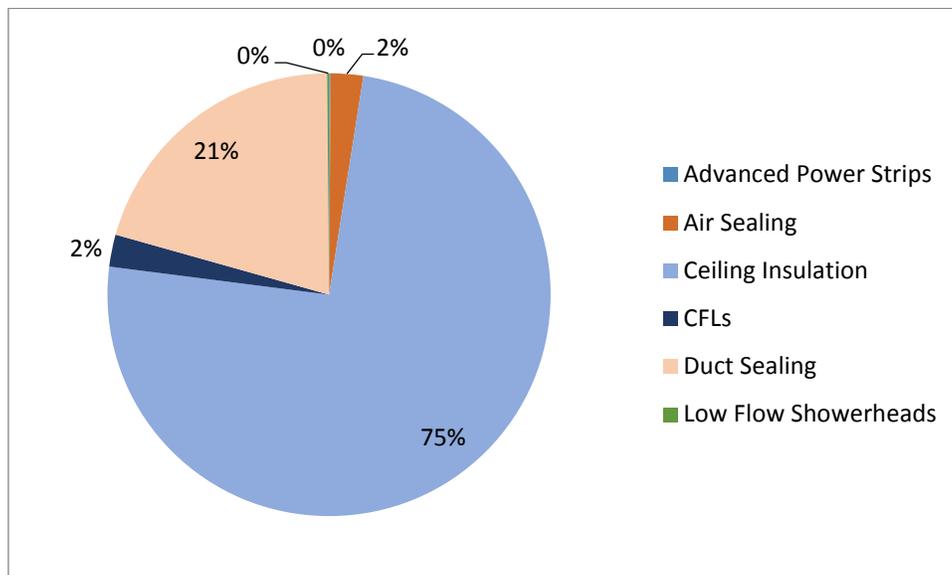


Figure 1-3 Savings Share by Measure – Income Qualified

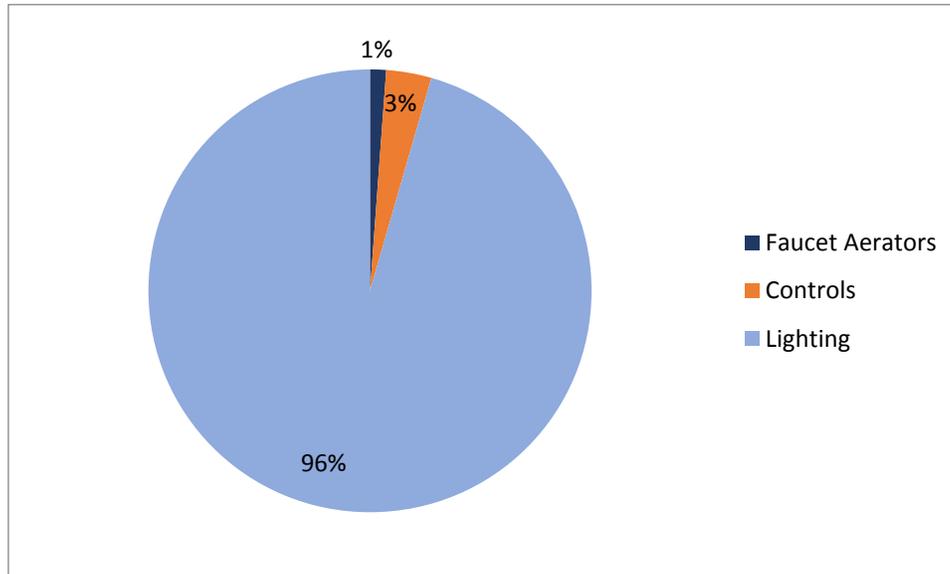


Figure 1-4 Savings Share by Measure – Small Business

The SWEPCO portfolio overall exceeded filed savings goals by 17.8%. All programs except Residential Solutions over-performed relative to their filed goals. Residential Solutions reached 98.8% of its savings goal.

Percent of goal attained and budget spent by program is summarized in Figure 1-5.

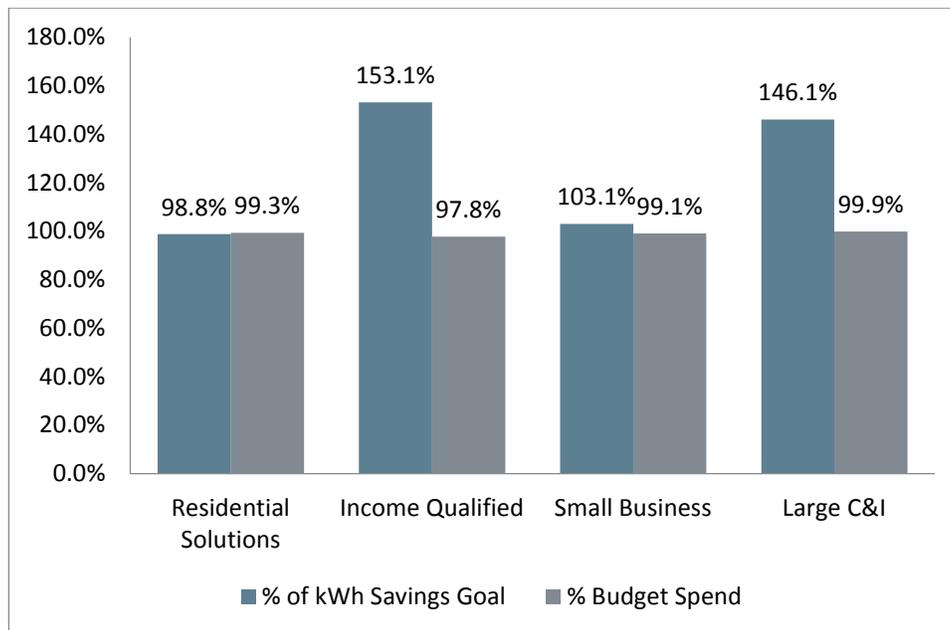


Figure 1-5 Summary of Goal Attainment & Budget Expenditure by Program

1.4 Process Findings

1.4.1 Residential Solutions Program

1.4.1.1 Program Design and Participation Process

- The Residential Solutions Program provides similar services and measures to other programs operated in the region. The program provides a walkthrough home energy assessment as well as the option for more in-depth home performance testing. Typical direct install measures such as CFLs, smart power strips, and low-flow devices are offered. Single and multi-family buildings are eligible.
- A sizable share of mass-market energy assessment participants, 24%, reported that their energy consultant did not discuss the available rebates or discounts for energy saving improvements.
- Very few participant survey respondents that installed incentivized measures had difficulty locating a contractor to install the measures.
- The program provided in-depth contractor training related to building certification, however, less training was provided on program participation processes. Staff is working on developing a quality assurance/quality control seminar for contractors that will also cover program changes.
- Contractors noted a few issues with the OPEN tool including an inability to edit entered data and needing to enter data multiple times.
- Program staff reported that use of the OPEN tool was discontinued because of issues using it for the mass-market and income qualified programs.
- Staff is considering reducing the number of audits funded and adding a single audit amount for multifamily buildings.

1.4.1.2 Program Marketing and Outreach

- A strategic decision was made to limit program marketing and to utilize the funds to incentivize measures. This strategy did not prevent the program from achieving its energy saving goals during the first year.
- The program website and promotion through social media were the primary forms of mass-marketing utilized during the program year. Additionally, SWEPCO had the opportunity to place two advertisements in a local paper at no cost. Program staff engaged in limited direct outreach to multifamily properties to promote the program as well.
- A customer fact sheet was developed for the program that provides information on benefits of participation, a description of the types of measures and serviced incentivized, and program contact information. The sheet is missing information on customer eligibility requirements.

- Thirty-six percent of program participants learned of the program from a friend, family member, or colleague and 29% learned of the program representative. Only 14% reported learning of the program from a contractor or home energy consultant. Although this suggests that contractors are having a limited effect on program awareness, it is possible that some respondents thought the contractor was a SWEPCO or CLEAResult program representative.
- Consistent with the program design, contractors reported actively promoting the program.

1.4.1.3 Quality Control and Verification Processes

- During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. Additionally, the program manual states that after the first 25 projects, 5% of additional projects completed by contractors are inspected. Ten percent of projects is a more typical verification rate.
- Project verification visits check for consistency between reported performance testing, site information, and measure information. Additionally, staff reported that they discuss the customer's satisfaction with the contractor during visits.
- During a mid-year review of the program tracking data, there were five instances where a single phone number was listed for multiple customers. In some instances the phone number was general property number listed for multiple participants or the contractor's phone number. Additionally, there were over 150 contacts without a phone number.

1.4.1.4 Customer and Contractor Satisfaction

- More than 80% of customers were satisfied with the program overall. Participants were most satisfied with the quality of contractors work and least satisfied with the energy savings on their bill.
- All customers that contacted program staff with questions or concerns were very satisfied with the timeliness and thoroughness of staff's response.
- Sixty-seven percent reported that participation in the program greatly increased their satisfaction with it.
- Most interviewed contractors were satisfied with the program overall. Issues raised by contractors included slower than expected review of project materials and a desire for larger rebates.

1.4.2 Income Qualified Program

The following sections summarize key process evaluation.

1.4.2.1 Program Design and Participation Process

- The Income Qualified Program provides similar services and measures to other programs operated in the region. The program provides a walkthrough home energy assessment as well as the option for more in-depth home performance testing. Typical direct install measures such as CFLs, smart power strips, and low-flow devices are offered. Single and multi-family buildings are eligible.
- Three out of five survey respondents were satisfied with the program participation process. None indicated dissatisfaction.
- Four of the five survey respondents agreed that the recommendations were relevant and easy to understand, as well as agreeing that the energy consultant was courteous and professional.
- The program provided in-depth contractor training related to building certification, however, less training was provided on program participation processes. Staff is working on developing a quality assurance/quality control seminar for contractors that will also cover program changes.
- Contractors noted a few issues with the OPEN tool including an inability to edit entered data and needing to enter data multiple times.
- Program staff reported that use of the OPEN tool was discontinued because of issues using it for the mass-market and income qualified programs.

1.4.2.2 Program Marketing and Outreach

- A strategic decision was made to limit program marketing and to utilize the funds to incentivize measures. The lack of marketing did not prevent the program met its energy saving goal relatively early in the program year and was likely an efficient use of the limited budget.
- The program website and promotion through social media were the primary forms of mass-marketing utilized during the program year. Additionally, SWEPCO had the opportunity to place two advertisements in a local paper at no cost. Program staff engaged in limited direct outreach to multifamily properties to promote the program as well.
- The program website does not reference the availability of the low-income program.
- One survey respondent reported learning of the program from a family member, friend, or colleague, while another reported learning of the program from a contractor or energy consultant. Three of the respondents did not recall how they first learned of the program.

- Consistent with the program design, contractors reported actively promoting the program.

1.4.2.3 Quality Control and Verification Processes

- During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. Additionally, the program manual states that after the first 25 projects, 5% of additional projects completed by contractors are inspected. Ten percent of projects is a more typical verification rate.
- Project verification visits check for consistency between reported performance testing, site information, and measure information. Additionally, staff reported that they discuss the customer's satisfaction with the contractor during visits.

1.4.2.4 Customer and Contractor Satisfaction

- Eighty percent of customers were satisfied with the program overall. Participants were most satisfied with the quality of contractors work and the energy savings on their bill
- Two customers reported contacting program staff with questions and concerns. Both were very satisfied with the thoroughness and timeliness of the response they received.
- All survey respondents reported that the program either greatly increased their satisfaction with SWEPCO (60%) or increased their satisfaction somewhat (40%).
- Most interviewed contractors were satisfied with the program overall. Issues raised by contractors included slower than expected review of project materials and a desire for larger rebates

1.4.3 Small Business Program

1.4.3.1 Program Design and Participation Process

- The small business program is consistent with the design of similar programs offered in other jurisdictions. It incorporates three key design characteristics to reduce common barriers to small business.
 - The program provides relatively high incentives for small businesses that typically have less capital for energy efficiency investments.
 - The program uses high-contact, direct outreach performed by approved contractors to improve program awareness among harder to reach small businesses.

- Incentive payments are paid to contractors to reduce the initial cost to participants.
- Small businesses are defined as businesses that with 100 kW or less average peak demand. This is a typical threshold for small business programs.
- The program utilizes a paperless process for completing the energy assessments and submitting customer proposals that reduces paperwork. These submissions can be made through the program software tool or by email. Submissions are sent to CLEAResult's central team in Austin. Neither program staff nor contractors identified any significant issues with the participation process or software.
- Contractors received training from CLEAResult on the program processes and use of the program software. Most of the interviewed contractors provided favorable assessments of the training. However, one respondent stated that they were not fully comfortable using the program software. Additionally, multiple contractors stated that program requirements changed after training and were not communicated to them.
- Contractor descriptions of the participation process were consistent with the program design. Interviewees appeared to understand the program process and documentation requirements, and few issues were noted with the program software tool. Contractors also indicated that proposals were approved in a reasonable period of time.
- Interviewed contractors stated that the measures offered through the program met the needs of the small businesses they work with. The primary barrier to participation identified by contractors was skepticism about the legitimacy of program offerings. Additionally, measure costs are a factor. Contractors indicated that the reason for customers not pursuing a project is the cost of the project.
- Most surveyed program participants were satisfied with the energy assessment and the proposal provided by the contractor. All participants were satisfied with the quality of the installation. Seventeen percent were dissatisfied with the amount of time between completion of the audit and the installation of the equipment.

1.4.3.2 Program Marketing and Outreach

- The program is designed to have contractors perform the majority of direct customer outreach. Interviewed contractors indicated that they were performing direct outreach to customers.
- Program staff recruited contractors through direct outreach and referrals from staff operating similar programs in the region. Although staff indicated that the number of contractors participating is generally sufficient, staff also stated that the program was seeking to recruit additional contractors.

- Participants most frequently reported learning of the program from a contractor (50%) or a program representative (25%).

1.4.3.3 Quality Control and Verification Processes

- The program has sufficient verification procedures in place. The first five projects completed by a new contractor receive pre and post verification. Interviewed staff indicated that 20% to 25% of subsequent projects are verified. However, the program manual indicates that 10% of subsequent projects are verified. This discrepancy is not critical to program operations because interviewed staff are notified which sites to inspect and are not performing the site selection.
- Projects are identified for pre- and post-inspection by central CLEAResult staff located in Austin. CLEAResult employs one regional program consultants who perform pre- and post-inspections.
- Inspection procedures include review of documentation, verification of building type (which determines operating hours), photographs of baseline conditions and efficient equipment, and verification that lamps installed are DesignLights Consortium (DLC) or ENERGY STAR® qualified.
- Contractors determine that a site meets program qualifications using the program software tool. Two contractors reported having projects not approved by program staff because the customer did not meet the peak demand requirement.

1.4.3.4 Customer and Contractor Satisfaction

- Contractors were generally satisfied with the program including the participation process, the incentives, measures offered, and support from program staff. There was greater dissatisfaction with the wait time to receive the rebates, with one-third of contractors reporting that they were dissatisfied with this aspect of the program.
- Most participants were satisfied with their experience with the program overall. One respondent indicated dissatisfaction with the program overall and 18% of respondents reported dissatisfaction with the length of time between the audit and the installation of the equipment. Program staff reported that they have taken steps to identify audit projects approaching the 60 day limit allowed for installing measures following the audit. Large Commercial & Industrial Program

1.4.3.5 Program Design and Participation Process

- Incentives are based on energy savings. The program appropriately offers higher incentives for HVAC projects of \$0.15 per kWh that typically have longer payback periods. Lighting incentives are \$0.10 kWh. Incentives of \$0.08 per kWh saved are offered for other custom projects.

- The interviewed contractor did not have suggestions for improving the application process and indicating that training provided by the program and written materials met their needs.
- All participants reported satisfaction with the steps required to participate, the equipment covered, the time to receive the rebate, and the project support received from a program representative. One respondent reported contacting a program representative with a question or concern and was satisfied with the response received.
- All participants reported the incentive amount was what they were expecting to receive. Most customers reported that it took two to four weeks to receive the incentive, but one customer reported that it took seven to eight weeks.

1.4.3.6 Program Marketing and Outreach

- Although the program opted to limit expenditures on program marketing, the program did not have difficulty achieving its energy saving goal. The primary means of marketing the program included: working with SWEPCO account managers, the program website, using the energy assessments to promote efficiency improvements, and using contractors to promote the program.
- The interviewed contractor reported promoting the program to customers and expanding energy efficient lighting offerings.
- Participant survey respondents reported that internet searches, contractors, and program representatives were the most common sources of program awareness.

1.4.3.7 Quality Control and Verification Processes

- The program has robust quality control and verification procedures in place. These include pre-installation and post-installation site visits for all projects, engineering review of all projects, and a review of all projects by at least two staff members.

1.4.3.8 Contractor and Participant Satisfaction

- The interviewed contractor was satisfied with the program and did not offer suggestions for improving it.
- All participants were very satisfied with the program overall. Eighty percent reported that participation increased their satisfaction with SWEPCO and none indicated that it decreased their satisfaction with the utility.

1.5 Report Organization

This report is organized with one chapter providing the full impact and process summary of a specified program. The report is organized as follows:

- Chapter 2 provides general methodologies;

- Chapter 3 provides results for the Residential Solutions Program;
- Chapter 4 provides results for the Income Qualified Program;
- Chapter 5 provides results for the Small Business Program;
- Chapter 6 provides results for the Commercial and Industrial Solutions Program;
- Chapter 7 provides results for the Home Energy Savings Program;
- Appendix A provides portfolio-level cost effectiveness testing results
- Appendix B provides the site-level custom reports for the Small Business and C&I Solutions Program.

2. General Methodology

This section details general impact evaluation methodologies by program-type as well as data collection methods applied. This section will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies;
- Process Evaluation Methodologies; and
- Data Collection Procedures.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the Evaluators provide a glossary of terms to follow¹⁸:

- *Ex Ante* – Forecasted savings used for program and portfolio planning purposes (from the Latin for “beforehand”)
- *Ex Post* – Savings estimates reported by an evaluator after the energy impact evaluation has been completed (From the Latin for “From something done afterward”)
- *Deemed Savings* – An estimate of an energy savings or demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) is applicable to the situation being evaluated (e.g., assuming 284 kWh savings for a low-flow showerhead)
- *Gross Savings* – *The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated*
- *Realization Rate* – *Ratio of Ex Post Savings / Ex Ante Savings (e.g., if the Evaluators verify 268 kWh per showerhead, Gross Realization Rate = 268/274= 99% realization rate*

2.2 Overview of Methodology

The proposed methodology for the evaluation of the PY1 SWEPCO EE Portfolio is intended to provide:

- Gross impact results; and
- Program feedback and recommendations via process evaluation

¹⁸ Arkansas TRM V4.0, Volume 1, Pg. 80-86

In doing so, this evaluation will provide the verified gross savings results, provide the recommendations for program improvement, and ensure cost-effective use of ratepayer funds. Leveraging experience and lessons learned from impact evaluation can provide greater guidance as to methods by which program and portfolio performance could be improved.

2.2.1 Sampling

Programs are evaluated on one of three bases:

- Census of all participants
- Simple Random Sample
- Stratified Random Sample

2.2.1.1 Census

A census of participant data was used for select programs where such review is feasible. All program measures were evaluated. Programs that received analysis of a census of participants include:

- Residential Solutions
- Income Qualified

2.2.1.2 Simple Random Sampling

For programs with relatively homogenous measures (largely in the residential portfolio), the Evaluators conducted a simple random sample of participants. The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of Variation (CV) is defined as:

$$CV = \frac{Mean_x}{Standard\ Deviation_x}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP} \right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

2.2.1.3 Stratified Sampling

For the SWEPCO Commercial & Industrial programs, Simple Random Sampling is not an effective sampling methodology as the CV values observed in business programs are typically very high because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

To address this situation, we use a sample design for selecting projects for the M&V sample that takes such skewness into account. With this approach, we select a number of sites with large savings for the sample with certainty and take a random sample of the remaining sites. To further improve the precision, non-certainty sites are selected for the sample through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. As a result of this methodology, the required sample for the C&I Solutions Program was reduced to six with one certainty stratum and three sample strata.

2.2.2 Process Evaluation

The Evaluator's general approach to process evaluation begins with a review of the tests for timing and appropriateness of process. In this review, the Evaluators determine what aspects of the program warrant a process evaluation. Most SWEPCO programs over-performed, and as such most of the PY1 process evaluation activity was focused around first year implementation.

The PY1 process overviews began with interviews of program staff. These interviews, inform the establishment of goals for the process evaluation, provide background history of programs, and give an introduction to portfolio-level issues. From this, the Evaluators then develop a list of data collection activities. The data collection procedures for process evaluations typically included:

- *Participant Surveying.* The Evaluators surveyed statistically significant samples of participants in each program in order to provide feedback for the program and provide an assessment of participant satisfaction.
- *In-Depth Interviews.* The Evaluators conducted in-depth interviews with high-level program actors, including SWEPCO program staff, third-party implementation staff, and program trade allies. These interviews are semi-structured, in having general topics to be covered, without fully prescribed question and answer frameworks.

- *Review of Marketing Materials.* The Evaluators reviewed marketing materials for each program, providing feedback as to the appropriateness of the message in reaching its target audience, the breadth of the audience that the effort is attempting to reach, and identifying possible cross-promotional opportunities.

3. Residential Solutions

3.2 Program Description

The Residential Solutions Program (RSOL) is designed to promote energy efficiency by offering home energy surveys and/or deeper energy assessments to its residential customers through a participating trade ally. The RSOL provides residential customers with access to qualified vendors and installation contractors (trade allies) within the SWEPCO service area. The participating contractors are to help the residential customer analyze their energy use, identify energy efficiency improvements, and install low cost measures in their home. The contractor inspection includes consultation about the customer's concerns, a visual inspection of the living space, attic, crawl space/basement, and exterior of the home, as well as installation of direct install measures (e.g., CFL lighting and faucet aerators). Following the assessment, the trade ally recommends home improvements to increase energy efficiency. The RSOL provides incentives for installing ceiling insulation, duct sealing, air infiltration sealing, central air conditioning, heat pump systems, and high performance tune-ups for central air conditioning and heat pump systems.

Prescriptive incentives were available to residential customers for installing efficiency equipment such as heat pumps, heat pump water heaters and other measures. Program approved contractors were allowed to install certain energy efficiency measures without an initial survey or assessment, such as ceiling and wall insulation.

The direct install measures include:

- Up to six compact fluorescent light bulbs (CFLs);
- Low-flow faucet aerators and showerheads (must have electric water heater); and
- One smart power strip
- LED Light bulbs
- Low Flow Showerhead

Rebate measures include:

- AC Tune-up
- Air Sealing
- Blower Door Testing
- Ceiling Insulation
- Central AC
- Duct Blaster Testing

- Duct Sealing
- Faucet Aerators
- Heat Pumps

A total of 888 households participated in the program. Below, Table 3-1 summarizes the total number of homes a measure was installed in/performed at, total measures installed/performed and the expected kWh and peak kW savings, by measure:

Table 3-1 Summary of Measures and Expected Savings

<i>Measure</i>	<i>Number Homes</i>	<i>Total Quantity of Measures</i>	<i>Total Expected kWh Savings</i>	<i>Total Expected peak kW Savings</i>
AC Tune-Up	1	1	661	0.33
Advanced Power Strips	204	204	28,699	3.66
Air Sealing	551	551	295,920	68.68
Assessment Tier 1	708	708	0	0.00
Assessment Tier 2	49	49	0	0.00
Blower Door Testing	442	452	0	0.00
Ceiling Insulation	203	193,549 sq. ft.	676,323	144.10
Central Air Conditioning	9	9	12,496	4.60
CFLs	705	4,112	77,737	12.38
Duct blaster test	369	369	0	0.00
Duct Sealing	490	490	1,381,227	278.27
Faucet Aerators	258	506	15,256	1.57
Heat Pump	19	19	39,881	11.17
LED Lightbulbs	8	48	726	0.13
Low flow showerhead	268	268	71,551	7.44
Total			2,600,477	532.32

3.3 Impact Savings Calculation Methodology

For equipment and retrofits rebated through the PY1 RSOL, calculation methodologies were performed as described in the TRM. Table 3-2 identifies the sections in the TRM that were used for verification of measure-level savings under the RSOL.

Table 3-2 TRM Sections by Measure Type

Measure	Section in TRM
AC Tune up	2.1.5
Air Sealing	2.2.9
Ceiling Insulation	2.2.2
Central AC Replacement	2.1.6
CFLs	2.5.1
Duct Sealing	2.1.11
Faucet Aerators	2.3.4
Low Flow Showerhead	2.3.5
Heat Pump Replacement	2.1.8
LED Lightbulbs	2.5.1

In addition to the TRM, the evaluators also examined the Excel workbook distributed to contractors and trade allies to assess savings by measure. The workbook utilizes TRM savings algorithms with contractor or trade ally inputs to calculate savings based on the measure and input parameters. The evaluators verified the factor tables for each measure to ensure the values were appropriate.

Three measures accounted for the majority of the gross savings for the RSOL: air infiltration reduction, ceiling insulation and duct sealing. The calculation methodologies for these measures are detailed in the following sections.

3.3.1 Air Infiltration Reduction Savings Calculations

The deemed savings values for air infiltration reduction were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Louisiana weather zones in developing savings values denominated in deemed savings per CFM₅₀ of air leakage rate reduction. Table 3-3 summarizes the deemed savings values for the SWEPCO service territory.

Table 3-3 Deemed Savings Values for Air Infiltration Reduction, Shreveport/Bossier City.

Equipment Type	kWh Savings / CFM50	kW Savings / CFM50
Electric AC with Gas	0.2689	0.000216822
Elec. AC with	1.3605	0.000217412
Heat Pump	0.8268	0.000217412

For example, consider a residence with electric AC and gas heat. If the residence had a leakage rate of 16,100 CFM₅₀ before air infiltration reduction and a leakage rate of 7,220 CFM₅₀ after, then the residence would have an annual gross savings of 2,388 kWh.

$$\text{Air Infiltration Savings} = 0.2689 \frac{\text{kWh Savings}}{\text{CFM}_{50}} \cdot (16,100 \text{ CFM}_{50 \text{ pre}} - 7,220 \text{ CFM}_{50 \text{ post}})$$

$$\text{Air Infiltration Savings} = 2,388 \text{ kWh}$$

3.3.2 Ceiling Insulation Savings Calculations

The deemed savings values for ceiling insulation were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Louisiana weather zones in developing savings values denominated in deemed savings per square footage of ceiling area. Table 3-4 and Table 3-5 summarizes the deemed savings values for the SWEPCO service territory.

Table 3-4 Deemed Savings Values for R-30 Ceiling Insulation, LA Weather Zone 6

Ceiling Insulation Base R-Value	AC/Gas Heat kWh/sq ft	AC/Electrical Resistance kWh/sq ft	Heat Pump kWh/sq ft	AC Peak Savings kW/ sq ft
0 to 4	1.4602	3.9184	2.2083	0.0010
5 to 8	0.6850	1.9555	1.0770	0.0003
9 to 14	0.3731	1.0712	0.5979	0.0002
15 to 22	0.1941	0.5460	0.3057	0.0000

Table 3-5 Deemed Savings Values for R-38 Ceiling Insulation, LA Weather Zone 6

Ceiling Insulation Base R-Value	AC/Gas Heat kWh/sq ft	AC/Electrical Resistance kWh/sq ft	Heat Pump kWh/sq ft	AC Peak Savings kW/ sq ft
0 to 4	1.5642	4.3355	2.4299	0.0010
5 to 8	0.7890	2.3726	1.2986	0.0004
9 to 14	0.4771	1.4883	0.8195	0.0003
15 to 22	0.2981	0.9631	0.5273	0.0001

For example, consider a residence with a heat pump, and a pre-retrofit R-value of ceiling insulation in the range of 9 to 14 and is upgraded to R-38. If the residence has a ceiling area of 1,200 sq. ft., then the residence would have an annual gross savings of 983 kWh.

$$\text{Ceiling Insulation Savings} = 0.8195 \frac{\text{kWh}}{\text{ft}^2} \cdot (1,200 \text{ ft}^2) = 983 \text{ kWh}$$

3.3.3 Duct Sealing Savings Calculations

Duct sealing savings were calculated using the following savings algorithms from the TRM.

3.3.3.1 Cooling Savings (Electric):

$$kWh_{savings,C} = \frac{(DL_{pre} - DL_{post}) \times EFLH_C \times (h_{out}\rho_{out} - h_{in}\rho_{in}) \times 60}{1,000 \times SEER}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)

DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)

ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05

$EFLH_C$ = Equivalent Full Load Hours. See Table 3-6

h_{out} = Outdoor design specific enthalpy (Btu/lb) See Table 3-6

h_{in} = Indoor design specific enthalpy (Btu/lb) See Table 3-6

Table 3-6 Deemed Savings Values for Duct Sealing Calculations

Parameter	Deemed Value
$EFLH_C$	2,040
HDD	1,842
h_{out}	40
h_{in}	30
ρ_{in}	.076
P_{out}	.074
SEER	11.5

ρ_{out} = Density of outdoor air at 95°F = 0.0740 (lb/ft³)¹⁹

ρ_{in} = Density of conditioned air at 75°F = 0.0756 (lb/ft³)⁴

60 = Constant to convert from minutes to hours

CAP = Cooling capacity (Btu/hr)

1,000 = Constant to convert from W to kW

$SEER$ = Seasonal Energy Efficiency Ratio of existing system (Btu/W·hr)

Default value for $SEER$ = 11.5²⁰

As an example, assume the duct leakage before sealing was measured at 360 CFM and the leakage after sealing was 90 CFM for a house. Using the SEER value of 11.5 BTU per WattHr, the annual savings would be:

$$kWh \text{ per year} = (360-90) \times 1,842 \times (40 \times 0.076 - 30 \times 0.074) \times 60 / 1000 \times 11.5 = 1.988 \text{ kWh per year.}$$

3.3.3.2 Heating Savings (Heat Pump):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{1,000 \times HSPF}$$

¹⁹ ASHRAE Fundamentals 2009, Chapter 1: Psychometrics, Equation 11, Equation 41, Table 2

²⁰ Average of Department of Energy minimum allowed SEER for new air conditioners from 1992-2006 (10 SEER) and after January 23, 2006 (13 SEER)

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
 $EFLH_H$ = Equivalent full load heating hours (see Table 3-6)
60 = Constant to convert from minutes to hours
 HDD = Heating degree days (see Table 3-6)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 CAP = Heating capacity (Btu/hr)
1,000 = Constant to convert from W to kW
 $HSPF$ = Heating Seasonal Performance Factor of existing system (Btu/W·hr)
Default value for $HSPF$ = 7.30.²¹

3.3.3.3 Heating Savings (Electric Resistance):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{3,412}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
60 = Constant to convert from minutes to hours
 HDD = Heating degree days (see Table 3-6)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 $EFLH_H$ = Equivalent full load heating hours (see Table 3-6)
 CAP = Heating capacity (Btu/hr)
3,412 = Constant to convert from Btu to kWh

3.3.3.4 Heating Savings (Gas Furnace):

$$Therms_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{100,000 \times AFUE}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
60 = Constant to convert from minutes to hours
 HDD = Heating degree days (see Table 3-6)
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 $EFLH_H$ = Equivalent full load heating hours (see Table 3-6)
 CAP = Heating capacity (Btu/hr or Btu/hr)
100,000 = Constant to convert from Btu to therms
 $AFUE$ = Annual Fuel Utilization Efficiency of existing system
Default value for $AFUE$ = 0.8.²²

²¹ Average of Department of Energy minimum allowed HSPF for new heat pumps from 1992-2006 (6.8 HSPF) and after January 23, 2006 (7.7 HSPF)

²² Department of Energy minimum allowed AFUE for new furnaces

3.3.3.5 Demand Savings (Cooling):

$$kW_{savings,C} = \frac{kWh_{savings,C}}{EFLH_C} \times CF$$

Where:

$kWh_{savings,C}$ = Calculated kWh savings for cooling

$EFLH_C$ = Equivalent full load cooling hours (see Table 3-6)

CF = Coincidence factor = 0.87²³

3.4 Verified Savings by Measure

After reviewing the tracking data and inputs for savings calculations, the evaluators provided verified gross savings according to TRM protocols. Savings from the following measures were verified and matched the calculations provided by CLEAResult:

- AC Tune-up;
- Advanced Power Strips;
- Air Sealing;
- Ceiling Insulation;
- Central AC replacement;
- Compact Fluorescent Lamps;
- Duct Sealing;
- Faucet Aerators;
- Heat Pump replacement;
- LED Lightbulbs;
- Low Flow Showerheads.

The savings calculated in this evaluation differed from CLEAResult's calculations for several items in the TRM. Upon investigation of an unlocked savings calculator provided by CLEAResult, the evaluators determined that the calculator had not been updated to reflect weather-dependent values for Louisiana Weather Zone 6: The zones in the calculator include two for New Orleans and two for Arkansas.

The evaluators verified measure-level savings according to TRM guidelines and obtained results that differed from CLEAResult's calculations for the following measures:

²³ Please see: Coincidence Factors for HVAC.

3.4.1 Infiltration/Air Sealing

- 1) The calculator uses values from the AR TRM for El Dorado, AR and the New Orleans area, rather than values appropriate for Caddo Parish in Louisiana, resulting in low realization rates.
- 2) Tracking information provided for review does not indicate cooling type and leaves the question open as to whether there is cooling.
- 3) The CFM check requires a drop down menu to effectively use the formulas. The current index(match) function is non-functioning.

Table 3-7 Expected and Realized Air Sealing Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Air Source Heat Pump	47,760	46,546	97.46%	12.56	12.24	97.46%
Electric Resistance/	222,695	219,080	98.38%	35.59	35.01	98.38%
Natural Gas Furnace	25,465	25,052	98.38%	20.54	20.20	98.38%
Total	295,920	290,677	98.23%	68.68	67.45	98.21%

3.4.2 Ceiling Insulation

- 1) Also for this measure, the calculator does not utilize appropriate weather data, affecting realization rates..
- 2) There is no distinction made between R-30 and R-38 values post-installation values. All ex ante calculations assumed a post value of R-30. Ex post calculations took the final R-value into account, resulting in high realization rates.
- 3) All ex ante calculations assumed functioning air conditioning.

Table 3-8 Expected and Realized Ceiling Insulation Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Air Source Heat Pump	24,905	27,468	110.3%	7.69	9.75	127%
Electric Resistance	584,480	561,796	96.1%	84.04	135.88	162%
Natural Gas Furnace	66,939	125,849	188.0%	52.37	81.62	156%
Total	676,323	715,113	105.7%	144.10	227.26	158%

3.4.3 Duct Sealing

- 1) EFLH and HDD have not been updated for the SWEPCO service territory and reflect incorrect/inappropriate weather zones, resulting in low realization rates.
- 2) Cooling capacity is in Tons on the 'Summary' tab but in BTU/hr in the calculation tab. Units may be applied incorrectly.

Table 3-9 Expected and Realized Duct Sealing Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Air Source Heat Pump	642,147	598,881	93.3%	139.3	135.3	97.1%
Electric Resistance	611,465	545,667	89.2%	80.3	80.3	100.0%
Natural Gas Furnace	127,616	137,577	107.8%	58.7	58.7	100.0%
Total	1,381,227	1,282,124	92.8%	278.3	274.2	98.5%

3.4.4 Faucet Aerators

- 1) Ex ante calculations did not use inlet and mixed water temperatures which were appropriate for the SWEPCO service territory.
- 2) Three savings values could not be replicated due to lack of input assumptions in tracking data and one ex ante savings estimate was 6,132 kWh. The evaluators determined that this value was a clerical error and should have been 61.32 kWh. The ex ante figures were adjusted.

Table 3-10 Expected and Realized Faucet Aerator Savings

<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
15,256	15,689	102.8%	1.57	1.63	103.9%

3.4.5 Low Flow Showerheads

- 1) Ex ante calculations did not use inlet and mixed water temperatures which were appropriate for the SWEPCO service territory.
- 2) Three savings values could not be replicated due to lack of input assumptions in tracking data and one ex ante savings estimate was 274.43 kWh. The evaluators determined that this value was a clerical error and should have been 274.13 kWh. The ex ante figures were adjusted.

Table 3-11 Expected and Realized Low Flow Showerhead Savings

<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
71,551	69,940	97.7%	7.44	7.27	97.8%

Table 3-12 presents the savings results of the evaluation of the PY1 Residential Program, by measure. Total savings summarizes the savings calculations performed as per TRM protocols for the RSOL.

Table 3-12 Verified Savings by Measure Type

<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
AC Tune-Up	661	661	100.0%	0.33	0.33	100.0%
Advanced Power Strips	28,699	28,699	100.0%	3.66	3.66	100.0%
Air Sealing	295,920	290,677	98.2%	68.68	67.45	98.2%
Ceiling Insulation	676,323	715,113	105.7%	144.10	227.26	157.7%
Central Air Conditioning	12,496	12,496	100.0%	4.60	4.60	100.0%
CFLs	77,737	77,737	100.0%	12.38	12.38	100.0%
Duct Sealing	1,381,227	1,282,124	92.8%	278.27	274.23	98.5%
Faucet Aerators	15,256	15,689	102.8%	1.57	1.63	103.9%
Heat Pump	39,881	39,881	100.0%	11.17	11.17	100.0%
LED Lightbulbs	726	726	100.0%	0.13	0.13	100.0%
Low flow showerhead	71,551	69,940	97.7%	7.44	7.27	97.7%
Total	2,600,477	2,533,743	97.4%	532.32	610.11	114.6%

3.5 Process Findings

This chapter presents the results of the process evaluation of the Residential Solutions Program. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with an overview of the program. This is followed by a discussion of the methodological approach used in the evaluation. A summary of findings and recommendations for program improvement follow the discussion of the methodology. This discussion is followed by detailed findings of the evaluation activities.

3.5.1 Data Collection Activities

The process of evaluation of the Residential Solutions Program included the following data collection activities:

- *SWEPCO Program Staff Interviews.* The Evaluators interviewed staff at SWEPCO involved in the administration of the Residential Solutions Program. These interviews were to collect information from program staff as to any changes or developments, as well as response to program recommendations.
- *CLEAResult Program Staff Interviews.* The Evaluators interviewed staff at CLEAResult, who implements the program. These interviews were to collect information on implementation activities and clarify questions about program design or processes.
- *Participant Surveying.* The Evaluators surveyed a sample of program participants. These surveys addressed issues including participant satisfaction with the program offerings, demographics, and other contextual issues regarding the participation process.
- *Contractor Interviews.* The Evaluators interviewed a sample of contractors that completed projects through the mass market Residential Solutions and the Income Qualified Program. The interviews addressed topics such as contractors' perception and understanding of the program participation process, efforts to market the program, perception of barriers to participation that their customers may face, and satisfaction with the program.

3.5.2 Program Overview

The Residential Solutions Program provides financial incentives for home energy assessments and energy efficiency measures to reduce energy consumption among residential customers.

The home energy assessments include consultation about the customer's concerns; a visual inspection of the living space, combustion safety testing, attic, crawl space/basement, and exterior of the home; and installation of direct install measures at no cost, e.g., CFL lighting, low flow showerhead, and faucet aerators. Qualifying customers are eligible to receive up to \$1,000 per home for eligible home improvement upgrades in this program.

Customers can receive \$75 dollars off of the cost of a Tier 1 energy assessment that consists of a walk through survey of the customer's home, direct installation of low cost energy efficiency measures, and an assessment report. Additionally, customers may qualify for and elect to have a Tier 2 assessment performed that includes home blower door testing and/or duct tightness testing. To qualify for the Tier 2 performance testing incentives, the customer's home energy costs must meet or exceed \$0.10/ square foot,

as calculated by the energy consultant. Qualifying customers may receive a discount from the contractor of \$25 on the cost of blower door testing and \$50 off the cost of duct tightness testing. In total, assessment incentives are capped at \$125 per home.

The direct install measures that customers are eligible to receive at no cost are:

- Up to six compact fluorescent light bulbs (CFLs);
- Low-flow faucet aerators and showerheads (must have electric water heater); and
- One smart power strip.

Table 3-13 summarizes the incentives for leakage reduction and insulation that customers may choose to implement. Customers that elect to install air sealing or duct sealing must have the performance testing performed either through a Tier 2 audit or independent of an energy assessment.

Table 3-13 Incentives for Assessments and Measures

<i>End- Use</i>	<i>Air Sealing</i>	<i>Duct Sealing</i>	<i>Floor Insulation</i>	<i>Ceiling Insulation</i>	
				<i>R-0 to R-4</i>	<i>R-5 to R-8</i>
Gas Furnace	\$.05/CFM50	\$.75/CFM25	Not eligible	\$.12	\$.10
Heat Pump	\$.13/CFM50	\$1.50/CFM25	\$.10/sf	\$.30	\$.16
Electric Resistance	\$.18/CFM50	\$1.50/CFM25	\$.20/sf	\$.35	\$.20

Customer may also receive rebates efficient air conditioners or heat pumps rated at SEER 15 or higher. Rebates for air conditioners range from \$50 to \$400. Rebates for air source heat pumps heat pumps range from \$100 to \$625. Customers may also receive rebates on SEER 20 ductless resistance heat systems ranging from \$250 to \$825.

In addition to duplexes, triplexes and quadplexes, single-family and multifamily properties of more than four units are eligible for participation. Renters and property owners may participate in the program. Electric cooling must be present for any building envelope measures.

Measure savings for both programs are estimated using the deemed savings values from the Arkansas Technical Reference Manual (TRM).

3.5.3 Methodology

3.5.3.1 Materials Reviewed

The Evaluators reviewed program materials including the program website, the program manual, an example home energy assessment report, and program marketing materials. These materials were reviewed to understand program operations and implementation approach.

3.5.3.2 Program Staff Interviews

Interviews were completed with two implementation contractor staff and one utility staff member. The interviews provided information on program operations and covered the following topics:

- Program goals and objectives;
- Marketing and outreach;
- Communication processes;
- Program management and staffing; and
- Quality control and verification processes.

3.5.3.3 Participant Survey

Surveys were administered to samples of participants to gain insight into the participant's experience with the program. Respondents answered questions on the following topics:

- Source of program awareness;
- Their decision to participate and complete an efficiency project;
- Experience with the participation process; and
- Satisfaction with various elements of the program and the program overall.

Seventeen customers completed the survey of program participants.

3.5.3.4 Contractor Interviews

Interviews were completed with program contractors that deliver the energy assessments and implement the program measures. The interviews covered the following topics:

- Promotion of the program and barriers to participation;
- Program marketing;
- The program participation process;
- Training and communication with program staff;
- Business and market impact; and
- Overall impressions and satisfaction.

Nine interviews were completed with program contractors.

3.5.4 Detailed Findings

3.5.4.1 Participation Data Quality Review

The evaluators reviewed the final program participant tracking data submitted by CLEAResult. The following issues were noted:

- Contact name was missing for 3% of projects.
- Phone number was missing or invalid (i.e., not 10 digits) for 28% of projects. Staff report that data validation rules have been implemented to correct the problem in PY2.
- Three phone numbers were associated with several contact names.

3.5.4.2 The Evaluators recommend that a field indicating housing type be added to the report. Analysis of Participation Data

Table 3-14 displays the number of projects that completed assessments and the share that implemented discounted and incentivized measures. As shown, 77% of assessment projects resulted in the installation of discounted measures and nearly three-quarters had direct install measures installed.

Table 3-14 Number of Audit Projects and Share that Implemented Measures

Number of Assessments	% Implementing Discounted Measures	% Implementing Direct Install Measures
720	77%	85%

The number of projects for different measure types and the expected energy savings are displayed in Table 3-15. As shown, duct sealing was the most often installed measure and accounted for the majority of program expected energy savings.

Table 3-15 Number of Projects and Expected Savings

Measure	Number of Projects	Total Expected kWh
Duct Sealing	474	1,381,227
Ceiling Insulation	202	676,323
Air Sealing	551	295,920
CFLs	704	77,737
Low-Flow Showerheads	268	71,551
Heat Pump	17	39,881
Advanced Power Strips	204	28,699
Low-Flow Faucet Aerator	248	15,256

Central Air Conditioning	9	12,496
LEDs	8	726
AC Tune-Up	1	661
Total	2,686	2,600,477

Figure 3-1 displays weekly and cumulative program activity. As shown program activity was fairly consistent throughout the program year.

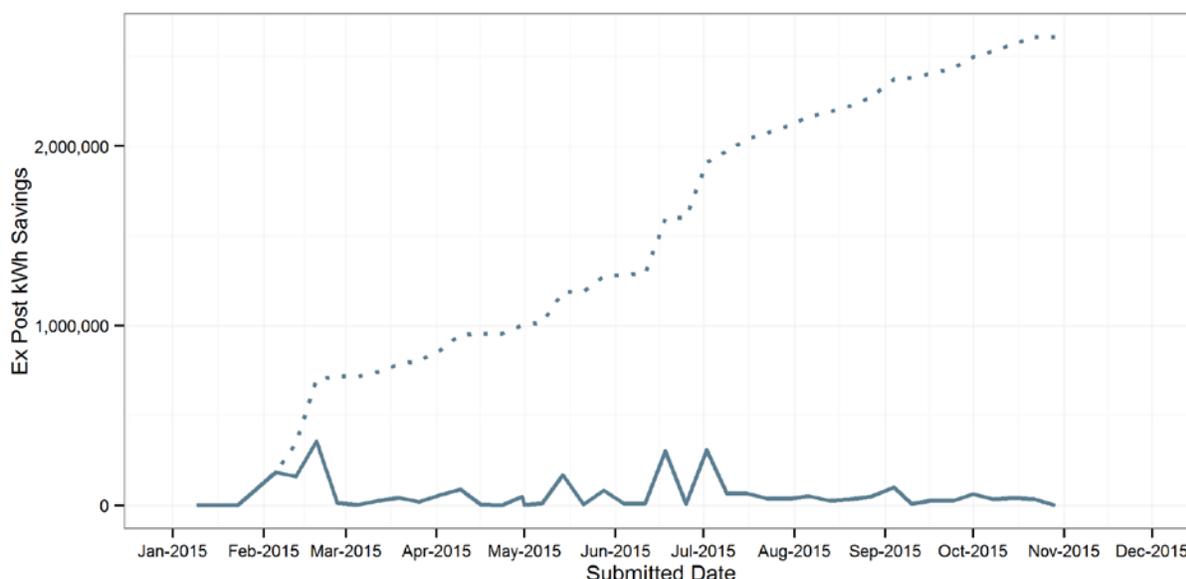


Figure 3-1 Weekly and Cumulative Program Activity

3.5.4.3 Program Comparison

The Evaluators reviewed multiple residential, regional whole house programs to assess how SWEPCO’s Residential Solutions Program compared in terms of audit processes, available measures, eligibility, and incentives.

Table 3-16 provides a summary of the programs reviewed. Each of these programs provides an onsite whole house audit, although they vary in their comprehensiveness. The SWEPCO program offers a two-tier system. The first tier includes a walkthrough assessment, while the second tier offers diagnostic home performance testing. Three of four programs have a direct install component which includes CFLs and/or water saving devices.

The eligible measures offered by the Residential Solutions Program are very much in-line with other program offerings from around the county, which emphasizes insulation and sealing. The biggest difference for incentives is the amount offered for the audit where the incentives range from \$75 to \$300. TVA’s eScore program offers the same incentive, but the costs are paid for by the customer rather than the trade ally invoicing the service. SWEPCO Arkansas’ program has the highest audit incentive as well as the

highest incentivized measures in their program. Overall, the SWEPCO program is comparable with other whole house programs regionally.

Table 3-16 Other Residential Energy Efficiency Programs

<i>Utility</i>	<i>Audit Component</i>	<i>Direct Install</i>	<i>Program Measures</i>	<i>Incentive Amount</i>	<i>Eligibility Criteria</i>
SWEPCO Louisiana Residential Solutions Program	<p>Tier 1 – Informational Energy Survey, direct install, visual walk-through inspections, Tier 1 report.</p> <p>Tier 2 – Energy Assessment – Direct install, walk-through inspection, blower door test, duct blaster test, air flow testing, combustion safety education, Tier 2 report.</p>	CFLs (max 6), low-flow showerhead, faucet aerator, power strip.	Air sealing, duct sealing, ceiling and floor insulation.	<p>Maximum incentive: \$1000/house.</p> <p>Tier 1: \$75 deducted from survey invoice.</p> <p>Tier 2: Additional \$25 for blower door test. Additional \$50 for duct tightness test. Deducted from assessment invoice. (\$125 maximum assessment incentive per home).</p> <p>Air sealing: Up to \$0.18/CFM50 reduction.</p> <p>Duct sealing: Up to \$1.50/CFM25.</p> <p>Ceiling insulation: Up to \$0.35/sq. ft. installed area.</p> <p>Floor insulation: Up to \$0.20/sq.ft. installed area.</p>	<p>SWEPCO residential customer. Must live in a single-family home or a multifamily unit of four units or fewer (renters and owners eligible), Must live in a home that is a minimum of one year old. Electric cooling.</p>
SWEPCO Arkansas Residential Home Performance with ENERGY STAR®	Comprehensive energy assessment – diagnostic and combustion safety testing, and energy assessment report.	Faucet aerator, low-flow showerhead, advanced power strip, and CFLs	Attic insulation, central air conditioner, windows, duct sealing, air sealing, and electric water heating.	<p>Comprehensive energy assessment: \$300</p> <p>Duct Sealing: \$175-\$325</p> <p>Duct Insulation: \$0.50/linear ft. of insulated duct</p> <p>Air Infiltration: \$100</p> <p>Ceiling Insulation: \$0.25/sq.ft.</p> <p>Extra incentive: \$100 bonus if 2 or more measures installed within six months of assessment.</p>	Any residential dwelling served by SWEPCO – condominiums, apartments, townhomes, multifamily dwellings, manufacture, and mobile homes. Units must be occupied.

Utility	Audit Component	Direct Install	Program Measures	Incentive Amount	Eligibility Criteria
Oklahoma Gas & Electric Home Energy Efficiency Program (HEEP)	Cooling inspections and A/C tune-up.	N/A	Duct repair and tightening, duct sealing, and attic insulation.	Assessment: \$85 A/C: One pound of A/C system refrigerant and filters. Duct sealing: up to \$300. Attic insulation: Up to 30% of costs of additional insulation (max \$500).	OG&E customers with central air conditioning.
Tennessee Valley Authority eScore Program	eScore evaluation (\$75) – customized list of upgrades and rebates available.	CFLs (max 12)	Air sealing, attic insulation, duct sealing, HVAC, water heaters, and windows and doors.	Air sealing: 50% of total installation cost (max \$200/home). Attic Insulation: 50% of total installation cost (max \$250/home). Duct sealing: 50% of total installation cost (max \$200). Heat Pump: \$250/unit. Geothermal: \$500. Central AC: \$150/unit. Dual Fuel Heat Pump: \$250/unit. Tune-up: \$15/unit. Window Replacement: \$25/window (max \$500). Exterior Door: \$50/door (max \$300). Storm Windows: \$12.50/window (max \$250).	Single-family homeowners.

3.5.4.4 Review of Home Energy Assessment Report

The Evaluators reviewed an example home energy assessment report provided to participants in the Residential Solutions Program. Overall, the home energy report is well laid out and includes the following design elements:

- A cover page summarizing home characteristics, the top recommended improvements for the customer, the program website address, and the program contact information.
- A page summarizing energy costs by end-use.

- A summary of direct install measures.
- Separate pages for the results of the assessment by type and any relevant energy saving recommendations.

Table 3-17 displays the criteria used and the Evaluators’ assessment of the report on those standards. Based on the review of the report, the Evaluators suggests staff consider the following modifications:

- If practicable, consider providing estimated customer cost to aid customer decision making.
- Reference specific incentives available for projects.

Table 3-17 Review of Energy Assessment Report

Criteria	Assessment	Comments/Notes
Provides information on energy use for all end-uses	Mixed	Does not cover appliances not incentivized by program such as washer/dryers/dishwashers Analysis does not include all appliance types, namely clothes washing and drying equipment.
Provides energy saving recommendations for all end-uses	Yes	
Expected cost savings are provided for recommended measures	Yes	Summary chart does not state what period of time they will be realized in. This is shown later in the report.
Provides estimates of expected improvement costs	No	
Payback for measure implementation is provided	No	
Includes information on non-energy benefits	Yes	Report describes home comfort and safety benefits.
Provides information on available incentives	Mixed	Incentives are not specifically referenced for recommended measures; No recommendations for reference to smart power strip rebates
Provides information on next steps	Yes	
Report is accessible, easy to understand	Yes	Analysis and recommendation sections are clearly laid out; Results in tables state next steps for the participant to take.
Prioritizes recommendations	Yes	

All information is complete	Mixed	Note some fields in analysis tables were empty, namely, efficiency ratings for furnace and water heater. Consider marking these as “unknown” or “not applicable.”
Provides information on locating a qualified contractor	Yes	
Report provides low/no cost energy saving tips	Yes	Low cost changes such as refrigerator temperature setting and using cold water for laundry are examples of energy saving tips.

3.5.4.5 Program Design, Operations and Activities

The following sections describe program design, operations, and activities and were developed from reviews of program documentation and interviews with program staff.

3.5.4.5.1 Program Objectives

The primary program objective is to assist residential customers in achieving electric energy savings and peak demand reductions through providing home energy assessments and rebates on energy saving equipment and home improvements. The program energy saving goal was 2,565,250 kWh and the peak demand reductions goal was 717.00 kW.

The program also has ancillary objectives related to educating customers and contractors about energy efficient technologies and home characteristics, and generally transforming the market for residential equipment and services.

Although the primary focus during the first year was to achieve the energy saving goals, staff also reported that the program is interested in seeing a mix of measure types implemented through the program. In order to meet this objective, staff has made an effort to recruit contractors that can implement multiple measure types. Additionally, contractors are encouraged to refer customers to contractors that may be able provide energy saving services that they do not provide.

In addition to energy saving and educational goals, program staff also noted that customer satisfaction is a primary concern, and that the efficiency programs could be a means to improve customer satisfaction.

Program staff identified some opportunities to improve the program design, such as reducing the number of audits that are funded. One possible change is to have a single audit for multi-family buildings rather than pay for separate audits for each unit in a complex.

3.5.4.5.2 Program Participation Process

Figure 3-2 presents the participation process for the Residential Solutions Program. Customers can receive an assessment that includes a walk-through of the residence to

identify energy saving opportunities and direct installation of energy efficient light bulbs, low-flow faucet aerators and shower heads, and smart power strips. Customers may also opt for additional performance testing such as blower door testing and duct tightness testing. Completing the performance testing makes these customers eligible to receive incentives on perimeter air sealing and duct sealing in addition to the incentives for insulation.

Although the program planned to use the OPEN tool as a means for contractors to complete the audits and provide reports of recommended measures, the tool did not work well for implementing both the Income Qualified program and the Residential Solutions program for non-income qualified customers. As an alternative, the program has provided worksheets for contractors to use to estimate savings for recommended measures. Contractors also use their own internally developed materials as well. Staff is looking at the costs and benefits of modifying the OPEN tool for the forthcoming year.

Customers may also install the program measures without receiving an energy assessment. Customers that elect to implement duct sealing and air sealing measures must have a duct blaster test or blower door test performed.

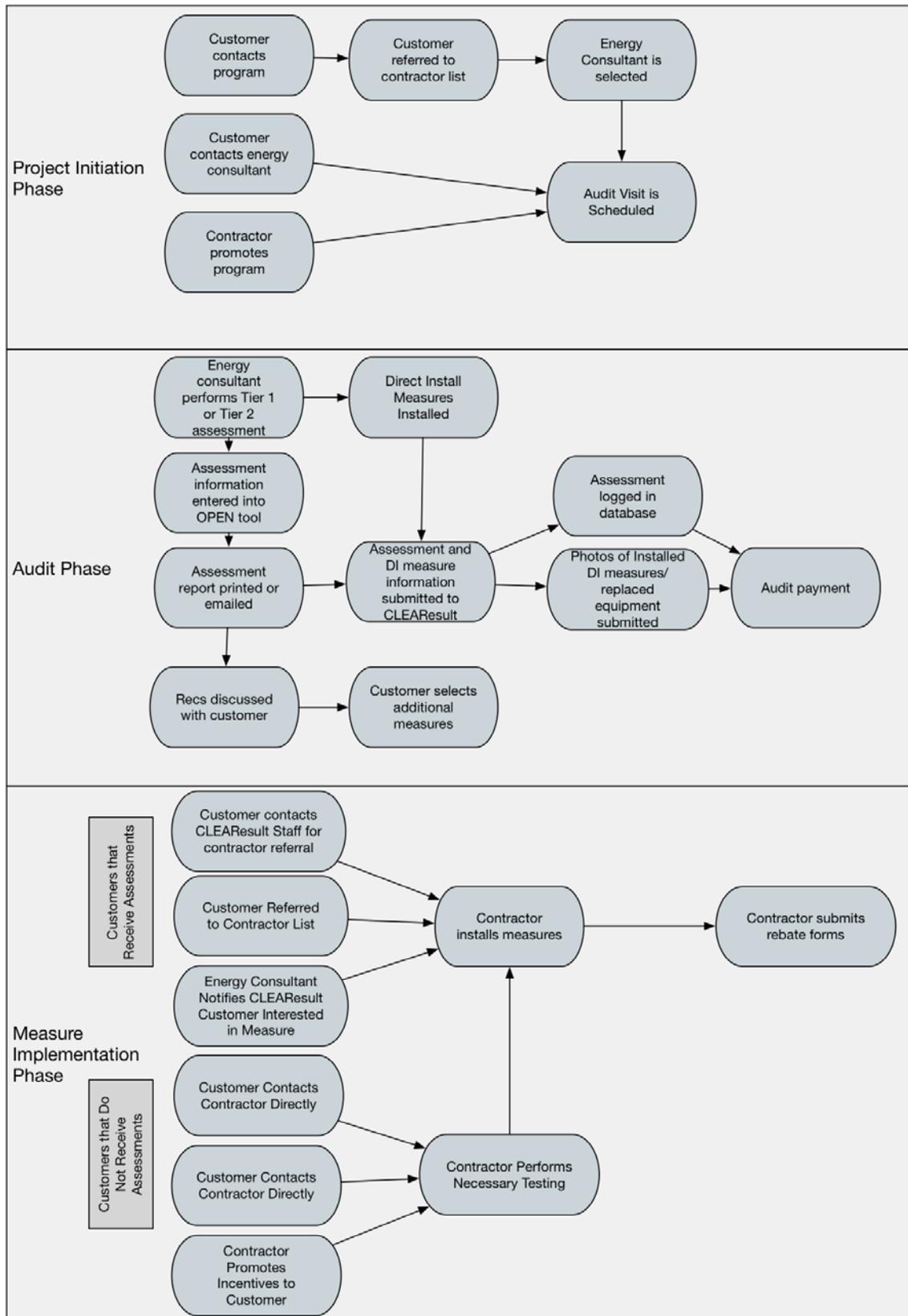


Figure 3-2 Program Participation Process

3.5.4.5.3 Roles and Responsibilities

CLEAResult is responsible for the primary program implementation tasks, namely:

- Perform onsite inspections and other quality control and quality assurance activities;
- Customer and contractor education and outreach;
- Process qualifying incentives;
- Review and approval of proposed projects; and
- Oversight and training of program contractors.

CLEAResult staffs the program with a consultant who splits time between the Income Qualified and Residential Solutions Program for non-income qualified customers. Oversight is provided by the program manager who oversees all of the SWEPCO programs as well as programs operating in two other states. A program coordinator also supports program implementation. Additionally, CLEAResult indicated that they also have additional support from the broader company, such as for program marketing and engineering analyses.

SWEPCO is responsible for authorization and issuing payments for project incentives paid. SWEPCO also provides program oversight such as monitoring progress towards savings goals and ensuring that customers have a positive experience in the program. SWEPCO staff also engages in some contractor outreach activities. SWEPCO account managers are responsible for ensuring that their accounts are aware of the efficiency programs and customer service representatives are responsible for being informed about the program so that customers can be referred to program representatives as is appropriate.

3.5.4.5.4 Program Communications

CLEAResult holds weekly internal meetings with staff supporting all of the residential and non-residential SWEPCO programs. During these meetings, staff review each program's status including project time lines, changes of project status (e.g., from site assessment performed to measure proposal submitted), and program budgets.

The program consultant attends a biweekly telephone meeting with other regional program consultants assigned to residential programs. These meetings provide staff an opportunity to leverage each other's expertise and to discuss any issues with regional contractors and other matters related to program implementation.

The program manager attends a monthly meeting of program managers from the region. The purpose of these meetings is to share best practices, troubleshoot issues that managers may be facing, share information about items of concern such as quality of contractors working across program lines, and provide EM&V updates for the region.

Staff assessed the current internal communication processes as effective and meeting program management needs. Moreover, one staff member emphasized that openness of communication was a particular strength of CLEAResult.

The utility program manager also meets on a biweekly basis with SWEPCO program staff. The primary objectives of this meeting are to review program status and to discuss any recommendations CLEAResult may have. During this meeting, a program status report generated by CLEAResult is reviewed. Additionally, a more comprehensive monthly status report is generated that includes additional metrics and highlights program successes and future outlook.

CLEAResult staff also reported that there is significant coordination and communication between SWEPCO customer service and account managers. These groups are copied on biweekly reports detailing program activity and participated in program training at launch.

SWEPCO and CLEAResult program leads have regular weekly calls and more in-depth biweekly calls. During these meetings, staff discusses program goals, progress, budget status, and individual projects. Additionally, approximately every six weeks, all SWEPCO meets with the full CLEAResult implementation team in person.

Staff reported frequent unscheduled communication. The utility program representative indicated that the frequent communication between the utility and CLEAResult ensures that there are no surprises during any of the regularly scheduled meetings.

3.5.4.5.5 Program Marketing and Outreach Strategies

A strategic decision was made to prioritize the program's budget for incentives over marketing efforts. As a result marketing activity was limited and the program intended to have the program contractors primarily drive program activity. In addition to contractor's promotion of the program, the program website also provides a means of disseminating program information. The program has engaged in limited outreach to multifamily properties, but is primarily focused on the single family home market. Due to the small budget available for the program, staff were concerned that a few multifamily properties could easily fully utilize the program budget.

SWEPCO provides some promotion of the programs through social media but chose not to utilize more traditional channels such as bill stuffers or bill messaging. These channels were not utilized because staff believed the goals were obtainable without those efforts. SWEPCO did have the opportunity to place two advertisements in a local paper at no cost. Additionally, a newspaper article about the programs generated some program activity.

Program marketing planning is utility specific but coordinated across states where CLEAResult implements programs for SWEPCO. An example of this coordination is the

use of a common website template across all three states. Additionally, staff reported that regional program managers share information about leads among customers that have operations in multiple utility jurisdictions.

A single page customer information sheet is provided on the program website. The customer fact sheet includes information on the program participation steps and some description of the incentives and incentives provided through the program. The program lists a number of benefits possible from participation including saving energy and money, environmental benefits, and improved home comfort. Telephone and email contact information is provided for additional information. However, the customer eligibility section does not describe what SWEPCO customers are eligible.

The program website also contains links to tools to enable customers to calculate potential energy savings.

3.5.4.5.6 Barriers to Participation

Program staff has not identified any significant barriers to participation.

3.5.4.5.7 Quality Control and Verification Processes

Staff reported that they target the first five projects completed by a new contractor firm for a pre- and post-inspection visit and that 5% of the projects are inspected after that. The inspection requirement for new contractors described is more stringent than what is stated in the program manual (which states that 10% of the first 25 projects completed by contractors are inspected). The number of initial visits may also be reduced if contractors have completed work through CLEAResult Programs operating in other service territories. Project verification visits check for consistency between reported performance testing, site information, and measure information. Additionally, staff reported that they discuss the customer's satisfaction with the contractor during visits. Staff's assessment is that customers are more receptive to a discussion of the contractor's performance than to completing a form.

3.5.4.5.8 Trade Ally Recruitment and Management

As of August 2015, the program had 22 contractor firms in the network. In order to participate in the program, the contractor firm must employ a staff member who has at least one of the following certifications: Building Performance Institute (BPI) Building Analyst, BPI Energy Auditor, or RESNET Home Energy Rater. Contractors that only provide ceiling and wall insulation can substitute the BPI Science Principals Certificate of Knowledge. Energy consultants must also be certified as a BPI Building Analyst, BPI Energy Auditor, or RESNET Home Energy Rater (HERS) rater. If the assessor was certified as a RESNET HERS rater before January 1st, 2014, RESNET Combustion Safety training is also required.

In addition to the training requirements, contractors must sign the Participating Contractor Agreement and Best Practices Installation Standards, have \$1,000,000 in minimum liability requirements, a current Louisiana contractor's license, and satisfactory trade and bank references.

Program staff also reported that they are developing a quality assurance/quality control seminar that will cover completion of project paperwork and discuss program changes.

Program staff's assessment is that the contractor network is sufficiently well developed in terms of numbers and types of services provided to meet the programs current needs. Similarly, the recruitment effort was assessed as successful and staff believes they have a group of high skilled contractors in the network. The program consultant's previous experience as a home inspector was a resource for identifying capable firms.

Program staff also held a kickoff meeting with the most active residential contractors to solicit their feedback on the program. Overall, staff reported that feedback from contractors has been positive, but that some modifications have been made based on feedback. For example, when the program initially launched, they had multiple forms that contractors were required to complete. Based on contractors' feedback, these forms were combined into a single form.

3.5.5 Participant Survey Results

3.5.5.1 Demographic Characterization

Participants in the Residential Solutions Mass Market channel were surveyed to provide insight into the participants experience with the program. A total of 17 program participants responded to the survey, of which 88% lived in a single family detached home with an average of 2.4 people living in the home. Twenty-four percent of those surveyed had a household income of \$50,000 or less, while 24% were between \$51,000 and \$100,000, and 18% had more than \$100,000. Eighty-eight percent of surveyed owned the home, and 29% had at least a four-year college degree.

The Evaluators cross-tabulated income levels and the number of home occupants to assess the probability of a given participant who qualified as low income. The criterion used was 200% of federal poverty line (the criterion applied by the federal Weatherization Assistance Program). The probability scoring is summarized in Table 3-18.

Table 3-18 Low Income Probability Scoring by Household Size and Income Level

Family Size	200% of Fed. Poverty ²⁴	Income Bracket Response from Survey			
		Less than \$25k	\$25k-\$50k	\$51k-\$75k	\$76k-100k
1	\$23,540	94.2%			
2	\$31,860	100%	27.4%		
3	\$40,180	100%	60.7%		
4	\$48,500	100%	94.0%		
5	\$56,820	100%	100%	27.8%	
6	\$65,140	100%	100%	60.6%	
7	\$73,460	100%	100%	93.8%	
≥8	\$81,780	100%	100%	100%	27.1%

Using this probability assignment, the Evaluators found that 16.6% of survey respondents were within 200% of the federal poverty line.

3.5.5.1.1 Sources of Awareness

Participant sources of awareness are summarized in Figure 3-3. The most common way participants first learned about the program was through a friend, family member, or colleague (18%), followed by a program representative (29%).

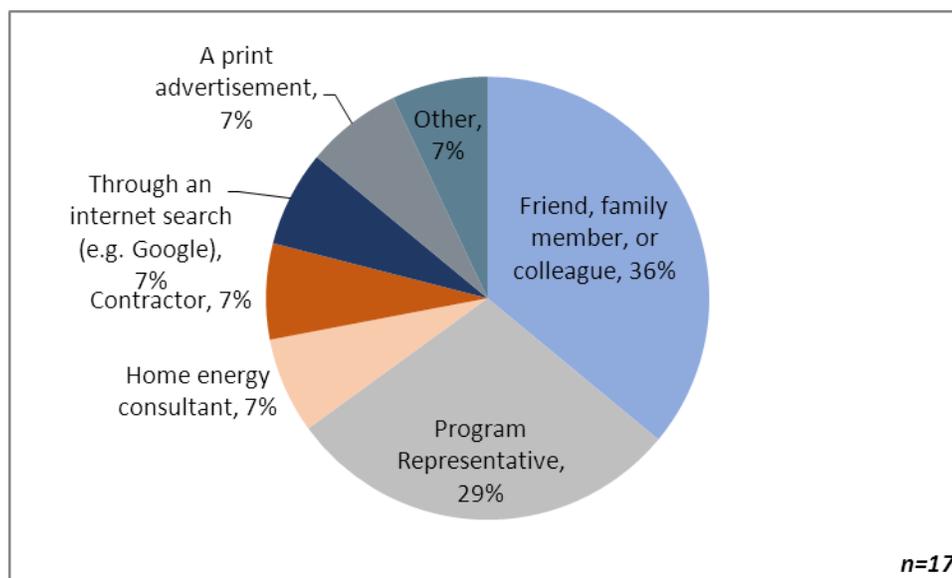


Figure 3-3 RSOL: How Participants Learned of the Program

3.5.5.1.2 Decisions to Participate

Seventy-one percent of those surveyed reported being motivated to participate in the program by a desire to improve the comfort of their home, or to conserve energy and

²⁴ <https://www.healthcare.gov/glossary/federal-poverty-level-FPL/>. Accessed October 10th, 2015.

protect the environment. Other top reasons for participating included: saving money on energy bills (59%), becoming as energy efficient as their friends or neighbors (35%), and getting the rebate (35%). These responses demonstrate that participants consider both energy and non-energy benefits when deciding to complete a project and the rebate provided by the program.

Twenty-nine percent of participants said they were considering a home energy assessment before they learned of the rebate or discount available through the utility's program, while 65% said they were not planning to do one, and 6% did not know.

Participant survey responses suggested that a significant share would have completed the energy assessments without the rebate or discount provided. Thirty-five percent of participants reported they definitely would have had the home energy assessment completed without a rebate or discount, while 29% said they probably would have. The remaining participants indicated they probably would not have (24%), definitely would not have (6%), or they didn't know (6%). These results suggest that rebate or discount may not have been a critical factor in a sizable share of participants' decisions about completing the energy assessment. However, the discounts and rebates may have been indirectly influential for some of these participants. The availability of the discounts or rebates may have motivated energy consultants to promote the energy assessments, and this promotional activity may have affected participants' awareness of the service.

When participants who implemented project measures following a home energy assessment were asked if they would have implemented the same measures without the assessment, 27% said they definitely would have, 33% said they probably would have, 20% said they probably would not have, and 20% said they definitely would not have. These responses suggest that the energy assessments were influential in customer's decisions to complete energy saving projects for a sizable minority of program participants.

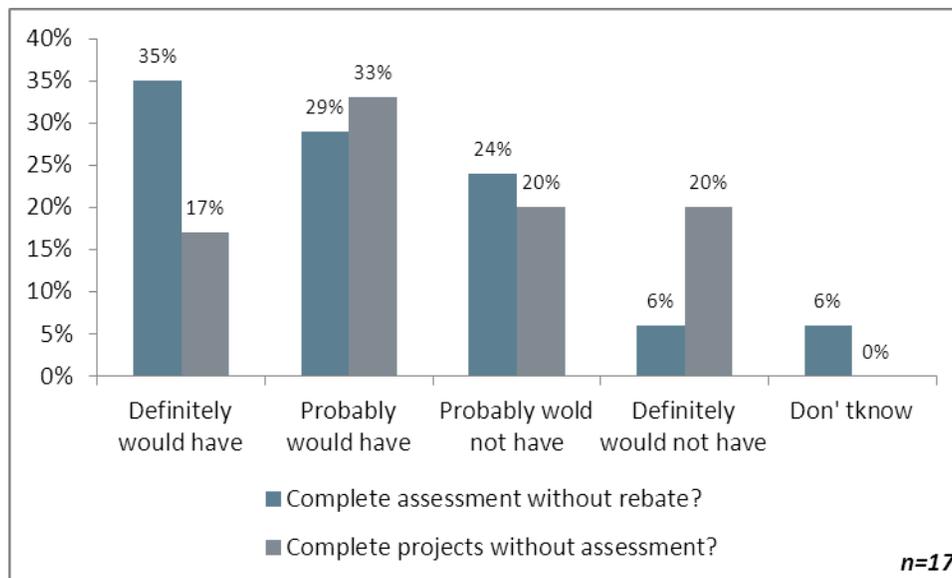


Figure 3-4 Likelihood of Completing Assessments or Projects without the Program

3.5.5.1.3 Participation Process

Overall, participants thought the energy saving recommendations were easy to understand, the energy consultant was courteous and professional, and the energy recommendations were relevant for their home. As shown in Figure 3-5, at least 82% gave favorable assessments of the recommendations provided and the energy consultant. Respondents were least likely to agree that the energy assessments were easy to understand, although a clear majority thought that they were.

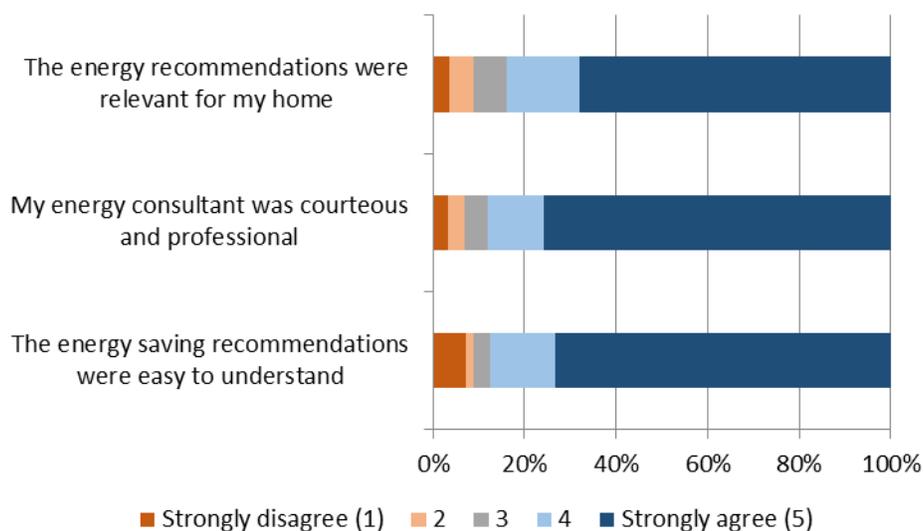


Figure 3-5 Participants Rating of the Home Energy Assessments

Respondents reported the energy consultant discussed the availability of rebates or discounts for energy saving recommendations 65% of the time, while 24% said this was not discussed, and 12% did not know if a discussion about rebates and discounts took place.

Respondents that completed Inspections or Tier 1 audits were then asked if contractors discussed the Tier 2 audit offering with them. If they were discussed, the respondent was then asked to identify why they did not elect to have more in-depth testing on their home. The results are summarized in Figure 3-6 and Figure 3-7.

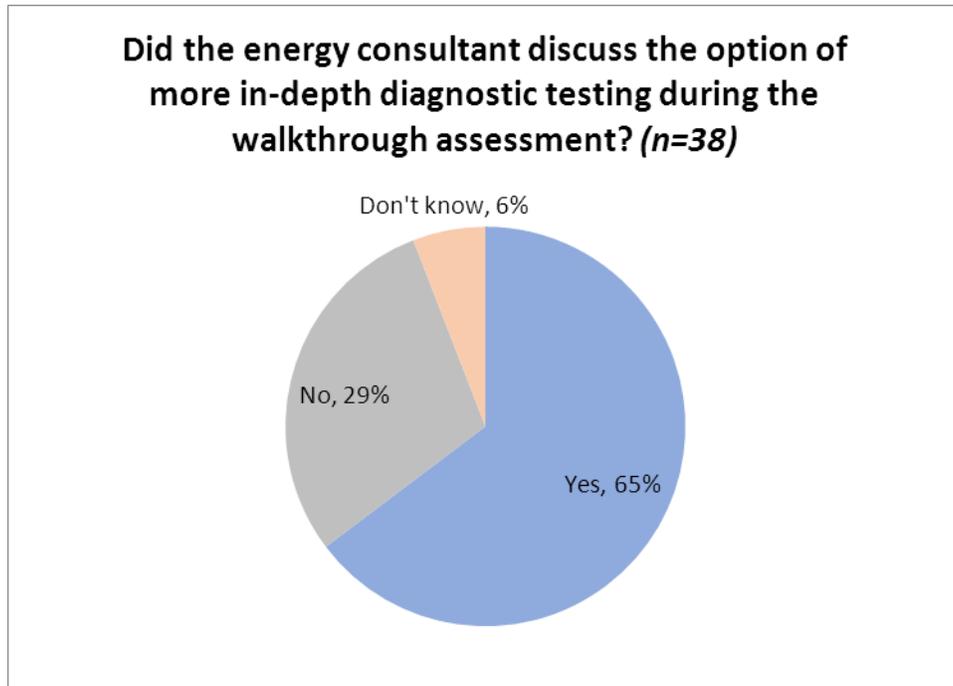


Figure 3-6 Discussion of In-depth Diagnostic Testing with Walkthrough Participants

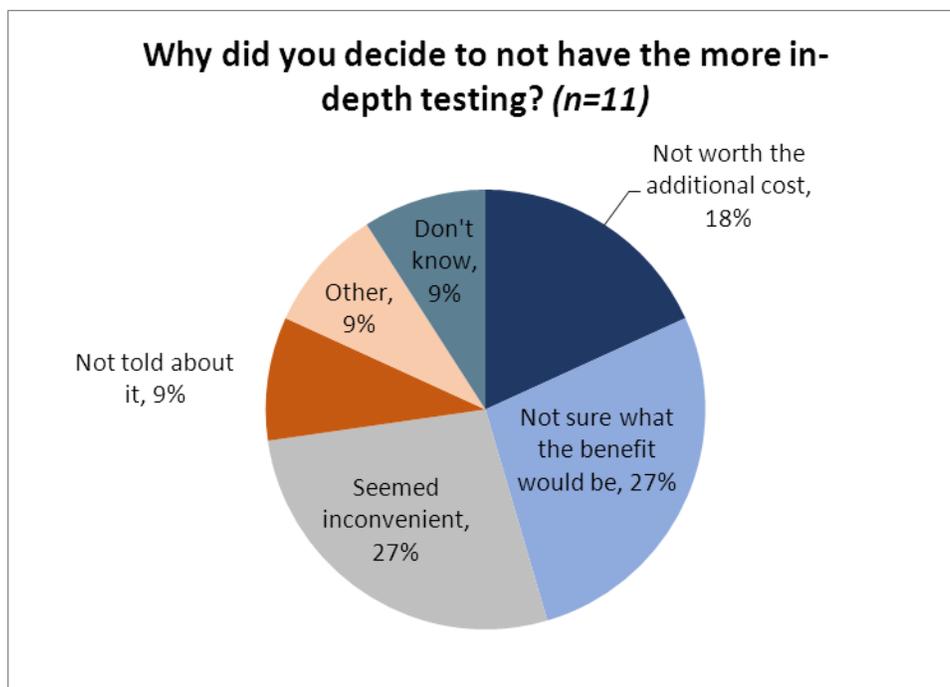


Figure 3-7 Reasons for Declining More In-depth Testing

The majority of participants reported that finding a participating contractor was very easy (93%), however 7% reported that it was difficult. Participants who installed measures were asked how they found the contact information for their contractor. The most common ways included family or friend referral (40%), a contractor they had worked with before (20%), and the energy consultant who did the assessment (13%).

3.5.5.1.4 Participant Satisfaction

As shown in Figure 3-8, participants were most satisfied with the quality of the contractor's work, the time it took staff to address questions/concerns, and the program overall. Participants were least satisfied with the energy savings on their utility bill and the walkthrough measures installed. Other reasons for dissatisfaction for participants who listed some level of dissatisfaction are listed in the table below.

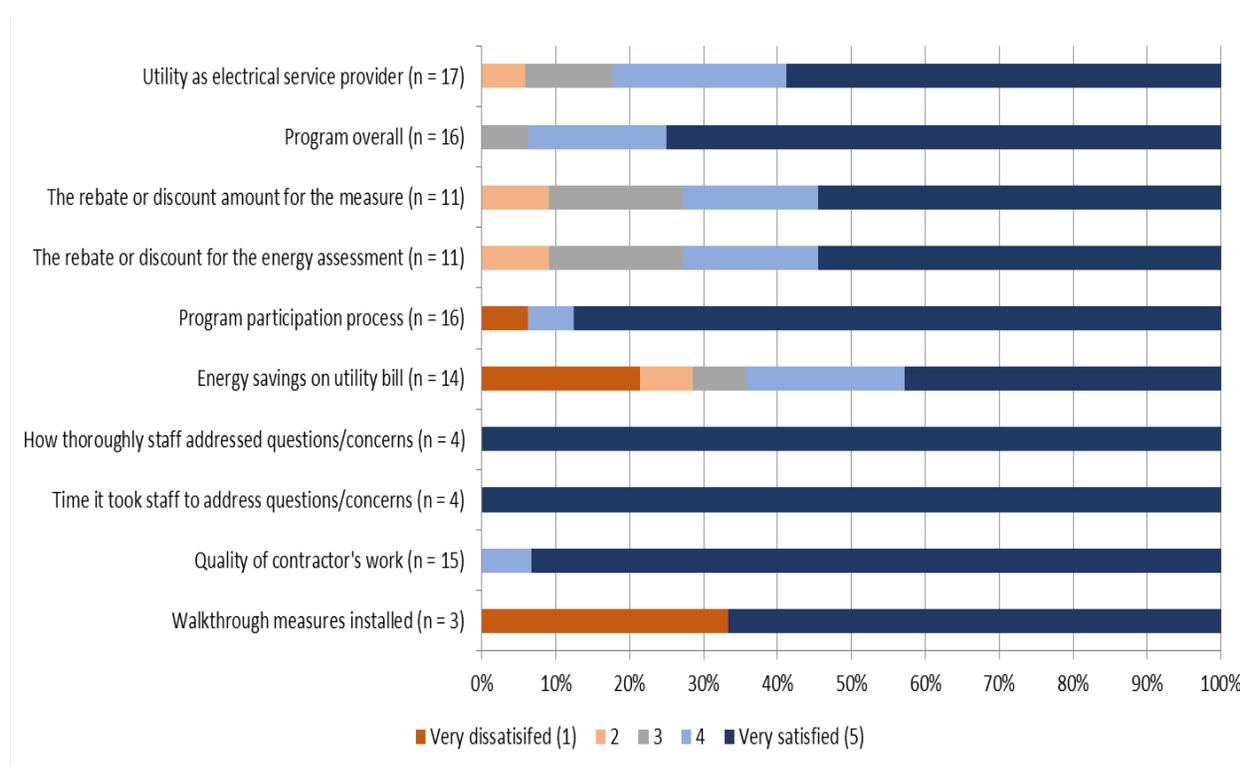


Figure 3-8 Participant Satisfaction Scores

Participants who reported dissatisfaction with the program were asked to elaborate on the reasons for their dissatisfaction. Their responses are shown in Table 3-19. The reasons given were related to not seeing the energy or cost savings expected.

Table 3-19 Reasons for Dissatisfaction with the Program

<i>Reason for dissatisfaction</i>	<i>% of Dissatisfied Respondents (n = 9)</i>
No energy savings noticed	67%
Higher bill	33%

Table 3-20 summarizes respondents' self-reported impact of participation on satisfaction with the utility. Program participants reported greatly increased satisfaction with the utility 41% of the time, somewhat increased satisfaction 29% of the time, no change in satisfaction 18% of the time, and decreased satisfaction 12% of the time.

Table 3-20 Impact of Participation on Satisfaction with Utility

<i>Effect of participation in the Utility's Program on satisfaction with SWEPCO?</i>	<i>% of Respondents (n = 17)</i>
Greatly increased your satisfaction with the Utility	41%
Somewhat increased your satisfaction with the Utility	29%
Did not affect your satisfaction with the Utility	18%
Somewhat decreased your satisfaction with the Utility	6%
Greatly decreased your satisfaction with the Utility	6%

3.5.5.2 Participating Contractor Interviews

The Evaluators completed interviews with nine participating contractors who had all completed at least one project in the Residential Solutions program. The interviewed contractors participate in the Entergy Louisiana, Entergy Gulf States, SWEPCO, or Cleco programs and many of the contractors interviewed participate in more than one program.

3.5.5.3 Background

Six of the nine respondents were energy consultants that deliver energy assessments and all were installing contractors. Four respondents stated that their business specialized in energy efficiency, while others offer more generalized services including insulation, infiltration, and duct efficiency. All of the respondents provide services for residential (single and/or multi-family), and one-half provide for the commercial sector as well.

3.5.5.3.1 Motivations for Participating

In order to gain insight into their decision making processes, respondents were asked what motivated them to participate in the Residential Solutions program. The evaluators asked about how participating trade allies learned of the program, their motivation for becoming a trade ally, and any concerns they had about participating.

Five respondents first learned of the program through direct utility or program staff outreach. One respondent stated that he or she learned about the program from other contractors in the area, and another said their firm was seeking out energy efficiency programs to participate in Louisiana. One respondent, that had been a participant of the Residential Solutions program in another service territory, decided to expand their business to provide the program sponsored services to become a participating contractor.

Contractors provided information on any initial concerns they had about participating in the program. The most common concerns cited were with program processes like the application process and the wait time to receive the rebates. One respondent had a concern about the incentive levels, but noted that this did not end up being a problem.

Another said that they were worried that customers would be uninterested in participating, but noted that their business is doing very well.

The major factors that influenced the respondents' decision to participate was the opportunity to expand their business (60%; either revenue or market sectors) and to help customers make their homes more energy efficient (30%).

3.5.5.3.2 Contractor and Program Marketing

Many of the respondents stated that their marketing or promotion of the program is through word-of-mouth and direct referrals. Those respondents have found that this was one of the most effective and cost effective means to promote the program. One respondent specifically uses the approach of canvassing neighborhoods to generate business. Contractors also reported using other approaches such as purchasing mailing lists, distributing fliers, magazine ads, social media, and emails. One respondent contacted the utility to get approval to distribute their own marketing materials to promote the program to potential customers.

Contractors provided estimates ranging from 0% to 15% for the number of projects that are initiated by customers approaching them first, indicating that most projects are initiated through contractor outreach efforts. The relatively small share of projects initiated by customers may also indicate a general lack of awareness of the program. A low level of customer awareness of the program is not surprising given that program are new.

When contractors were asked about the program marketing efforts directed at customers, a few responded that they had seen television advertisements or knew that the utility websites were used to promote the programs. However, many were unable to specify the utility's marketing efforts for the program. Even though they were unsure about the specific materials being used to promote the program, the respondents thought the program outreach and marketing efforts were effective because they had received some phone calls from customers about the program.

All of the respondents received guidelines on the use of the utility and program name for their marketing materials. Respondents were asked if the program or utility staff had provided them with any marketing materials for them to distribute to promote the program. Approximately one-half the contractors confirmed they had received materials from the program staff. The available materials included brochures, other paperwork, and business cards. One respondent stated:

"They had a few brochures, but they were limited in supply. I never had very many of them and I probably didn't ask for a larger supply. They did give me some brochures that I used quickly."

However, even though the program staff had given some of the respondents marketing materials, about one-half of them stated that they have not used the materials while the remainder said to have used them frequently.

Respondents were asked for any suggestions on how to improve on the materials to make them more effective. Some suggestions included the addition of a place to input their own company information on the flyer and clearer messaging about using a specific contractor for the program.

3.5.5.3.3 Barriers to Participation

In order to identify any customer barriers to participation, respondents were asked about customers' awareness of the Residential Solutions program, concerns they may have had before participating, and feedback on the financial incentives offered.

About one-half of the respondents said that several of their customers were initially skeptical about the program offerings. Contractors indicated that some customers are worried that the program is "too good to be true" and assume there is a "catch" to it. Additionally, some customers are wary about allowing the trade ally into their home to conduct the audit. Another customer concern that was mentioned is whether or not they will see a lower utility bill as a result of their participation.

A customer's primary concern when deciding whether or not to implement a trade ally's recommendations is cost. One respondent stated that in many cases the customer knows about the problems in their home before the assessment is performed, but solving the problem is cost prohibitive. Other potential barriers to participation noted include customers not wanting to let people in their homes to perform the work and concerns about the time required to complete the energy saving improvements.

Almost 70% of the contractors said that they think the rebate for the audit is not a sufficient enough incentive to encourage customers to have an energy assessment performed. Their suggested incentive range should be between \$100 and \$150. When asked whether or not the financial incentives are sufficient to encourage customers to install energy efficient equipment, respondents replied:

"I think it's a nice gesture when we offer the rebate. I'm not sure if it would be a 'game changer.' It's not a 'make or break situation.'"

"If they're going to do it anyway, they like [the recommendations]. If they don't want it, they're less inclined."

"If the incentives were larger, more people would be inclined to do it, because everyone wants something for nothing...The rebates are reasonable. I think they need to be higher for me to able to attract people out here. The main thing is advertising and letting people know about the programs."

It should be noted, however, that the program was very quickly oversubscribed and as such increasing the program incentive is likely not needed unless the program is to be significantly expanded.

3.5.5.3.4 Participation Process

Several questions were asked of contractors regarding the application procedures, the level of effort to complete the program steps, feedback on the OPEN tool software, and any suggestions for improvement.

All of the respondents choose to fill out the application for the customer and return the paperwork for them to sign. They prefer this method, as opposed to having the customer fill it out, because it *“takes a lot of the hassle away from the customer”* and they *“like to make it as simple as they can for them.”* Respondents further stated that it took them “minimal” effort to fill out the applications. None of the respondents had suggestions for improving the application.

Respondents provided feedback on the use of the OPEN tool. About one-half of the respondents did not experience any major issues, and all indicated that it was fairly easy to use. However, some did have issues such as difficulty logging into the system, input data not showing up in real-time, having to input data multiple times, and being unable to edit data inputs. Example comments on use of the tool include the following:

“I always have trouble logging on. The main issue is getting kicked out. I’ve been having a problem with inputting data multiple times and only one name showing up. Sometimes it gets stuck.”

“It would be a very good tool if they could have worked all the kinks out. Going back to edit, it wouldn’t allow you to edit an address. Some things didn’t show up in real-time and it repeated values later.”

3.5.5.3.5 Training and Staff Support

Contractors provided information on the training they received. Seventy-eight percent of the respondents had received training; some received more formal training and others received informal training. Some respondents noted that program staff came to them to give the training while another said they went to the program staff’s office to receive training. Those respondents that did receive training said that it was comprehensive and easy, and the timing and location were convenient. The only suggestion for improving the training would be to hold additional trainings to cover program changes.

All but one respondent was provided written documentation describing program procedures and requirements. Overall, the information provided to the contractors was assessed as clear, simple, and user-friendly.

3.5.5.3.6 Market Effects

Energy efficiency programs may cause market effects such as altering the products and services provided by contractors. One-third of respondents indicated that they had made changes to the products or services they offer as a result of participating in the program. One-third also said that they did not provide residential energy audits prior to their involvement in the program.

In addition to changes in the services provided, two respondents said that participation in the program has led them to increase their staffing by two to three full-time employees. Two other contractors reported that to meet the needs to deliver the program services, they have hired between 10 and 12 full-time employees. One of these respondents also indicated that their firm opened a new office location in Louisiana.

3.5.5.3.7 Overall Satisfaction

Respondents were then asked to rate their satisfaction on a scale of 1 to 10, with “1” meaning very dissatisfied and “10” meaning very satisfied, on a range of elements related to their program experience. Table 3-21 tabulates the satisfaction results.

Table 3-21 Trade Ally Satisfaction Levels of Program Elements

Element of Program Experience	Very Satisfied (10 -9)	Somewhat Satisfied (8-7)	Neither Satisfied or Dissatisfied (6-5)	Somewhat Dissatisfied (4-3)	Very Dissatisfied (2-1)	Don't Know
The application process	33%	44%	0%	0%	0%	22%
Wait time for the rebate	11%	22%	22%	0%	33%	11%
Incentive levels	22%	33%	11%	33%	0%	0%
The range of measures covered by the program	44%	56%	0%	0%	0%	0%
Service from program staff	44%	33%	11%	11%	0%	0%
Overall program	44%	33%	11%	11%	0%	0%

Overall satisfaction with the Residential Solutions program is high. A majority of the trade allies reported high satisfaction with most of the program elements such as the range of measures covered by the program, the service from program staff, and the application process. Respondents who rated specific program elements lower than 5 were asked to clarify the low rating. Specifically, respondents who had issues with the wait to receive the rebate said:

“You submit the stuff and you wait a couple of weeks to hear back...We’re waiting between 3-4 weeks. The turnover is slower than expected.”

“We email them daily. They had some ‘communication errors’ on their end and lost some rebates. We had to reissue applications...They are still delayed on some, but it’s better.”

Respondents were also asked to describe the greatest strengths of the Residential Solutions program. Many of them said the greatest strength was the ability to help people. More specifically, they responded:

“Helping improve peoples’ lives.”

“You’re helping a customer. Helping someone who can’t afford to insulate their home.”

“The fact that the program is easy for people to understand and implement the program. There are people available to answer questions. There is little effort on what to do and how to do it because it’s explained so well.”

Lastly, respondents were asked for recommendation or suggestions on how to improve the program or the role that they play as trade allies in the program. Three respondents mentioned advertising; one specifically said that the opportunity for the creation of marketing materials that would allow them to add their contact information would be very helpful in future promotion of the program. Two respondents mentioned providing more program money for future years. Two other respondents mentioned faster rebate processing. Overall, respondents were generally satisfied with the program.

3.6 Key Findings from Trade Allies

Key findings from the participating trade ally interviews were as follows:

- Of the nine interviewed contractors, more than one-half of them learned about the program through utility or program staff directly contacting them about the program.
- The major factors that influenced the respondents’ decision to participate as a trade ally was the opportunity to expand their business (either revenue and/or market sectors) and to help customers make their homes more energy efficient.
- Many customers are still unaware about the program, where respondents cited that up to 15% of their customers contacted them about the Residential Solutions Program.
- A customer’s primary concern when deciding whether or not to implement a trade ally’s recommendations is cost.

- Almost all respondents received training, but would like trainings in a more convenient location and whenever there are program changes.
- All the respondents said that the program documents they received from the utility were clear and easy.
- When trade allies used the OPEN Tool, approximately one-half of the respondents did not experience any major issues, and everyone found it fairly easy to use. However, others did not have some issues with operating the software including not being able to edit entered information or having to enter information multiple times.
- Respondents are generally satisfied with the Residential Solutions program.

The evaluators recommend the following:

- Marketing materials – Marketing materials are utilized by a number of contractors. Ensure that contractors have sufficient supplies or access to electronic versions for printing. Ensure that contractors have access to materials that promote the program and include space for their contact information.
- Training – Schedule training events at slower times of the year (late fall or early winter). Additionally, provide program updates on any changes. To provide trainings in more convenient locations, the evaluators recommend that utilities co-sponsor training events to reach all service territories.
- OPEN tool software – Include an “Edit” feature for trade allies to fix input data in real-time and offer the tool in bigger font sizes.

3.6.1 Conclusions

The following sections summarize key process evaluation findings.

3.6.1.1 Program Design and Participation Process

- The Residential Solutions Program provides similar services and measures to other programs operated in the region. The program provides a walkthrough home energy assessment as well as the option for more in-depth home performance testing. Typical direct install measures such as CFLs, smart power strips, and low-flow devices are offered. Single and multi-family buildings are eligible.
- A sizable share of mass-market energy assessment participants, 24%, reported that their energy consultant did not discuss the available rebates or discounts for energy saving improvements.
- Very few participant survey respondents that installed incentivized measures had difficulty locating a contractor to install the measures.

- The program provided in-depth contractor training related to building certification, however, less training was provided on program participation processes. Staff is working on developing a quality assurance/quality control seminar for contractors that will also cover program changes.
- Contractors noted a few issues with the OPEN tool including an inability to edit entered data and needing to enter data multiple times.
- Program staff reported that use of the OPEN tool was discontinued because of issues using it for the mass-market and income qualified programs.
- Staff is considering reducing the number of audits funded and adding a single audit amount for multifamily buildings.

3.6.1.2 Program Marketing and Outreach

- A strategic decision was made to limit program marketing and to utilize the funds to incentivize measures. This strategy did not prevent the program from achieving its energy saving goals during the first year.
- The program website and promotion through social media were the primary forms of mass-marketing utilized during the program year. Additionally, SWEPCO had the opportunity to place two advertisements in a local paper at no cost. Program staff engaged in limited direct outreach to multifamily properties to promote the program as well.
- A customer fact sheet was developed for the program that provides information on benefits of participation, a description of the types of measures and serviced incentivized, and program contact information. The sheet is missing information on customer eligibility requirements.
- Thirty-six percent of program participants learned of the program from a friend, family member, or colleague and 29% learned of the program representative. Only 14% reported learning of the program from a contractor or home energy consultant. Although this suggests that contractors are having a limited effect on program awareness, it is possible that some respondents thought the contractor was a SWEPCO or CLEAResult program representative.
- Consistent with the program design, contractors reported actively promoting the program.

3.6.1.3 Quality Control and Verification Processes

- During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. Additionally, the program manual states that after the first 25 projects, 5% of additional projects completed by contractors are inspected. Ten percent of projects is a more typical verification rate.

- Project verification visits check for consistency between reported performance testing, site information, and measure information. Additionally, staff reported that they discuss the customer's satisfaction with the contractor during visits.
- During a mid-year review of the program tracking data, there were five instances where a single phone number was listed for multiple customers. In some instances the phone number was general property number listed for multiple participants or the contractor's phone number. Additionally, there were over 150 contacts without a phone number.

3.6.1.4 Customer and Contractor Satisfaction

- More than 80% of customers were satisfied with the program overall. Participants were most satisfied with the quality of contractors work and least satisfied with the energy savings on their bill.
- All customers that contacted program staff with questions or concerns were very satisfied with the timeliness and thoroughness of staff's response.
- Sixty-seven percent reported that participation in the program greatly increased their satisfaction with it.
- Most interviewed contractors were satisfied with the program overall. Issues raised by contractors included slower than expected review of project materials and a desire for larger rebates.

3.6.2 Recommendations

The Evaluators' recommendations for the Residential Solutions Program are as follows:

- **Updated calculators to Louisiana weather.** High and low program realization rates are due to the use of incorrect/inappropriate weather data in ex ante savings calculations. The calculator uses values from the AR TRM for El Dorado, rather than values appropriate for Caddo Parish in Louisiana.
- **Specify air conditioner configuration.** All ex ante savings calculations assumed either central or window AC configurations. This is to say, it was assumed that all homes had functional air conditioners
- **Distinguish between R-30 and R-38 installation.** Tracking data provided no distinction between these levels of insulation. Ex-ante calculations assumed R-30 throughout, resulting in a verified savings 57.7% higher than expected.
- **EISA standards to affect portions of the program.** The Energy Independence and Security Act set efficiency standards for several classes of equipment, including heat pumps. 45% of heat pumps installed through the program did not meet this standard. The effective date of the standards is January 1, 2015. However, due to uncertainty caused by recently-settled litigation, DOE has agreed to an 18-month grace period during which noncompliant central air

conditioners manufactured prior to January 1, 2015 may be installed. The grace period ends on June 30, 2016.

- **Emphasize with energy consultants the importance of encouraging audit participants to complete incentive projects.** Twenty-four percent of respondents stated that the availability of rebates and discounts was not discussed with them.
- **Continue plans to develop an audit incentive that is specific to multifamily properties.** Staff identified modifying the audit incentives as a means of enhancing the program design and better utilizing the incentive budget.
- **Keep contractors updated on program changes.** Provide training or other forms of information to participating contractors when program changes are made.
- **Review modifications needed to utilize the OPEN tool to streamline the program participation process.** If OPEN is utilized again, review options for adding data editing capabilities to the OPEN tool. Allowing for edits may improve the quality of data submitted by contractors.
- **Monitor program activity to determine if additional marketing effort is needed.** Staff made the decision to engage in limited program marketing in order to preserve more funding for incentives. However, broader outreach may be needed in the future to ensure that the program meets its energy saving goals and that all customers are aware of the program offerings.
- **Consider adding information on customer eligibility requirements to the customer fact sheet form.**
- **Accurately document and communicate to program staff the verification sampling rate to ensure understanding of verification processes.** During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. The Evaluators recommend verifying 10% of projects completed after the initial projects are inspected instead of 5%.
- **Perform periodic data quality reviews to ensure completeness of information.** Additionally, provide training to contractors on providing the correct phone number for participants. For multifamily properties, contractors should provide the number of the individual they worked with rather than the general property phone number.
- **Develop strategies for improving data quality.** Data quality issues were identified for a portion of the project tracking records. Staff should seek strategies to minimize data quality issues. Strategies may include training of contractors on data requirements, incorporating data validation functions into program software, and periodic reviews of data quality.

4. Income Qualified

4.1 Program Description

The Income Qualified program (IQ) targets and offers comprehensive weatherization services to qualified low-income, single-family homes and low-rise, multi-family dwellings. The IQ program is intended to be primarily implemented through local participating trade allies who provide energy efficiency upgrades available to income qualifying customers. The Program's objective is to educate customers on how they are using energy, identify opportunities for energy savings specific to their home, and prioritize a wide range of energy conservation measures that will allow them to save energy immediately.

The IQ program provides customers with household incomes at or below 200 percent of the Federal income eligibility guidelines with home energy upgrades at low or no cost. The Program offers these customers a free home energy assessment through a qualified and participating trade ally. The IQ program includes audit and installation practices similar to national public weatherization grant programs. The participating trade ally will assess building state, collect data, and generate an energy efficiency improvement report for each home audited.

The IQ program is intended help qualifying customers save money on their home energy bills. The participating contractor helps residential customers analyze their energy use, identify energy efficiency improvement projects, and install low-cost, energy saving measures at home. The inspection includes consultation about the customer's concerns, a visual inspection of the living space, combustion safety testing, attic, crawl space/basement, and exterior of the home, and installation of direct install measures (e.g., CFL lighting, showerheads, and faucet aerators). Following the assessment, the contractor recommends and coordinates the installation of home improvements to increase its energy efficiency. Qualifying customers are eligible to receive up to \$2,500 per home for home improvement upgrades with measures included in the program.

4.2 Expected Savings and Program Participation

The direct install measures include:

- Up to six compact fluorescent light bulbs (CFLs);
- One smart power strip
- Low Flow Showerhead

Additional measures are:

- AC Tune-up
- Air Sealing

- Blower Door Testing
- Ceiling Insulation
- Duct Blaster Testing
- Duct Sealing
- Faucet Aerators
- Floor Insulation

A total of 172 households participated in the program. Below, Table 3-1 summarizes the total number of homes a measure was installed in/performed at, total measures installed/performed and the expected kWh and peak kW savings, by measure:

Table 4-1 Summary of Measures and Expected Savings

<i>Measure</i>	<i>Number Homes</i>	<i>Total Quantity of Measures</i>	<i>Total Expected kWh Savings</i>	<i>Total Expected peak kW Savings</i>
Advanced Power Strip	4	4	423	0.05
Air Sealing	16	16	9,442	1.51
Blower Door Test	21	21	0	0.00
Ceiling Insulation	148	142,812sq ft	297,223	75.06
CFLs	120	660	9,329	1.80
Duct Blaster Test	22	22	0	0.00
Duct Sealing	18	18	81,701	10.72
Low Flow Showerhead	7	7	548	0.06
Tier 1 Assessment	171	171	0	0.00
Tier 2 Assessment	1	1	0	0.00
Total			398,666	89.20

4.3 Impact Savings Calculation Methodology

For equipment and retrofits rebated through the PY1 IQ program, calculation methodologies were performed as described in the TRM. Table 3-2 identifies the sections in the TRM that were used for verification of measure-level savings under the IQ program.

Table 4-2 TRM Sections by Measure Type

<i>Measure</i>	<i>Section in TRM</i>
AC Tune up	2.1.5
Air Sealing	2.2.9
Ceiling Insulation	2.2.2
CFLs	2.5.1
Duct Sealing	2.1.11
Low Flow Showerhead	2.3.5

In addition to the TRM, the evaluators also examined the Excel workbook distributed to contractors and trade allies to assess savings by measure. The workbook utilizes TRM savings algorithms with contractor or trade ally inputs to calculate savings based on the measure and input parameters. The evaluators verified the factor tables for each measure to ensure the values were appropriate.

Three measures accounted for the majority of the gross savings for the IQ program: air infiltration reduction, ceiling insulation and duct sealing. The calculation methodologies for these measures are detailed in the following sections.

4.3.1 Air Infiltration Reduction Savings Calculations

The deemed savings values for air infiltration reduction were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Louisiana weather zones in developing savings values denominated in deemed savings per CFM₅₀ of air leakage rate reduction. Table 3-3 summarizes the deemed savings values for the SWEPCO service territory.

Table 4-3 Deemed Savings Values for Air Infiltration Reduction, Shreveport & Bossier City.

<i>Equipment Type</i>	<i>kWh Savings / CFM50</i>	<i>kW Savings / CFM50</i>
Electric AC with Gas Heat	0.2689	0.000216822
Elec. AC with Resistance	1.3605	0.000217412
Heat Pump	0.8268	0.000217412

For example, consider a residence with electric AC and gas heat. If the residence had a leakage rate of 16,100 CFM₅₀ before air infiltration reduction and a leakage rate of 7,220 CFM₅₀ after, then the residence would have an annual gross savings of 2,388 kWh.

$$\text{Air Infiltration Savings} = 0.2689 \frac{\text{kWh Savings}}{\text{CFM}_{50}} \cdot (16,100 \text{ CFM}_{50 \text{ pre}} - 7,220 \text{ CFM}_{50 \text{ post}})$$

$$\text{Air Infiltration Savings} = 2,388 \text{ kWh}$$

4.3.2 Ceiling Insulation Savings Calculations

The deemed savings values for ceiling insulation were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Louisiana weather zones in developing savings values denominated in deemed savings per square footage of ceiling area. Table 3-4 and Table 3-5 summarizes the deemed savings values for the SWEPCO service territory.

Table 4-4 Deemed Savings Values for R-30 Ceiling Insulation, Shreveport and Bossier City

Ceiling Insulation Base R-Value	AC/Gas Heat kWh/sq ft	AC/Electrical Resistance kWh/sq ft	Heat Pump kWh/sq ft	AC Peak Savings kW/ sq ft
0 to 4	1.4602	3.9184	2.2083	0.0010
5 to 8	0.6850	1.9555	1.0770	0.0003
9 to 14	0.3731	1.0712	0.5979	0.0002
15 to 22	0.1941	0.5460	0.3057	0.0000

Table 4-5 Deemed Savings Values for R-38 Ceiling Insulation, Shreveport and Bossier City

Ceiling Insulation Base R-Value	AC/Gas Heat kWh/sq ft	AC/Electrical Resistance kWh/sq ft	Heat Pump kWh/sq ft	AC Peak Savings kW/ sq ft
0 to 4	1.5642	4.3355	2.4299	0.0010
5 to 8	0.7890	2.3726	1.2986	0.0004
9 to 14	0.4771	1.4883	0.8195	0.0003
15 to 22	0.2981	0.9631	0.5273	0.0001

For example, consider a residence with a heat pump, and a pre-retrofit R-value of ceiling insulation in the range of 9 to 14 and is upgraded to R-38. If the residence has a ceiling area of 1,200 sq. ft., then the residence would have an annual gross savings of 983 kWh.

$$\text{Ceiling Insulation Savings} = 0.8195 \frac{\text{kWh}}{\text{ft}^2} \cdot (1,200 \text{ ft}^2) = 983 \text{ kWh}$$

4.3.3 Duct Sealing Savings Calculations

Duct sealing savings were calculated using the following savings algorithms from the TRM.

4.3.3.1 Cooling Savings (Electric):

$$kWh_{savings,C} = \frac{(DL_{pre} - DL_{post}) \times EFLH_C \times (h_{out}\rho_{out} - h_{in}\rho_{in}) \times 60}{1,000 \times SEER}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)

DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)

ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05

$EFLH_C$ = Equivalent Full Load Hours. See Table 3-6

h_{out} = Outdoor design specific enthalpy (Btu/lb) See Table 4-6

h_{in} = Indoor design specific enthalpy (Btu/lb) See Table 4-6

Table 4-6 Deemed Savings Values for Duct Sealing Calculations

Parameter	Deemed Value
EFLH _C	2,040
HDD	1,842
h _{out}	40
h _{in}	30
ρ _{in}	.076
P _{out}	.074
SEER	11.5

ρ_{out} = Density of outdoor air at 95°F = 0.0740 (lb/ft³)²⁵

ρ_{in} = Density of conditioned air at 75°F = 0.0756 (lb/ft³)⁴

60 = Constant to convert from minutes to hours

CAP = Cooling capacity (Btu/hr)

1,000 = Constant to convert from W to kW

SEER = Seasonal Energy Efficiency Ratio of existing system (Btu/W·hr)

Default value for SEER = 11.5²⁶

As an example, assume the duct leakage before sealing was measured at 360 CFM and the leakage after sealing was 90 CFM for a house. Using the SEER value of 11.5 BTU per WattHr, the annual savings would be:

$$\text{kWh per year} = (360-90) \times 1,842 \times (40 \times 0.076 - 30 \times 0.074) \times 60 / 1000 \times 11.5 = 1.988 \text{ kWh per year.}$$

4.3.3.2 Heating Savings (Heat Pump):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{1,000 \times HSPF}$$

²⁵ ASHRAE Fundamentals 2009, Chapter 1: Psychometrics, Equation 11, Equation 41, Table 2

²⁶ Average of Department of Energy minimum allowed SEER for new air conditioners from 1992-2006 (10 SEER) and after January 23, 2006 (13 SEER)

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
 $EFLH_H$ = Equivalent full load heating hours Table 4-6
60 = Constant to convert from minutes to hours
 HDD = Heating degree days Table 4-6
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 CAP = Heating capacity (Btu/hr)
1,000 = Constant to convert from W to kW
 $HSPF$ = Heating Seasonal Performance Factor of existing system (Btu/W·hr)
Default value for $HSPF$ = 7.30.²⁷

4.3.3.3 Heating Savings (Electric Resistance):

$$kWh_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{3,412}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
60 = Constant to convert from minutes to hours
 HDD = Heating degree days Table 4-6
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 $EFLH_H$ = Equivalent full load heating hours Table 4-6
 CAP = Heating capacity (Btu/hr)
3,412 = Constant to convert from Btu to kWh

4.3.3.4 Heating Savings (Gas Furnace):

$$Therms_{savings,H} = \frac{(DL_{pre} - DL_{post}) \times 60 \times HDD \times 24 \times 0.018}{100,000 \times AFUE}$$

Where:

DL_{pre} = Pre-improvement duct leakage at 25 Pa (ft³/min)
 DL_{post} = Post-improvement duct leakage at 25 Pa (ft³/min)
 ΔDSE = Assumed improvement in distribution system efficiency = 5% = 0.05
60 = Constant to convert from minutes to hours
 HDD = Heating degree days Table 4-6
24 = Constant to convert from days to hours
0.018 = Volumetric heat capacity of air (Btu/ft³°F)
 $EFLH_H$ = Equivalent full load heating hours Table 4-6
 CAP = Heating capacity (Btu/hr or Btu/hr)
100,000 = Constant to convert from Btu to therms
 $AFUE$ = Annual Fuel Utilization Efficiency of existing system
Default value for $AFUE$ = 0.8.²⁸

²⁷ Average of Department of Energy minimum allowed HSPF for new heat pumps from 1992-2006 (6.8 HSPF) and after January 23, 2006 (7.7 HSPF)

²⁸ Department of Energy minimum allowed AFUE for new furnaces

4.3.3.5 Demand Savings (Cooling):

$$kWh_{savings,C} = \frac{kWh_{savings,C}}{EFLH_C} \times CF$$

Where:

- kWh_{savings,C} = Calculated kWh savings for cooling
- EFLH_C = Equivalent full load cooling hours Table 4-6
- CF = Coincidence factor = 0.87²⁹

4.4 Verified Savings by Measure

After reviewing the tracking data and inputs for savings calculations, the evaluators provided verified gross savings according to TRM protocols. Savings from the following measures were verified and matched the calculations provided by CLEAResult:

- Advanced Power Strips;
- Air Sealing;
- Ceiling Insulation;
- Compact Fluorescent Lamps;
- Duct Sealing;
- Low Flow Showerheads.

The savings calculated in this evaluation differed from CLEAResult's calculations for several items in the TRM. Upon investigation of an unlocked savings calculator provided by CLEAResult, the evaluators determined that the calculator had not been updated to reflect weather-dependent values for Louisiana Weather Zone 6: The zones in the calculator include two for New Orleans and two for Arkansas.

The Evaluators verified measure-level savings according to TRM guidelines and obtained results that differed from CLEAResult's calculations for the following measures:

4.4.1 Infiltration/Air Sealing

- 1) The calculator uses values from the AR TRM for El Dorado, AR and the New Orleans area, rather than values appropriate for Caddo Parish in Louisiana, resulting in a low realization rate.
- 2) The CFM check requires a drop down menu to effectively use the formulas. The current index(match) function is non-functioning.
- 3) The following values were not included program in tracking data:
 - Wind shielding of home

²⁹ Please see **Error! Reference source not found.**: Coincidence Factors for HVAC.

- Number of bedrooms per home
- Approximate square footage of home
- Number of stories of home

These omissions did not affect savings figures, however without them it was not possible to confirm that the measure qualified for a rebate.

Table 4-7 Expected and Realized Air Sealing Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Electric Resistance	9,442	9,289	98.4%	1.51	1.48	98.4%
Total	9,442	9,289	98.4%	1.51	1.48	98.4%

4.4.2 Ceiling Insulation

- 1) Also for this measure, the calculator does not utilize appropriate weather data.
- 2) There is no distinction made between R-30 and R-38 values post-installation values. All ex ante calculations assumed a post value of R-30. Verified savings calculations distinguished between post R values.
- 3) All ex ante calculations assumed functioning air conditioning.

Table 4-8 Expected and Realized Ceiling Insulation Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Electric Resistance	246,262	232,673	94.5%	35.10	52.57	149.8%
Natural Gas Furnace	50,961	96,104	188.6%	39.96	63.18	158.1%
Total	297,223	328,777	110.6%	75.06	115.76	154.2%

4.4.3 Duct Sealing

- 1) EFLH and HDD have not been updated for the SWEPCO service territory and reflect incorrect/inappropriate weather zones.

- 2) Cooling capacity is in Tons on the 'Summary' tab but in BTU/hr in the calculation tab. Units may be applied incorrectly.
- 3) No detailed cooling data listed in tracking data. All ex ante calculations assumed a SEER of 11.5.

Table 4-9. Expected and Realized Duct Sealing Savings

<i>Heating Type</i>	<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Air Source Heat Pump	5,815	3,379	58.1%	0.76	0.76	100.0%
Electric Resistance	75,886	67,720	89.2%	9.96	9.96	100.0%
Total	81,701	71,098	87.0%	10.72	10.72	100.0%

4.4.4 Low Flow Showerheads

- 1) Ex ante calculations did not use inlet and mixed water temperatures which were appropriate for the SWEPCO service territory.
- 2) Three savings values could not be replicated due to lack of input assumptions in tracking data and one ex ante savings estimate was 274.43 kWh. The evaluators determined that this value was a clerical error and should have been 274.13 kWh. The ex-ante figures were adjusted.

Table 4-10 Expected and Realized Faucet Aerator Savings

<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
548	536	97.7%	0.06	0.06	97.8%

Table 4-11 presents the savings results of the evaluation of the PY1 Residential Program, by measure. Total savings summarizes the savings calculations performed as per TRM protocols for the IQ program.

Table 4-11 Verified Savings by Measure Type

<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
Advanced Power Strip	423	423	100.0%	0.05	0.05	100.0%
Air Sealing	9,442	9,288	98.4%	1.51	1.48	98.4%
Ceiling Insulation	297,223	328,777	110.6%	75.06	115.76	154.2%
CFLs	9,329	9,329	100.0%	1.80	1.80	100.0%

Measure	Ex Ante kWh Savings	Ex Post kWh Savings	kWh Realization Rate	Ex Ante Peak kW Savings	Ex Post Peak kW Savings	Peak kW Realization Rate
Duct Sealing	81,701	71,098	87.0%	10.72	10.72	100.0%
Low Flow Showerhead	548	536	97.7%	0.06	0.06	97.8%
Total	398,666	419,452	105.2%	89.20	129.87	145.6%

4.5 Process Evaluation

This chapter presents the results of the process evaluation of the Income Qualified Program. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with an overview of the program. This is followed by a discussion of the methodological approach used in the evaluation. A summary of findings and recommendations for program improvement follow the discussion of the methodology. This discussion is followed by detailed findings of the evaluation activities.

4.5.1 Data Collection Activities

The process of evaluation of the Income Qualified Program included the following data collection activities:

- *SWEPCO Program Staff Interviews.* The Evaluators interviewed staff at SWEPCO involved in the administration of the Income Qualified Program. These interviews were to collect information from program staff as to any changes or developments, as well as response to program recommendations.
- *CLEAResult Program Staff Interviews.* The Evaluators interviewed staff at CLEAResult, who implements the program. These interviews were to collect information on implementation activities and clarify questions about program design or processes.
- *Participant Surveying.* The Evaluators surveyed a sample of program participants. These surveys addressed issues including participant satisfaction with the program offerings, demographics, and other contextual issues regarding the participation process.
- *Contractor Interviews.* The Evaluators interviewed a sample of contractors that completed projects through the mass market Residential Solutions and the Income Qualified Program.

4.5.2 Program Overview

The Income Qualified Program provides energy efficiency home upgrades at low or no cost to customers with household incomes at or below 200 percent of the current

Federal Income Eligibility guidelines. The program is designed to help qualifying customers save money on their home energy bills by analyzing their energy use, identifying energy efficiency improvement projects, and installing low-cost, energy saving measures in their home. The home energy assessments include consultation about the customer’s concerns; a visual inspection of the living space, combustion safety testing, attic, crawl space/basement, and exterior of the home; and installation of direct install measures at no cost, e.g., CFL lighting, low flow showerhead, and faucet aerators. Following the assessment, the contractor will recommend and coordinate the installation of home improvements to increase its energy efficiency. Qualifying customers are eligible to receive up to \$2,500 per home for eligible home improvement upgrades in this program.

The direct install measures that customers are eligible to receive at no cost are:

- Up to six compact fluorescent light bulbs (CFLs);
- Low-flow faucet aerators and showerheads (must have electric water heater); and
- One smart power strip.

Table 4-12 Incentives for Assessments and Measures

<i>Measure/Service</i>	<i>Air Sealing</i>
Air Sealing	\$.30/CFM50/\$250 max
Duct Sealing	\$4.00/CFM25/\$750 max
Ceiling insulation	\$.37/sqft - \$.52/sqft
Tier 1 Energy Assessment	\$100
Tier 2 Energy Assessment	+ \$50 for blower door pre/post testing and + \$50 for duct sealing pre/post testing

The rebates for the assessments and measures are intended to cover the full cost of the measures for income qualified participants.

Measure savings for both programs are estimated using the deemed savings values from the Arkansas Technical Reference Manual (TRM).

4.5.3 Methodology

4.5.3.1 Materials Reviewed

The Evaluators reviewed program materials including the program website, the program manual, an example home energy assessment report, and program marketing materials. These materials were reviewed to understand program operations and implementation approach.

4.5.3.2 Program Staff Interviews

Interviews were completed with two implementation contractor staff and one utility staff member. The interviews provided information on program operations and covered the following topics:

- Program goals and objectives;
- Marketing and outreach;
- Communication processes;
- Program management and staffing; and
- Quality control and verification processes.

4.5.3.3 Participant Survey

Surveys were administered to samples of participants to gain insight into the participant's experience with the program. Respondents answered questions on the following topics:

- Source of program awareness;
- Their decision to participate and complete an efficiency project;
- Experience with the participation process; and
- Satisfaction with various elements of the program and the program overall.

Seventeen customers completed the survey of program participants.

4.5.3.4 Contractor Interviews

Interviews were completed with program contractors that deliver the energy assessments and implement the program measures. The interviews covered the following topics:

- Promotion of the program and barriers to participation;
- Program marketing;
- The program participation process;
- Training and communication with program staff;
- Business and market impact; and
- Overall impressions and satisfaction.

Nine interviews were completed with program contractors.

4.5.4 Detailed Findings

4.5.4.1 Participation Data Quality Review

The evaluators reviewed the final program participant tracking data submitted by CLEAResult. The following issues were noted:

- Phone number was missing or invalid (i.e., not 10 digits) for 4% of projects.
- Two phone numbers were associated with several contact names. It was determined that the phone numbers listed in these cases was for the property, not the listed customer, or was the contractor's phone number.

4.5.4.2 The Evaluators recommend that a field indicating housing type be added to the report. Analysis of Participation Data

Table 4-13 displays the number of projects that completed assessments and the share that implemented discounted and incentivized measures. As shown, nearly all assessment projects resulted in the installation of discounted measures and nearly three-quarters had direct install measures installed.

Table 4-13 Number of Audit Projects and Share that Implemented Measures

Number of Assessments*	% Implementing Discounted Measures	% Implementing Direct Install Measures
171	95%	72%

*Defined by the number of account numbers with assessments.

The number of projects for different measure types and the expected energy savings are displayed in Table 4-14. As shown, ceiling insulation was the most often installed measure and accounted for the majority of program expected energy savings.

Table 4-14 Number of Projects and Expected Savings

Measure	Number of Measure Projects	Total Expected kWh
Ceiling Insulation	148	297,223
Duct Sealing	18	81,701
Air Sealing	16	9,442
CFLs	120	9,329
Low-Flow Showerheads	7	548
Advanced Power Strips	4	423

Figure 4-1 displays the weekly and cumulative accrual of expected energy savings during the program year. As shown, program activity increased quickly. By the end of the summer the program budget was exhausted.

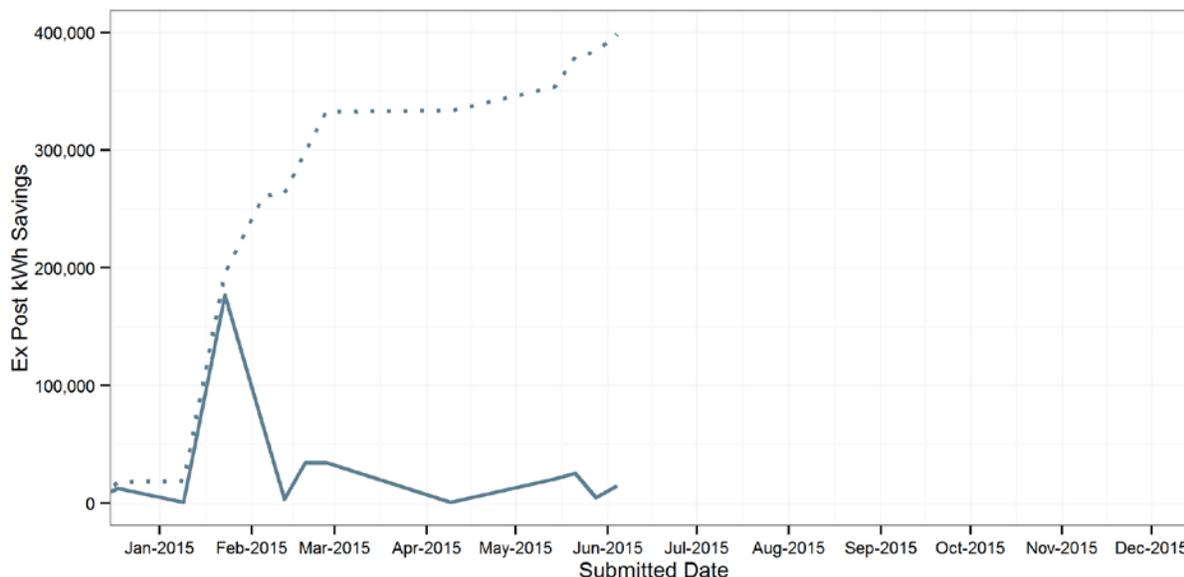


Figure 4-1 Weekly and Cumulative Program Activity

4.5.4.3 Program Comparison

The Evaluators reviewed multiple regional home improvement programs targeting lower income customer to assess how SWEPCO’s IQ program component compared in terms of program measures, eligibility, and advertisements. SWEPCO’s eligibility criterion for program participants is customers with household incomes at or below 200% of federal income eligibility guidelines. Four out of five other programs use the federal income guidelines as a basis for eligibility with the exception of OG&E. Overall, the SWEPCO program is comprehensive and comparable with other low income weatherization programs regionally.

Table 4-15 provides a summary of the programs. The program measures include floor insulation, ceiling insulation, air sealing, and duct sealing as well as including direct install measures such as low-flow devices, CFLs, and power strips. Other programs offer similar measures as well as others such as high efficiency appliances, energy efficient windows, and programmable thermostats.

The Entergy program marketing emphasizes focuses on energy savings/cost savings, comfort, and improved indoor air quality.

SWEPCO’s eligibility criterion for program participants is customers with household incomes at or below 200% of federal income eligibility guidelines. Four out of five other programs use the federal income guidelines as a basis for eligibility with the exception

of OG&E. Overall, the SWEPCO program is comprehensive and comparable with other low income weatherization programs regionally.

Table 4-15 Low Income Weatherization Program Inter-Utility Comparison

	SWEPCO LA	OG&E	Oncor Texas	AEP Texas - Central	Louisville Gas & Electric
Program Name	Residential Solutions Income Qualified	Weatherization Program	Low-Income Weatherization Program	Hard-to-Reach Standard Offer Program	WeCare Program
Program Measures	<p>Tier 1 – Informational Energy Survey – walk-through assessment, direct install, and written report.</p> <p>Tier 2 – Energy Assessment – all the above including diagnostic testing.</p> <p>Direct install – CFLs, low-flow showerhead, faucet aerator, and smart power strip.</p> <p>Qualifying measures: air sealing, duct sealing, ceiling insulation, and floor insulation. HVAC tune-ups.</p>	Attic insulation, sealing air leakage around windows and doors, duct sealing, and CFLs.	<p>Insulation, duct sealing, caulking and weather-stripping, CFLs, and water-saving devices.</p> <p>Other qualifying measures: High-efficiency central air conditioner or room air conditioner, floor insulation, solar screens, ENERGY STAR® appliances, energy-efficient windows.</p>	<p>Insulation, air infiltration, CFLs. High efficiency water heaters, insulation blankets, pipe insulation. Low-flow showerheads, ENERGY STAR home appliances.</p> <p>A/C duct testing and sealing, HE split-system HVAC, HE packaged-unit HVAC, room A/Cs.</p>	<p>Air and duct sealing and insulation, attic and wall insulation, water heater jacket, water devices, heating and central A/C tune-ups, CFLs, programmable thermostats, and energy-efficient refrigerators, window and A/Cs.</p>
Participation limit		No information	No information	No information	The customer's home must not have received WeCare services or an On-Site Home Energy Analysis in the last three years.
Advertised “reduce energy usage”	Yes	Yes	Yes	Yes	Yes
Advertised “comfort”	Yes	Yes	Yes	No	Yes
Advertised “safety/health”	No	Yes	No	No	Yes
Eligibility	Louisiana	OG&E residential	Qualified low-	Household	Lived in their

	<i>SWEPCO LA</i>	<i>OG&E</i>	<i>Oncor Texas</i>	<i>AEP Texas - Central</i>	<i>Louisville Gas & Electric</i>
Requirements	residential customer with a valid account number. Customers with household incomes at or below 200% of federal income eligibility guidelines. Live in a single-family home or a multifamily unit of four units or fewer (renters and owners eligible). Live in a home that is at least one year old. Central heat and A/C.	customers who own or lease a single-family, duplex or mobile home and have an income of less than \$50,000/year.	income residential consumers have an annual household income at or below 200% above the federal poverty guidelines. Oncor customers who rent their homes can participate provided they have permission from their landlords.	incomes at or below 200% of the federal poverty guidelines or that participates in an approved government program.	home for one year with 12 months of continuous service. The customer's income must meet the guidelines of the federal government's Low Income Heating Assistance Program (LIHEAP) at 150% poverty.

The Income Qualified Program design, operations, and activities are essentially the same as for the Residential Solutions program as described in Section 3.5.4.5

The program energy saving goals were 273,895 kWh and 91.0 kW.

4.5.4.4 Participant Survey Results

A total of five program participants responded to the survey, with 60% living in a single family detached home and an average of 3.3 people living in the home. None of the survey respondents reported more than 2 years of college, and most reported household earnings of less than \$25,000 (40%), with the rest not disclosing their income.

Few program participants were reachable using the provided program tracking data. The data included numerous disconnected numbers, duplicate numbers for multiple households as well as trade ally phone numbers listed instead of participant numbers. This resulted in a small pool of viable contacts.

4.5.4.4.1 Preferred Outreach and Sources of Awareness

A majority of surveyed did not know how they first learned about the program (40%), with the rest reporting they learned from a friend, family member, or colleague (20%), a contractor or energy consultant (20%), or something other means. There were no secondary sources reported.

4.5.4.4.2 Decisions to Participate

All participants surveyed reported being motivated to participate in the program out of a desire to save money on energy bills, improve the comfort of their home, protect the environment, or become as energy efficient as their friends and neighbors. A majority (80%) also reported the need to improve the value of their home as a motivating factor.

4.5.4.4.3 Participation Process

The majority of participants (80%) provided favorable assessments of the energy saving recommendations, the energy consultant, and the work contractor (Figure 4-2).

Similarly, favorable assessments were provided of the work performed by the contractor installing the additional measures (Figure 4-3).

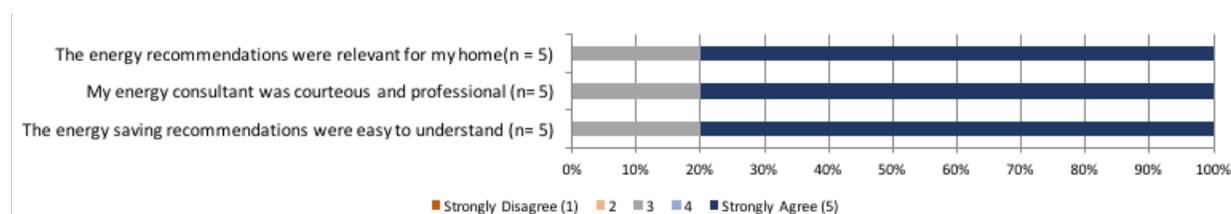


Figure 4-2 Participant Experience with Energy Assessment

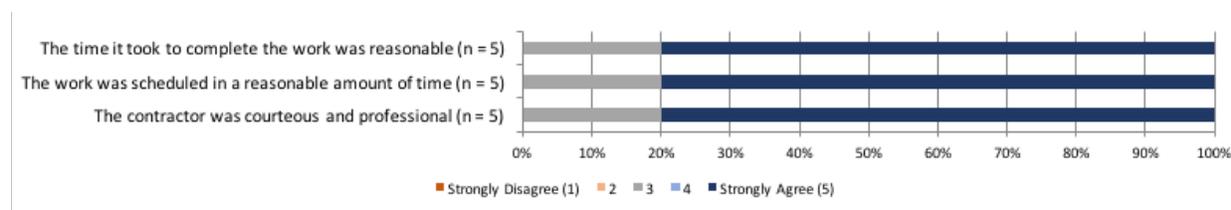


Figure 4-3 Participant Experience with Installation Contractor

4.5.4.4.4 Participant Satisfaction

Figure 4-4 summarizes participant satisfaction with the Income Qualified Program. As shown, nearly all survey respondents were satisfied with the program. One participant indicated dissatisfaction with the energy efficient light bulbs installed because they were too dim.

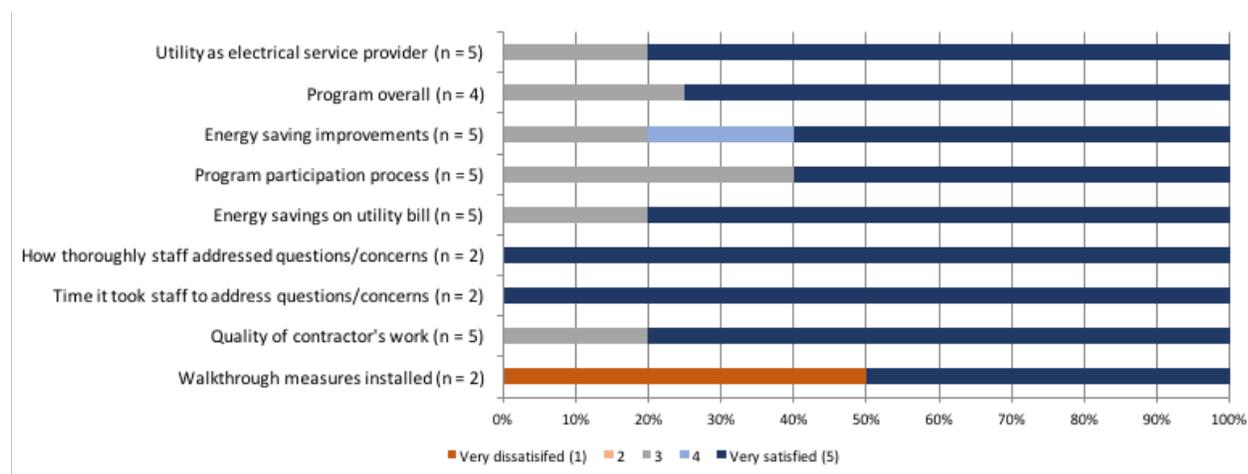


Figure 4-4 Participant Satisfaction

Table 4-16 displays respondent’s assessments of the program’s effect on their satisfaction with their utility. Program participants reported greatly increased or increased satisfaction with the utility 60% and 40% of the time, respectively.

Table 4-16 Effect of Participation in Program on Satisfaction with Utility

<i>Effect of participation in the Utility's Program</i>	<i>% of Respondents (n = 5)</i>
Greatly increased your satisfaction with the Utility	60%
Somewhat increased your satisfaction with the Utility	40%
Did not affect your satisfaction with the Utility	0%
Somewhat decreased your satisfaction with the Utility	0%
Greatly decreased your satisfaction with the Utility	0%
Don't know	0%
Refused	0%

4.5.4.5 Participating Contractor Interviews

The Evaluators completed interviews with nine participating contractors who provide services through the Residential Retrofit and Income Qualified program. These results are presented in Section 3.5.5.2.

4.5.5 Conclusions

The following sections summarize key process evaluation.

4.5.5.1 Program Design and Participation Process

- The Income Qualified Program provides similar services and measures to other programs operated in the region. The program provides a walkthrough home

energy assessment as well as the option for more in-depth home performance testing. Typical direct install measures such as CFLs, smart power strips, and low-flow devices are offered. Single and multi-family buildings are eligible.

- Three out of five survey respondents were satisfied with the program participation process. None indicated dissatisfaction.
- Four of the five survey respondents agreed that the recommendations were relevant and easy to understand, as well as agreeing that the energy consultant was courteous and professional.
- The program provided in-depth contractor training related to building certification, however, less training was provided on program participation processes. Staff is working on developing a quality assurance/quality control seminar for contractors that will also cover program changes.
- Contractors noted a few issues with the OPEN tool including an inability to edit entered data and needing to enter data multiple times.
- Program staff reported that use of the OPEN tool was discontinued because of issues using it for the mass-market and income qualified programs.

4.5.5.2 Program Marketing and Outreach

- A strategic decision was made to limit program marketing and to utilize the funds to incentivize measures. The lack of marketing did not prevent the program met its energy saving goal relatively early in the program year and was likely an efficient use of the limited budget.
- The program website and promotion through social media were the primary forms of mass-marketing utilized during the program year. Additionally, SWEPCO had the opportunity to place two advertisements in a local paper at no cost. Program staff engaged in limited direct outreach to multifamily properties to promote the program as well.
- The program website does not reference the availability of the low-income program.
- Thirty-six percent of program participants learned of the program from a friend, family member, or colleague and 29% learned of the program representative. Only 14% reported learning of the program from a contractor or home energy consultant. Although this suggests that contractors are having a limited effect on program awareness, it is possible that some respondents thought the contractor was a SWEPCO or CLEAResult program representative.
- Consistent with the program design, contractors reported actively promoting the program.

4.5.5.3 Quality Control and Verification Processes

- During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. Additionally, the program manual states that after the first 25 projects, 5% of additional projects completed by contractors are inspected. Ten percent of projects is a more typical verification rate.
- Project verification visits check for consistency between reported performance testing, site information, and measure information. Additionally, staff reported that they discuss the customer's satisfaction with the contractor during visits.

4.5.5.4 Customer and Contractor Satisfaction

- Eighty percent of customers were satisfied with the program overall. Participants were most satisfied with the quality of contractors work and the energy savings on their bill
- Two customers reported contacting program staff with questions and concerns. Both were very satisfied with the thoroughness and timeliness of the response they received.
- All survey respondents reported that the program either greatly increased their satisfaction with SWEPCO (60%) or increased their satisfaction somewhat (40%).
- Most interviewed contractors were satisfied with the program overall. Issues raised by contractors included slower than expected review of project materials and a desire for larger rebates. Despite the desire for larger rebates, contractor and customer reports indicate that no additional costs are being born by the participating customer.

4.5.6 Recommendations

The Evaluators' recommendations for the Income Qualified Program are as follows:

- **Keep contractors updated on program changes.** Provide training or other forms of information to participating contractors when program changes are made.
- **Review modifications needed to utilize the OPEN tool to streamline the program participation process.** If OPEN is utilized again, review options for adding data editing capabilities to the OPEN tool. Allowing for edits may improve the quality of data submitted by contractors.
- **Provide information on incentives for income qualified participants.** Although the program did not have difficulty meeting its goals, the program

should consider some limited marketing of the program to ensure that a larger share of income qualified customers are aware that they are eligible for larger incentives than are available through the mass-market program. At a minimum, staff should consider providing information about the program on the residential program website.

- **Accurately document and communicate to program staff the verification sampling rate to ensure understanding of verification processes.** During staff interviews, a discrepancy was identified between the written verification procedure described in the program manual, which states that 10% of the first 25 projects completed by a contractor are inspected, and what staff reported, which was that the first five projects are verified. The Evaluators recommend verifying 10% of projects completed after the initial projects are inspected instead of 5%.
- **Develop strategies for improving data quality.** Data quality issues were identified for a portion of the project tracking records. Staff should seek strategies to minimize data quality issues. Strategies may include training of contractors on data requirements, incorporating data validation functions into program software, and periodic reviews of data quality.

5. Small Business Program

5.1 Program Description

The SWEPCO Small Business Direct Install program (SBDI) offers enhanced incentives to small business owners to help overcome the first-cost barrier unique to the small business market which interferes with small business adoption of energy efficiency measures. By offering enhanced financial incentives, the Program generates significant cost-effective energy savings for small businesses using added market-segmented strategies that encourage the adoption of diverse efficiency measures in target sub-sectors.

The Program is designed to provide small business owners with energy efficiency information and develop awareness of energy/non-energy benefits of energy efficiency. The information helps small business customers invest in energy efficient technologies and help overcome high “first costs.” It is intended to increase the awareness of the latest energy efficient technologies available to SWEPCO small business customers. Through the Program, a network of contractors were developed that have an interest in working with smaller customers. The Program provides the tools and training for contractors to quantify the energy savings and incentives for small business customers.

The Program offers technical assistance effective in removing market barriers for small business customers. This includes providing free walk through facility assessments to educate the business owner on the value of energy efficiency. Incentives are offered for energy efficiency measures utilizing a streamlined approach for enrollment, installation, and savings verification. The Program develops and maintains a local trade ally network to provide additional outreach and customer participation.

The Program includes direct installation of low-cost energy efficiency measures, including low cost CFLs and other low-cost lighting measures and low flow devices for electric hot water. A qualified network of contractors offer the facility survey, generate a customer proposal and receive a commitment from the customer through a signed project application and submit for approval from the SWEPCO. The trade ally then direct installs the free energy saving devices while waiting for Program staff to approve larger lighting and HVAC project measures.

5.2 M&V Methodology

Evaluation of the SB program requires the following:

- Stratified Random Sampling, selecting large saving sites with certainty (as detailed in Section 2.2.1)
- Review of deemed savings parameters for prescriptive projects;

- On-site verification;
- Interviewing of program participants and trade allies.

Parameters required for evaluation of the SB program are presented in Table 5-1 below.

Table 5-1 Data Sources for Gross Impact Parameters – SB program

<i>Parameter</i>	<i>Source</i>
Project Details	Program Tracking Data
Energy Efficient Equipment	Manufacturer’s Literature
Lighting Hours of Operation	Arkansas TRM deemed hours
HVAC Interactive Factors	Simulations of archetypical buildings using local
Lighting Peak Coincident Factor	Review of deemed values, assignment of new

5.3 Impact Findings

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

- Data for the study have been collected through review of program materials and on-site inspections. Based on data provided by SWEPCO, sample designs were developed for on-site data collection for the impact evaluation. Sample sizes were determined that provide savings estimates for the program with $\pm 10\%$ precision at the 90% confidence level. Actual sampling precision was 8.84% and 90%.
- On-site visits were used to collect data for savings impacts calculations. The on-site visits were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. 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.

Gross savings were estimated using proven techniques, including engineering calculations using industry standards and verification of computer simulations developed by program contractors to determine energy savings. Table 5-2 summarizes the total participation in the PY1 Small Business Program.

Table 5-2 PY1 Small Business Program Participation Summary

<i># Projects</i>	<i>Expected kWh</i>	<i>Expected kW</i>
56	1,216,343	306.80

Data provided by SWEPCO showed that during PY1, there were 56 projects which were initially expected to provide gross savings of 1,216,343 kWh. The resulting overall sample is presented in Table 5-3.

Table 5-3 Small Business Sample Summary

# Sites in Population	Site Visit Sample Size	# Surveys
56	16	8

5.3.1 SB Program Gross Savings Estimates

Sampling for evaluation of SWEPCO’s SBDI program was developed using the Stratified Random Sampling procedure detailed in Section 2.2.1. This procedure provides 90% confidence and +/- 10% precision with a significantly reduced sample than random sampling would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results. Actual sampling precision was 8.84% at 90%.

5.3.1.1 Small Business Program Sample Design

The participant population for the SB program was divided into four strata. Table 5-4 summarizes the strata boundaries and sample frames for the SB program.

Table 5-4 Small Business Program Sample Design

	Stratum 1	Stratum 2	Stratum3	Stratum 4	Totals
Strata boundaries (kWh)	<8,000	8,000-18,000	18,000 – 49,000	>49,000	
Number of sites	18	19	12	7	56
Total kWh savings	90,414	258,092	399,765	468,072	1,216,343
Average kWh	5,023	13,584	33,314	66,867	21,720
Standard deviation of kWh	2,108	3,327	9,047	9,9227	20,821
Coefficient of variation	.42	.25	.27	.14	.96
Final sample	2	5	3	6	16

5.3.1.2 Small Business Site-Level Realization

Sites chosen within each stratum are visited in order to verify installation of rebated measures and to collect data needed for calculation of ex post verified savings. The realization rates for sites within each stratum are then applied to the non-sampled sites within their respective stratum. Table 5-5 presents realization at the stratum level, with Table 5-6 presenting results at the site level.

Table 5-5 Summary of kWh Savings for Sampled Small Business Program by Sample Stratum

Stratum	Expected kWh Savings	Realized kWh Savings	Realization Rate
1	12,938	12,988	100.4%
2	54,641	59,019	108.0%
3	93,132	92,905	99.8%
4	403,359	412,156	102.2%
Total	564,070	577,068	102.3%

Table 5-6 shows the expected and realized energy savings for the program by project.

Table 5-6 Expected and Realized Savings by Project

Project ID(s)	City	Facility Type	Expected kWh Savings	Realized kWh Savings
PRJ-327174	Shreveport	Retail	6,088	6,137
PRJ-321169	Bossier City	Retail	6,850	6,851
PRJ-336335	Shreveport	Retail	8,227	8,227
PRJ-320742	Shreveport	Retail	8,558	10,723
PRJ-313339	Shreveport	Retail	9,924	11,779
PRJ-297248	Shreveport	Retail	10,645	10,908
PRJ-308464	Bossier City	Retail	17,287	17,382
PRJ-312861	Shreveport	Retail	20,440	19,769
PRJ-306015	Bossier City	Grocery	29,380	29,823
PRJ-319857	Shreveport	Outdoor	43,312	43,313
PRJ-314665	Shreveport	Retail/Warehouse	50,505	50,505
PRJ-307954	Bossier City	Retail/Outdoor	63,054	53,650
PRJ-320668	Shreveport	Retail/Outdoor	66,440	76,133
PRJ-327888	Shreveport	Retail	70,289	72,227
PRJ-330793	Shreveport	Warehouse	72,996	79,565
PRJ-320738	Shreveport	Retail/Outdoor	80,075	80,075

5.3.1.3 Small Business Program-Level Gross Realization

Using the realization rates presented in Table 5-5, the Evaluator extrapolated results from sampled sites to non-sampled sites in developing program-level gross savings estimates. Table 5-7 presents results by stratum.

Table 5-7 Small Business Program-Level Realization by Stratum

Stratum	# Sites	Expected kWh	Realized kWh	kWh Gross Realization	Expected kW	Realized kW	kW Gross Realization
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		Savings	Savings	Rate	Savings	Savings	Rate
1	2	90,414	90,762	100.4%	25.45	25.35	99.6%
2	5	258,092	278,771	108.0%	69.20	74.04	107.0%
3	3	399,765	398,791	99.8%	83.52	83..73	99.9%
4	6	468,072	478,281	102.2%	128.63	132.55	103.1%
Total	16	1,216,343	1,246,605	102.5%	306.80	315.67	102.8%

5.3.1.4 Small Business – Causes of Low Realization

Table 5-8 summarizes the causes of savings shortfalls and overestimations for projects with low or high realization rates.

Table 5-8 Small Business – Causes of Low Realization

Project ID(s)	Expected kWh Savings	Realized kWh Savings	Realization Rate	Causes of Savings Variance
PRJ-320742	8,558	10,723	125%	This project is a beauty supply store. The ex ante calculations used an “Undetermined” space heating system type, resulting in an Energy Interactive Factor of .98. The Evaluators verified that this facility uses natural gas heating, which revised the interactive factor to 1.09.
PRJ-313339	9,924	11,779	119%	This project was a lighting retrofit at a convenience store. The ex ante calculations used lighting HOA of 3,965, corresponding to a strip mall retail space. On site the evaluators determined that this is a non-strip mall retail location, selling groceries with posted hours corresponding more closely with “Food Sales: Non 24-hour Supermarket,” than 3,965. Food sales, 4,706, annual operating hours were used in the evaluation.
PRJ-312861	20,440	19,769	97%	This project was a lighting retrofit at a retail facility. The ex ante calculations used an “Undetermined” space heating system type, resulting in an Energy Interactive Factor of .98. The Evaluators verified that this facility uses electric resistant space heating, which revised the interactive factor to .87.
PRJ-307954	63,054	53,650	85%	This project was a lighting retrofit at retail facility. The ex ante calculations used an “Electrical Resistance” space heating system type, resulting in an Energy Interactive Factor of .87. The Evaluators verified that this facility uses natural gas heating, which revised the interactive factor to 1.09. Additionally, “Retail : Strip Shopping,” 3,965 HOA were used in ex ante calculations, whereas the facility is not part of a strip mall and posted hours more closely match “Retail: Excluding Strip Malls,” 3,668.
PRJ-320668	66,440	76,133	115%	This project was a lighting retrofit at retail facility. The ex ante calculations used an “Undetermined” space heating system type, resulting in an Energy Interactive Factor of .98. The Evaluators verified that this facility uses natural

				gas heating, which revised the interactive factor to 1.09.
PRJ-330793	72,996	79,565	109%	This facility is a warehouse. Ex ante calculations assumed energy and demand interactive factors of 1.0. The evaluators verified a natural gas heating type and calculated savings using a factor of 1.09 for energy and 1.2 for demand.

Key issues identified in site-level analyses include:

- **Use of the “Undetermined” space heating type.** Many trade allies defaulted to using the “Undetermined” space heating value, which has an Energy Interactive Factor of .98. The Evaluators found that electric radiant heating was used in a large share of small business projects, and savings were reduced when the Energy Interactive Factor was corrected to .87. Further, there were instances where the Evaluators verified the presence of natural gas space heating, which revises the interactive factor to 1.09.
- **Facility type assignment for nonconforming business types.** Other significant corrections occurred when program staff were required to make a judgement call in assigning a facility type from the list of Arkansas TRM facilities. The Evaluators made numerous corrections on projects of this type.

5.4 Process Findings

This chapter presents the results of the process evaluation of the Small Business Solutions (Small Business) Program. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with an overview of the program. This is followed by a discussion of the methodological approach used in the evaluation. A summary of findings and recommendations for program improvement follow the discussion of the methodology. This discussion is followed by detailed findings of the evaluation activities.

5.4.1 Program Overview

The Small Business Program provides energy education to contractors and customers, and financial incentives to customers, to encourage small businesses to implement energy efficiency projects that reduce their facilities electricity consumption. The program utilizes a network of participating contractors to assist customers in identifying energy saving opportunities and to promote the incentives available.

Financial incentives are based on expected savings for the measure implemented. Incentives are \$0.16 per kWh saved and may cover up to 90% of the project cost. Additionally, the program covers 100% of the cost of direct install measures including faucet aerators, pre-rinse spray valves, and vending economizers. Incentives are paid directly to the contractor implementing the project to reduce or eliminate the initial cost of the equipment to the customer.

Energy savings are calculated based on procedures outlined in the Arkansas Technical Resource Manual.

The primary measures offered through the program are the efficient lighting and refrigeration equipment listed below:

- Linear fluorescent lamp and ballast replacement;
- High-intensity discharge (HID) fixture replacement;
- Compact fluorescent lamps (CFLs);
- Interior and exterior light emitting diodes (LEDs);
- Lighting and HVAC controls;
- Pre-rinse spray valves and faucet aerators for businesses with electric water heating;
- Solid and glass door reach in units;
- Electronically commutated motors (ECM) for evaporator fans;
- Door heater controls; and
- Vending machine controls.

Small business customers may also elect to install additional measures offered through the Large Commercial and Industrial Solutions Program and receive incentives of \$0.16 per kWh saved for that equipment.

In order to mitigate barriers to small business participation such as lack of program awareness and energy saving opportunities, the program relies upon a network of participating contractors to perform direct customer outreach. The program provides contractors with training and software used to perform onsite assessments and estimate energy savings associated with measures.

Any non-residential customer Entergy Louisiana customer that has not opted out of the Quick Start Energy Efficiency Cost Rate Rider and with peak demand of ≤ 100 kW is eligible for the program.

5.4.2 Methodology

5.4.2.1 *Materials Reviewed*

The Evaluators reviewed program materials including the program website, the program manual, and program marketing materials. These materials were reviewed to understand program operations and implementation approach.

5.4.2.2 *Program Staff Interviews*

Interviews were completed with two implementation contractor staff and one utility staff member. The interviews provided information on program operations and covered the following topics:

- Program goals and objectives;
- Marketing and outreach;
- Communication processes;
- Program management and staffing; and
- Quality control and verification processes.

5.4.2.3 Participant Survey

Surveys were administered to a sample of program participants. The survey covered the following topics:

- Source of program awareness and preferred outreach methods;
- Decision making regarding participation;
- Assessment of the audit process, the project proposal, and the equipment selection; and
- Participant satisfaction.

In total, 8 program participants completed the survey out of 33 sampled contacts.

5.4.2.4 Contractor Interviews

In-depth telephone interviews were completed with participating contractors. Contractors were contacted five times to complete the interview. Two contractors declined the interview. In total, four program approved contractors who participated in the Small Business Program were interviewed. These contractors participated in the Small Business Program in the SWEPCO service territory. Interview topics included:

- Promotion of the program;
- Barriers to participation;
- Program process;
- Training on the program;
- Communication with staff;
- Program influence on projects; and
- Overall impressions of the program.

5.4.3 Summary of Findings and Recommendations

The following sections summarize key process evaluation findings and recommendations.

5.4.3.1 Program Design and Participation Process

- The small business program is consistent with the design of similar programs offered in other jurisdictions. It incorporates three key design characteristics to reduce common barriers to small business.
 - The program provides relatively high incentives for small businesses that typically have less capital for energy efficiency investments.

- The program uses high-contact, direct outreach performed by approved contractors to improve program awareness among harder to reach small businesses.
- Incentive payments are paid to contractors to reduce the initial cost to participants.
- Small businesses are defined as businesses that with ≤ 100 kW average peak demand. This is a typical threshold for small business programs.
- The program provides a paperless process for completing the energy assessments and submitting customer proposals that reduces paperwork. These submissions can be made through the program software tool or by email. Submissions are sent to CLEAResult's central team in Austin. Neither program staff nor contractors identified any significant issues with the participation process or software. However, three of the four contractors reported submitting proposals through a means other than the program software.
- Contractors received training from CLEAResult on the program processes and use of the program software. All contractors provided favorable assessments of the program training. One contractor suggested providing training in an online webinar format.
- Contractors appear to understand what documentation is required by the program, few had issues with using the OPEN software tool, and project proposals are generally approved in a reasonable period of time.
- Interviewed contractors stated that the measures offered through the program met the needs of the small businesses they work with and that the incentives were sufficient. However, the primary barrier to participation identified by contractors was the cost of implementing the measures, even with the incentives.
- Most surveyed program participants were satisfied with the energy assessment and the proposal provided by the contractor and the quality of the installation. One participant was dissatisfied because the contractor installed two lamps where four were requested.

5.4.3.2 Program Marketing and Outreach

- The program is designed to have contractors perform the majority of direct customer outreach. Interviewed contractors indicated that they were performing direct outreach to customers and that most projects are initiated by through their outreach. Additionally, contractors reported that they promote the program to current and prospective customers.
- Two contractors listed on the program website reported that they do not provide services in SWEPCO's territory when contacted for interviews.

- The program lists 14 participating contractors on the program website, the majority of whom provide lighting services.³⁰ However, data supplied by the implementation contractor indicates that 51 contractors are a part of the network. Three contractors provide services for other measure types. However, two contractors listed on the program website reported that they do not provide services in SWEPCO's territory when contacted for interviews.
- The program provides a tri-fold brochure to help contractors promote the program. The brochure includes a number of effective marketing elements such as a clear call to action and an example project. Contractors have the option of requesting permission to use the gridSMART® logo but none had elected to do so at the time staff were interviewed.
- Participants most frequently reported learning of the program from a contractor or (50%), followed by from a program representative (25%). One participant reported learning of the program from friends or colleagues and another reported learning of it from a vendor.

The Evaluators recommend staff consider the following enhancements to the program:

- Review the list of approved contractors to verify that the contractors listed are providing services to SWEPCO customers.
- Consider providing pre-approved co-branding materials such as flyers that include the gridSMART® logo and a space for contractors to put their information.
- Program marketing materials focus on energy and cost saving benefits. However, participants reported also being motivated by other factors such as acquiring the latest equipment. Staff should consider materials that also illustrate non-energy benefits.

5.4.3.3 Quality Control and Verification Processes

- The first five projects completed by a contractor receive pre- and post-inspection and 20% of completed projects after the first five.
- Projects are identified for pre- and post-inspection by central CLEAResult staff located in Austin. CLEAResult employs two regional program consultants who perform pre- and post-inspections.
- Inspection procedures include review of documentation, verification of building type (which determines operating hours), photographs of baseline conditions and efficient equipment, and verification that lamps installed are DesignLights Consortium (DLC), CEE listed, or ENERGY STAR® qualified.

³⁰ <http://www.swepcogridsmart.com/louisiana/downloads/SBDI%20Contractor%20List.pdf> Retrieved January 15, 2016.

- Contractors determine that a site meets program qualifications using the program software tool.

5.4.3.4 Customer and Contractor Satisfaction

- Contractors were generally satisfied with the program including the participation process, the incentives, measures offered, and support from program staff. None of the interviewed contractors indicated dissatisfaction with the program.
- Most of the surveyed participants were satisfied with their experience with the program. However, three participants indicated dissatisfaction with their experience. The primary reasons for dissatisfaction related to issues with their contractor and the realized energy savings. Two respondents indicated that they had not noticed any difference in their electrical bill since installing the energy efficient lighting measures. Additionally, one participant stated that the contractor installed less lighting than was needed for the space. This respondent did not contact program staff about the issue.

The Evaluators recommend staff consider the following enhancements to the program:

- Consider providing additional training to contractors to ensure that they provide realistic expectations to customers regarding project impacts on utility bills.

5.4.4 Detailed Findings

5.4.4.1 Analysis of Participation Data

Table 5-9 summarizes the number of projects and energy savings by measure type. As shown, lighting projects were most common and accounted for most of the program savings.

Table 5-9 Number of Projects and Expected Savings by Measure Type

Measure	Number of Projects	Expected kWh Savings
Lighting	51	1,162,130
Controls	3	40,058
Aerators	5	14,185

The weekly and cumulative accrual of expected kWh savings is displayed in Figure 5-1. As shown, energy savings increased rapidly during the spring months. Program activity slowed during the remainder of the year, but savings continued to increase.

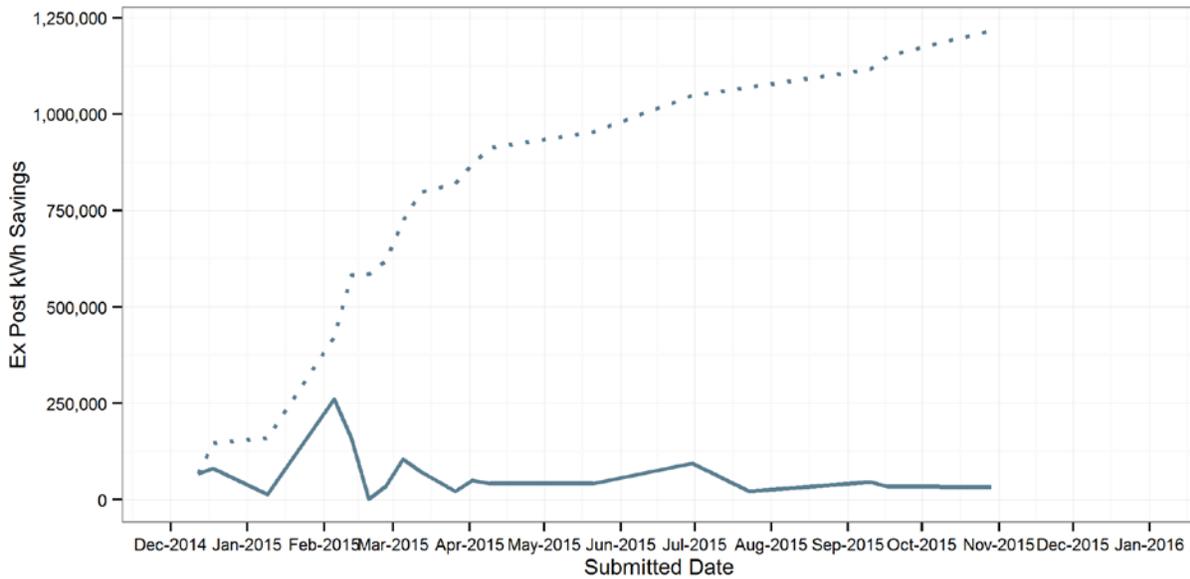


Figure 5-1 Weekly and Cumulative Expected kWh Savings

Figure 5-2 displays the share of energy savings. Projects completed in retail facilities accounted for approximately two-thirds of the program savings.

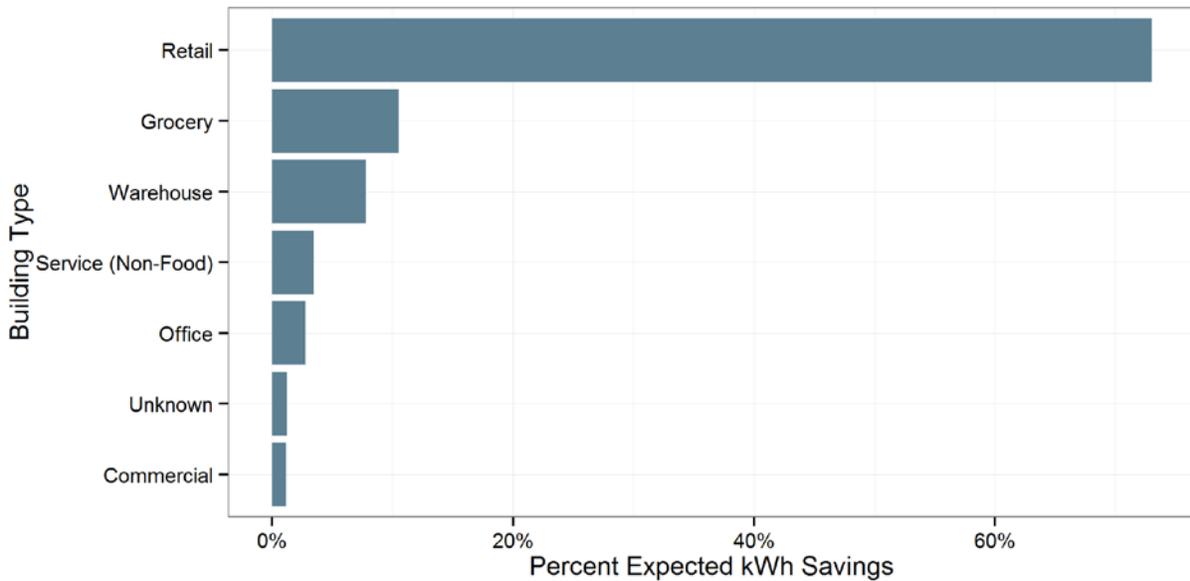


Figure 5-2 Share of Expected kWh Savings by Building Type

Figure 5-3 displays the share of expected savings by contractor firm. As shown, the two most active contractors accounted for approximately 70% of program savings.

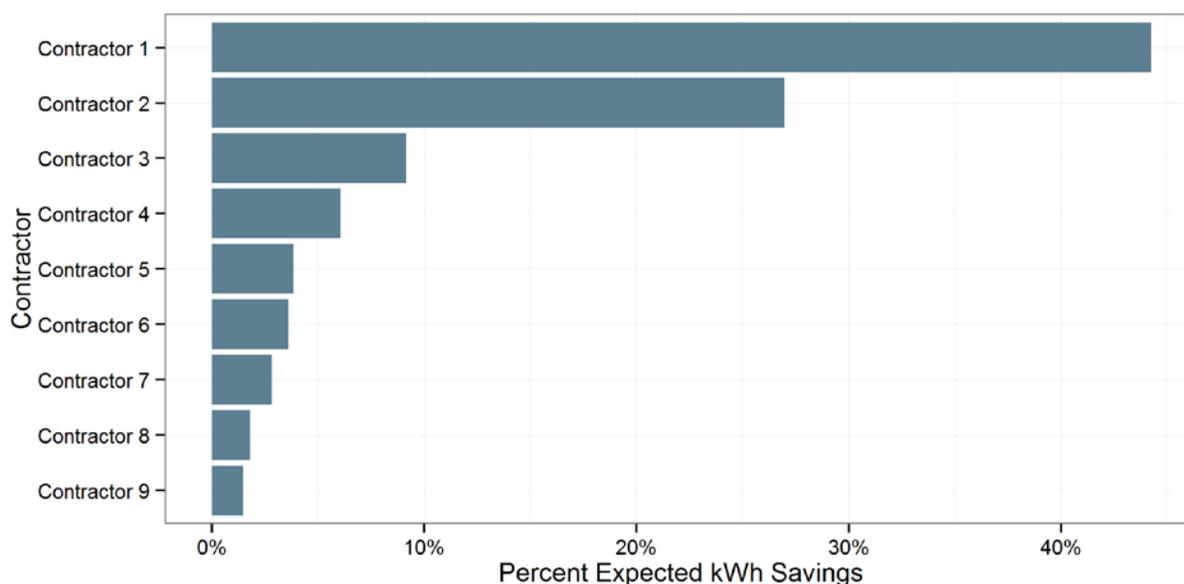


Figure 5-3 Share of Expected kWh Savings by Contractor

5.4.4.2 Program Comparison

The Evaluators reviewed several small business direct install programs from around the country to assess how SWEPCO's Small Business Program compared in terms of eligibility and incentives. Table 5-10 provides a summary of the programs. The eligible measures offered by the SBDI program are very much in-line with other program offerings from around the county. The majority of programs emphasize lighting and refrigeration, HVAC tune-ups, and controls. Many small business programs offer free direct install measures such as faucet aerators, pre-rinse sprayers, low-flow showerheads, and CFLs. SWEPCO's direct install measures only include water-saving devices and vending economizers.

SWEPCO provides incentive amounts of \$0.16/kwh based on the amount of kWh saved. This incentive amount is slightly less than amounts offered by comparable utilities. Additionally, some utilities base their incentive off of demand savings, such as Oncor Open, instead of per kWh savings.³¹

SWEPCO defines the small business sector as customers who have less than 100kW in monthly demand, which is comparable to the monthly demand criteria used by other programs.

³¹ This program operates in Texas and that state requires that kW targets are met.

Table 5-10 Other Small Business Direct Install Programs

<i>Utility</i>	<i>Available Measures</i>	<i>Direct Install</i>	<i>Incentive Amount</i>	<i>Eligibility Criteria</i>
Entergy LA and Gulf States Small Business Energy Solutions Program	<p>Lighting: Linear Fluorescent lamp and ballast replacements, high-intensity discharge (HID) fixture replacements, CFLs LED interior and exterior lamps and fixtures.</p> <p>Refrigeration: Solid & glass door reach-ins, ECM Evaporator fan motors, door heater controls.</p> <p>Food Services: Vending machine controls, pre-rinse spray valves</p> <p>Lighting & HVAC Controls: Day lighting controls, occupancy controls.</p>	Faucet aerators, pre-rinse spray valves, and vending economizers (certain beverage machines only).	Range is between \$0.10/kWh to \$0.13/kWh on the amount of kWh saved	< 100kW
PNM Quicksaver Program	<p>Refrigeration: High efficiency electronically commutated motors and evaporator fan motor controllers, plastic strip curtains for walk in refrigerators and curtains, night covers for refrigerated open display cases, energy efficient anti-sweat heater controls, vending machine controls.</p> <p>Lighting: T12 to T8 lighting retrofits, cold cathode fluorescent lamps, LED exit sign upgrades, Switching from high intensity discharge fixtures to high output T5 fluorescent fixtures in high bay and exterior applications, Installing lighting occupancy sensors.</p>	N/A	Range is between \$0.019/kWh- \$0.175/kWh	< 150 kW
Oncor Open	<p>Refrigeration: Anti-sweat heater controls for refrigerator doors</p> <p>Lighting: T12 to T8 lighting retrofits, LED lighting upgrades, occupancy sensor installations, LED exit sign retrofits.</p>	Lighting and low-flow faucet aerators	Customers with = 100kW demand up to \$800/kW saved Customers with = 10kW demand up to \$1,000/kW saved	< 100 kW
Entergy Arkansas Small Business Energy Solutions Program	<p>Lighting: Interior/exterior lighting retrofits, interior lighting controls, refrigerated case lighting.</p> <p>Refrigeration: ECMs, anti-sweat heater controls, ECM controls, gaskets and strip curtains.</p> <p>Misc.: window film, ceiling insulation (converted residences</p>	Low-flow faucet aerators, pre-rinse spray valves, vending misers, showerheads, and CFLs.	Lighting: \$0.18/kWh Refrigeration: \$0.30/kWh HVAC: \$0.18/kWh Lighting Controls: \$0.18/kWh Window film: \$0.35/kWh Duct Sealing:	< 100 kW

<i>Utility</i>	<i>Available Measures</i>	<i>Direct Install</i>	<i>Incentive Amount</i>	<i>Eligibility Criteria</i>
	only), duct sealing (converted residences only).		\$0.35/kWh Ceiling Insulation: \$0.35/kWh	

5.4.4.3 Program Design, Operations, and Activities

The following sections describe program design, operations, and activities and were developed from reviews of program documentation and interviews with program staff.

5.4.4.3.1 Program Objectives

The primary program objective is to assist small businesses in achieving electric energy savings and peak demand reductions through direct outreach, facility walkthrough energy assessments, and relatively large financial incentives on energy saving for typical small business end-uses. The savings goal for the first year of program operations was 1,209,420 kWh. The peak demand reduction goal was 310 kW. To meet the energy saving and peak demand reduction goals, the program has ancillary objectives to mitigate barriers to energy efficiency in small businesses. The program intends to increase customer awareness of energy and non-energy benefits resulting from the implementation of the energy efficiency measures, help small businesses overcome the initial cost of efficiency measures, and develop a network of contractors that can assist small businesses with energy efficiency improvements.

Overall, both utility and implementation contractor staff indicated that the program is well designed to meet its goals and objectives, and the success in the program fully committing its available incentive funds and meeting its savings targets during the first year supports this conclusion.

5.4.4.3.2 Program Participation Process

Figure 5-4 provides an overview of the participation process. The key steps in the participation process are:

- Outreach to customer by the contractor;
- Contractor completion of walkthrough assessment using the OPEN software tool;
- Customer measure selection and submission of the project proposal;
- CLEAResult’s review and approval of the proposal and associated pre-inspection;
- Measure implementation;
- Post-installation inspection; and
- Payment of incentives to the contractors.

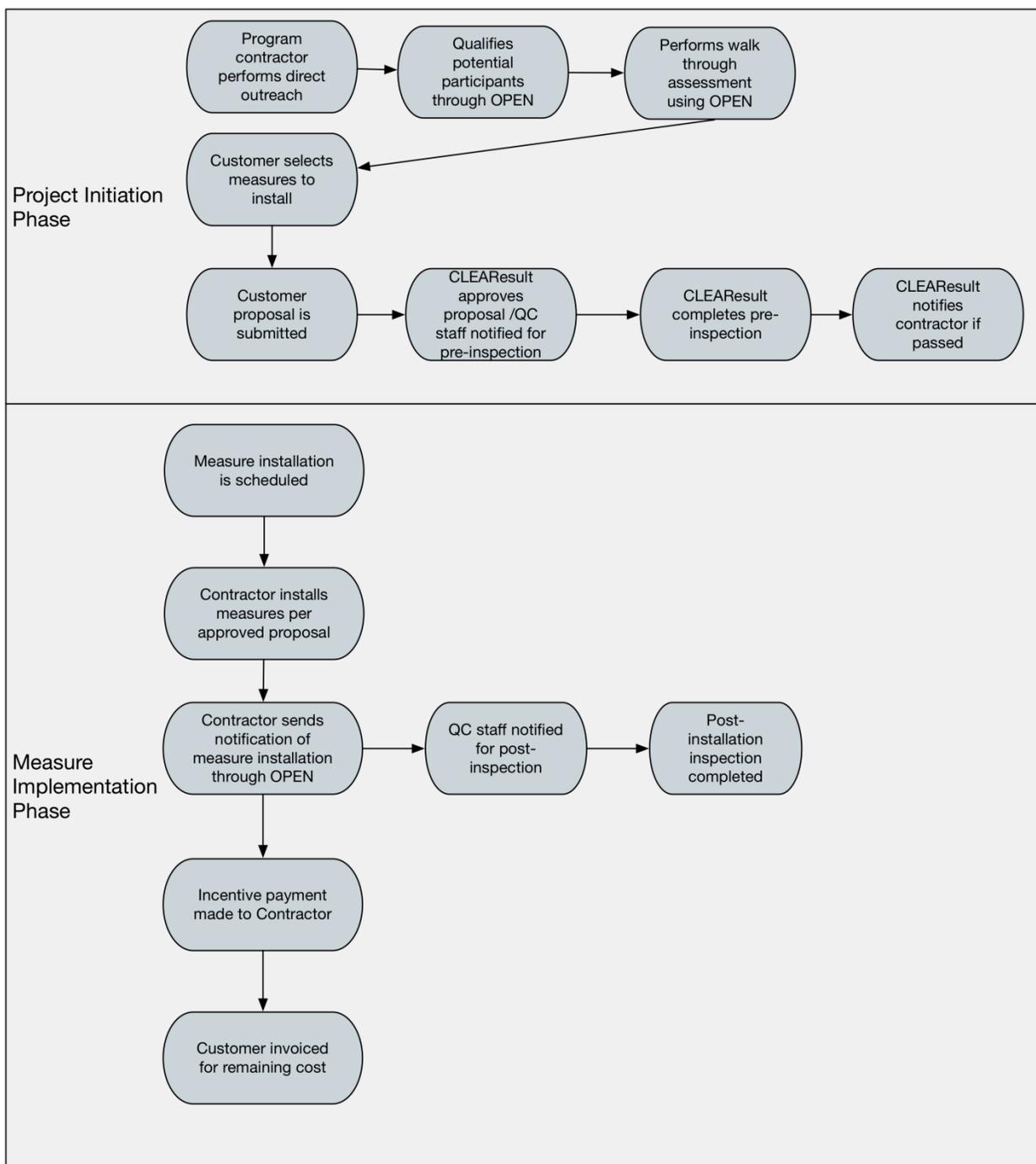


Figure 5-4 Small Business Program Participation Process

5.4.4.3.3 Roles and Responsibilities

CLEAResult is responsible for the primary program implementation tasks, namely:

- Perform onsite pre and post inspections;
- Customer and contractor education and outreach;
- Communicating with and supporting program participants;

- Review and approval of proposed projects; and
- Oversight and training of program contractors.

CLEAResult staffs the program with a consultant who splits time between the Small Business Program and the Large Commercial & Industrial Program. Oversight is provided by program manager who oversees all of the SWEPCO programs as well as programs operating in two other states. Additionally, CLEAResult indicated that they also have additional support from the company, such as support for program marketing and engineering analyses.

SWEPCO is responsible for authorization and issuing incentive payments for projects and oversight of the implementation contractor.

1.1.1.1.1 Program Communications

CLEAResult holds weekly internal meetings with staff supporting all of the residential and non-residential SWEPCO programs. During these meetings, staff review each program's status including project timelines, changes of project status (e.g., from site assessment performed to project proposal submitted), and program budgets. Additionally, the program consultant meets regularly with the Small Business and C&I Program coordinator. Staff assessed the current internal communication processes as effective and meeting program management needs.

The program manager attends a monthly meeting with other regional CLEAResult program managers. The purpose of these meetings is to share best practices, troubleshoot issues that managers may be facing, share information about items of concerns such as the quality of contractors working across program lines, and provide evaluation, measurement, and verification updates for the region.

The program manager also meets on a biweekly basis with SWEPCO program staff. The primary objectives of this meeting are to review program status and to discuss any recommendations CLEAResult may have. During this meeting, a program status report generated by CLEAResult is reviewed. Additionally, a more comprehensive monthly status report is generated that includes additional metrics and highlights program successes and future outlook. SWEPCO staff also reported regular communication with the CLEAResult program manager. Both SWEPCO and CLEAResult indicated that communications between the two parties were effective and sufficient to manage the program operations.

CLEAResult staff also indicated that there is significant coordination and communication between SWEPCO customer service and account managers. These groups are copied on biweekly reports detailing program activity and participated in program training at launch. Additionally, multiple referrals have come from SWEPCO staff and are considered a key program asset.

SWEPCO staff attends a bi-weekly meeting with staff operating programs in other states. During the meetings, program status, goals, budgets, safety and human resources issues are discussed.

5.4.4.3.4 Program Marketing and Outreach

A strategic decision was made to prioritize incentive payments over marketing efforts. Staff noted that they had assessed a high level of “pent up demand” for incentives to help business owners implement energy saving projects and decided that the program would succeed with minimal marketing effort.

The primary outreach strategies that were used during the year included information posted on the program website and development of a network of small business contractors. The program design intent is that contractors will promote the program with small businesses. To develop a network of contractors, staff engaged in direct outreach efforts to contractors and vendors in the area. Program staff also noted that word-of-mouth has been an important means of information dissemination.

Program marketing planning is utility specific but coordinated across states where CLEAResult implements programs for SWEPCO. An example of this coordination is the use of a common website template across all three states. Additionally, staff reported that regional program managers share information about leads for customers that have operations in multiple utility jurisdictions.

The implementation staff did not indicate that the program focuses on any submarkets of small business customers.

The program has developed a two page customer brochure as marketing collateral. Hard copies are available to participating contractors upon request. This brochure includes the following elements:

- A call to action (“It’s your bottom line – take control of your energy choices”);
- Contact information;
- Information on the availability of incentives and no cost direct install measures;
- Description of eligible project types; and
- An example lighting project scenario that provides an estimated energy and cost savings, the program incentives, the cost to the customer, the annual energy savings, and the payback period.

Additionally, contractors can apply to use the gridSMART® logo, but as of the interview, none had done so.

5.4.4.3.5 Barriers to Participation

The barriers to participation facing small business customers include:

- Lack of awareness of program offerings;

- Lack of knowledge about energy efficient technologies and the cost savings potential; and
- Insufficient financial and staff resources to implement energy saving measures.

The program includes design elements to overcome these barriers, namely direct outreach by contractors to promote the program offerings and higher incentives than those made available to larger customers to reduce measure costs. Additionally, by providing the incentives to the contractor, who in turn reduces the cost of the equipment services, the program allows small business customers to receive the incentives without covering the full measure installation cost until the incentive can be processed.

Implementation staff indicated that they had not identified any significant barriers to participation aside from those that the program is designed to address. However, it was noted that non-residential projects were largely lighting projects this year, and will likely be next year, but that looking longer term additional outreach will be needed to contractors that implement other measure types.

5.4.4.3.6 Quality Control and Verification Processes

Several activities are integrated into the program processes to verify that projects are implemented in accordance with program requirements. The key activities are:

- Qualification of customer eligibility through use of the OPEN tool;
- Review of customer proposal;
- Pre-inspection of select sites;
- Review of final customer proposal and project documentation;
- Post-inspection of select sites; and
- Review of customer feedback.

Problems identified through the quality control procedures are grouped into critical and non-critical issues. Critical issues that arise may result in the immediate suspension or removal of the contractor from the program. Non-critical issues that do not adversely affect energy savings, peak-demand reductions, or incentive amounts result in the documentation of the issue and corrective action such as further training.

The first five projects completed by a contractor receive pre- and post-inspection and 20% of completed projects after the first five. Program staff is notified through the OPEN software that a site requires a pre- or post-inspection. During pre- and post-inspection, staff counts and photographs every fixture or other equipment included in the project. Additionally, staff reviews equipment specification sheets and invoicing submitted by the contractor through email.

Staff reported that there have been few verification issues that have arisen during the program year. Only one issue was noted that involved one contractor's installation of a

non-qualified screw-in lamp at two sites. Staff communicated the issue to the contractor who corrected the issue.

5.4.4.3.7 Contractor Recruitment and Management

As of October 2015, the program had 14 contractors in the network listed on the program website. The majority are lighting contractors, although three offer other measure types including HVAC, refrigeration, and pumps and motors. However, program data indicates that there are 51 contractors participating in the program. Of these contractors, 71% provide lighting services, 14% provide HVAC services, 8% provide services related to motors and pumps, and 4% provide refrigeration equipment services. For 16% of the contractors listed, the services provided field was not populated.

In order to be eligible to participate, contractors need to attend an initial training session that covers the program processes and use of the OPEN software tool for auditing sites and developing project proposals. This training takes approximately two and one-half hours to complete. Contractors are encouraged to invite program staff to their first walkthrough assessment.

Contractors also must sign the program participation agreement; provide evidence of \$1,000,000 in general liability coverage, workers compensation and employer's liability coverage, business automobile liability coverage; and applicable licenses. Contractors that complete the training requirements for another CLEAResult managed small business program do not need to attend the training provided through the SWEPCO program.

CLEAResult staff indicated that they maintain communications with contractors with active projects in order to be available to provide assistance and guide them towards completion.

5.4.4.3.8 Participant Survey Results

Participants of the Small Business Program were surveyed to provide insight into participants' experience with the program.

A total of 8 program participants responded to the survey. Thirty-eight percent were the owner or proprietor of their business, 25% were the President or CEO, 25% held a management position, and 13% held a facilities management position.

Of the facilities represented in the survey, 13% were the company's headquarters, 50% were from a company with several other locations, and 38% were the company's sole location.

Sixty-three percent owned and occupied the facility of interest, while 38% rented. The business types surveyed ranged from retail (38%), to cell phone store (25%), and industrial supplier (25%).

All respondents reported being billed directly for their electricity use.

5.4.4.3.9 Preferred Outreach and Sources of Awareness

The majority of participants learned about the program incentives from a contractor (50%), program representative (25%), or from friends and colleagues (13%). This is consistent with the program design that intends for participation to be primarily driven by contractors.

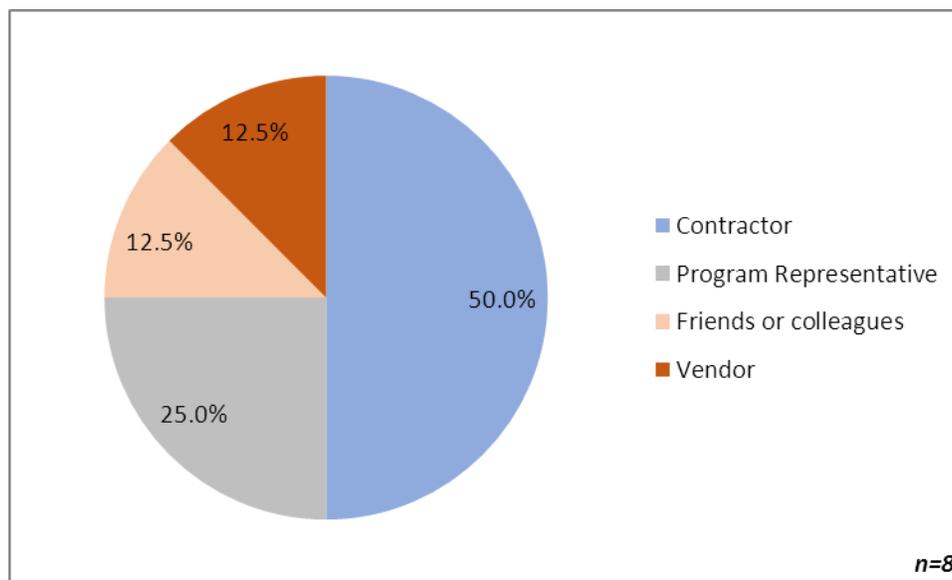


Figure 5-5 SPD: How Participants Learned of the Program

Interview respondents also provided information on the best way to receive information on energy saving opportunities. A majority of respondents (50%) stated that visits from contractors or program staff is the best way to contact them about energy saving opportunities, followed by bill inserts (38%), email (13%), and telephone (13%).

5.4.4.3.10 Decisions to Participate

Seventy-five percent of respondents thought participating in the program was an easy decision, while 25% had some concerns. Those with concerns said they did not know about the quality of the energy efficient equipment or that they thought that the claims sounded “too good to be true”. These respondents indicated that their concerns were resolved when they heard about the program working for other participants.

Reasons for participating in the program are shown in Figure 5-6. The most common reasons provided were: saving on energy bills (88%), conserving energy and protecting the environment (63%), and acquiring the latest equipment (25%).

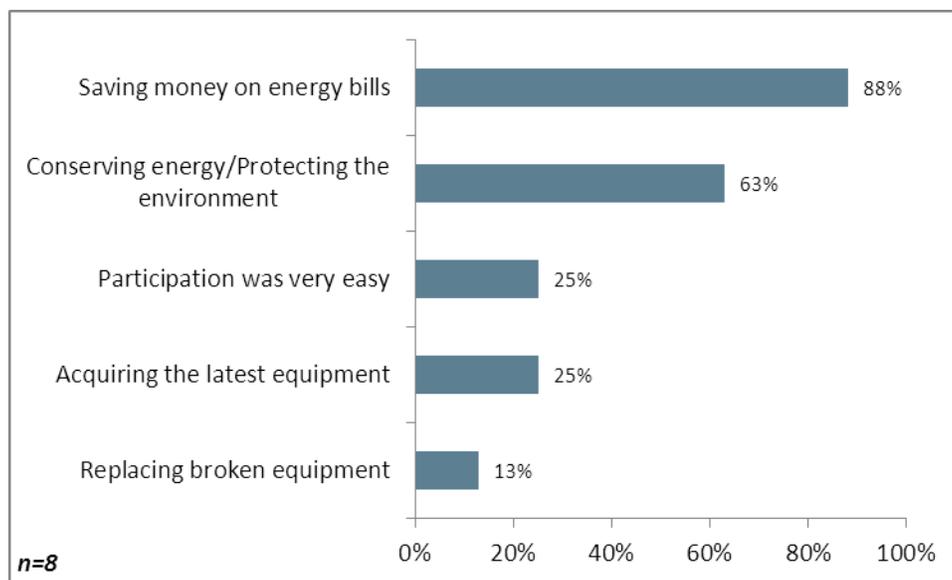


Figure 5-6 SBDI: Reasons for Participating

Figure 5-7 displays the likelihood that participants would have installed the energy efficient equipment had their contractor not completed the energy assessment of their facility as well as if the incentives from the SBDI were not available. Responses to this were mixed; 63% of respondents stated that they “probably would not have” or “definitely would not have” installed this equipment without the program rebate, but respondents were twice as likely to indicate that they “definitely would have” installed without an incentive as opposed to installing without a program assessment. This would indicate that both the technical services and financial incentives are valued by PY1 participants.

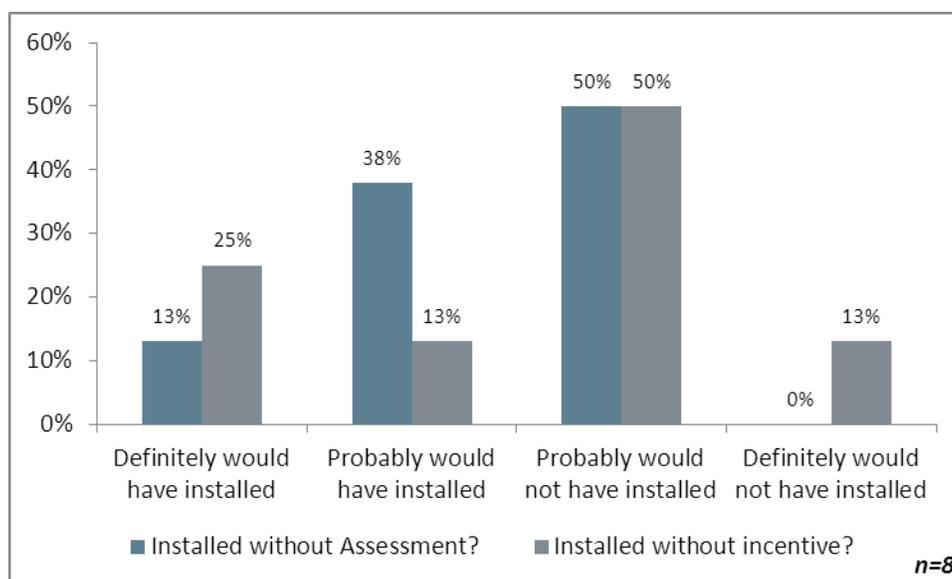


Figure 5-7 SBDI: Likelihood of Installing without Program Offerings

5.4.4.3.11 Assessment of Audit

Overall, participants were satisfied with the auditing process. At least 63% were very satisfied with the audit of the facility, the project proposal, and the professionalism and knowledge of the contractor.

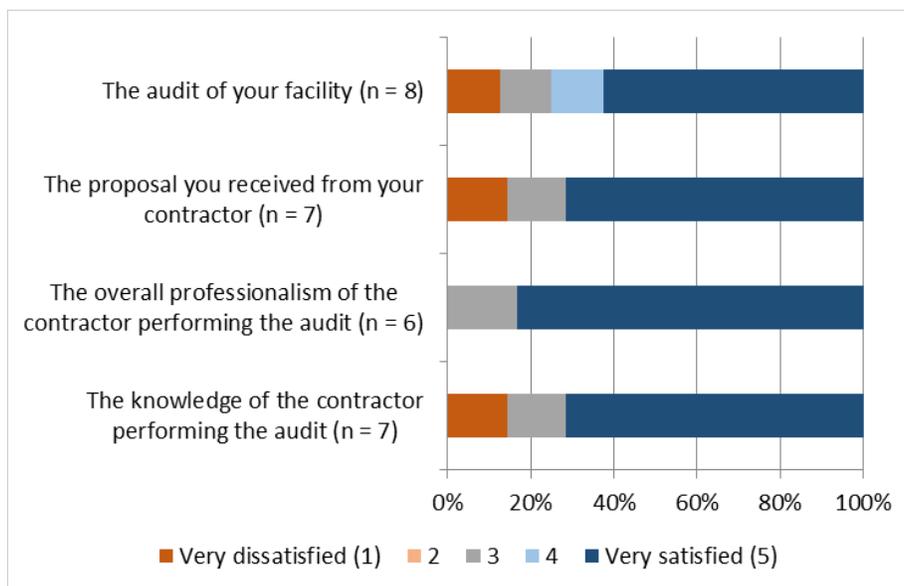


Figure 5-8 Participants Rating of the Auditing Process

The majority of participants surveyed thought the program was easy and the contractor was courteous and knowledgeable.

5.4.4.3.12 Equipment Selection

The majority of survey respondents (88%) installed all of the energy saving equipment recommended by the contractor. The one respondent who did not install all of the recommended equipment could not recall the type of recommended equipment that was not installed.

In addition, most of those surveyed thought the energy-saving equipment options fit their needs completely (63%) or nearly completely (25%). One respondent indicated that the equipment options did not fit their needs. However, the concern raised by the customer related to the quantity of equipment installed, not the type of equipment available through the program. Specifically, the respondent indicated four light bulbs were requested, but that the contractor only agreed to install two light bulbs.

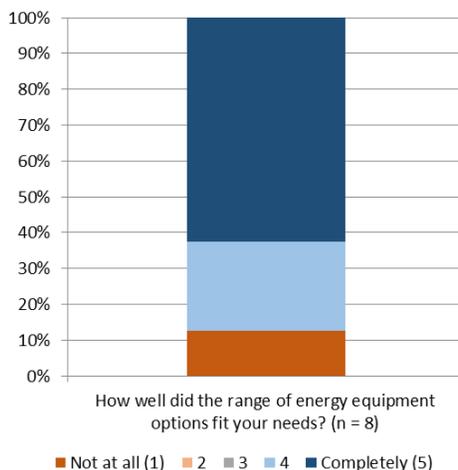


Figure 5-9 Fit of Equipment Options Provided

5.4.4.3.13 Participant Satisfaction

Seventy-five percent of respondents were satisfied with the program overall, while 25% reported dissatisfaction. Participants were most satisfied with the amount of time between the audit and equipment installation, and the utility as electrical service provider. Satisfaction was relatively lower with the quality of the equipment installation.

Two participants indicated that they contacted program staff with a question or concern. Both were very satisfied with how thoroughly their concern was addressed, but one was dissatisfied with how promptly their question was addressed.

Two respondents elaborated on their reason for dissatisfaction. One stated that only two light bulbs were installed when four were requested and that as a result the lighting level is insufficient. The other respondent stated that their bill remained high and that they had to install the lights on their own.

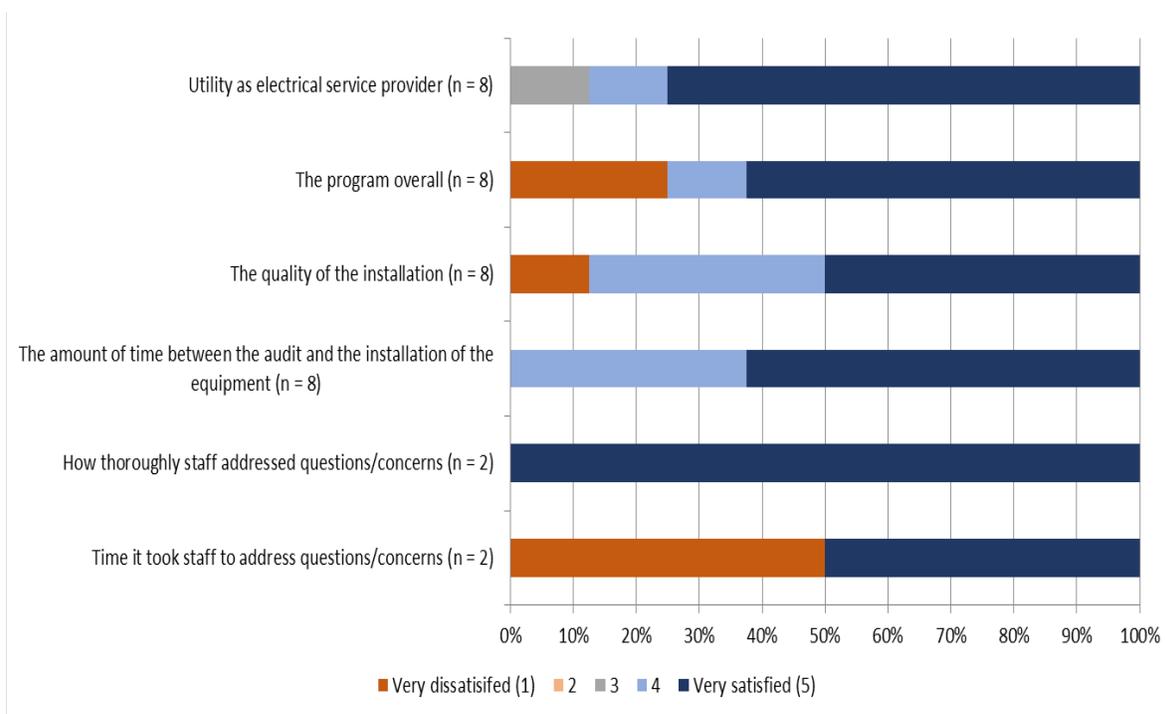


Figure 5-10 Participant Satisfaction Scores

Seventy-five percent of respondents indicated that participation in the program increased their satisfaction with SWEPCO. One indicated that their participation had no effect on their satisfaction.

Table 5-11 Effect of Participation on Satisfaction with Utility

<i>Effect of participation in the Utility's Program?</i>	<i>% of Respondents (n = 8)</i>
Greatly increased your satisfaction with the Utility	38%
Somewhat increased your satisfaction with the Utility	38%
Did not affect your satisfaction with the Utility	25%
Somewhat decreased your satisfaction with the Utility	0%
Greatly decreased your satisfaction with the Utility	0%
Don't know	0%
Refused	0%

5.4.4.4 Participating Contractor Interviews

Five attempts were made to contact participating contractors. Two contractors declined the interview. The reasoning given by the contractors for not participating in the program was that they did not have the sales force for the service area and that the utility service area was not a core territory for the business.

In total, interviews were completed with four of the 14 participating contractors listed on the program website.³²

Two of the respondents' businesses did not specialize in any specific type of energy efficient equipment, one specialized generally in lighting, and one specialized in LED lighting. None of the businesses specialized in providing services to a specific type of business.

5.4.4.4.1 Motivations for Participating

One-half of the interviewed contractors reported becoming aware of the Small Business program through researching rebates available in their area, and the remainder reported that they were contacted by CLEAResult directly about the program.

When asked what factors influenced their decision to participate in the program, all contractors stated one or both of the following influences: familiarity with the type of program offered, or because of the financial benefits of the program to the customer.

None of the contractors reported having initial concerns about participating in the program. One contractor stated that they had a history of positive experiences working with CLEAResult programs.

5.4.4.4.2 Program Marketing

Interviewed contractors provided information on their efforts to market the program to small business customers. All of the contractors stated that projects are typically initiated by them rather than a customer contacting them about participating in the program. All of the contractors also stated that they are promoting the program with

Three contractors stated that they received guidelines on how to use the utility or program name on their marketing materials, but only one contractor stated that they received marketing materials directly from CLEAResult. This contractor reported using the materials frequently, and suggested updating the materials with more LED examples.

When asked what the program could do to help them be more effective in marketing the program, one-half of respondents stated that it was difficult to market the program to potential customers because there was so little funding available. The remainder did not provide any suggestions for program marketing efforts.

5.4.4.4.3 Customer Awareness and Barriers to Participation

Three contractors indicated that they had not had any customers raise any concerns about participating in the program. One contractor stated that some customers were concerned that the program was too good to be true.

³² Data supplied by the program implementer indicates that 51 contractors have been trained through the program and approved to provide services.

Although contractors stated that customers were generally aware of measures offered through the program, they were more familiar with some measures than with others. One contractor stated that customers were familiar with T8s but were not as familiar with LEDs. Another contractor stated that their customers were generally aware of LEDs, but they sometimes had to explain refrigeration and more complicated measures. Two contractors stated that although customers are generally aware of measures offered through the program, they are less aware of the specifics of the program such as the return on investment they can expect, or the expected lifetime of the measures.

All contractors stated that the measure types offered through the program were sufficient, and that the incentives met the needs of small businesses.

The main reason contractors stated that customers did not participate in the program was that even with the incentive the project was too expensive.

5.4.4.4.4 Participation Process

Contractors provided responses to a series of questions about the participation process. The key documentation that contractors collected during the walkthrough was a copy of the business's energy bill and photographs of the existing equipment.

The walkthrough assessments are completed using a software tool CLEAResult developed called OPEN. When asked to assess the OPEN software, two contractors stated that they had no major issues with the software, and one contractor stated that the software tends to freeze when submitting a project. The difference in experiences with OPEN may be a function of the specific device contractors are using with the software. One contractor stated that they do not personally use the software, so could not comment on it.

Contractors reported that they submit customer proposals by email or in person. One contractor stated that proposals were submitted through the OPEN tool. The time it takes for proposals to be approved reported by contractors ranged from a few days to up to one week. One contractor did not give a specific timeframe, but stated that it does not take long, and is pretty immediate.

None of the respondents reported having a project rejected.

Overall, contractors appear to understand what documentation is required by the program, few had issues with using the OPEN software tool, and project proposals are generally approved in a reasonable period of time.

5.4.4.4.5 Training and Staff Support

All contractors stated that the training they received program met their needs for understanding the program. When asked if the training could be improved, one contractor suggested implementing an online webinar or training to allow new employees to be trained more efficiently.

Contractors were generally satisfied with the support they received from staff. Of the three contractors that had contacted staff with questions about the program, all found them helpful and responsive.

5.4.4.5 Overall Satisfaction

Contractors were asked a series of questions about their level of satisfaction with the program overall or specific aspects of it.

Three of the contractors stated that they were very satisfied with the program and one contractor was neither particularly satisfied nor dissatisfied. The contractor that rated the program as neutral stated that although they thought the program was a good idea, the lack of funding made it difficult for them to participate. They had been unable to sign people up for the program because there was no funding available by the time customers were ready to commit to the program.

Contractors were generally satisfied with the application process, wait time to receive the rebate, range of measures, the incentive levels, and the service from utility staff. All contractors gave a score of seven or higher for each of these factors.

5.5 Conclusions and Recommendations

5.5.1 Conclusions

5.5.1.1 Program Design and Participation Process

- The small business program is consistent with the design of similar programs offered in other jurisdictions. It incorporates three key design characteristics to reduce common barriers to small business.
 - The program provides relatively high incentives for small businesses that typically have less capital for energy efficiency investments.
 - The program uses high-contact, direct outreach performed by approved contractors to improve program awareness among harder to reach small businesses.
 - Incentive payments are paid to contractors to reduce the initial cost to participants.
- Small businesses are defined as businesses that with ≤ 100 kW average peak demand. This is a typical threshold for small business programs.
- The program utilizes a paperless process for completing the energy assessments and submitting customer proposals that reduces paperwork. These submissions can be made through the program software tool or by email. Submissions are sent to CLEAResult's central team in Austin. Neither program staff nor contractors identified any significant issues with the participation process or software.

- Contractors received training from CLEAResult on the program processes and use of the program software. Most of the interviewed contractors provided favorable assessments of the training. However, one respondent stated that they were not fully comfortable using the program software. Additionally, multiple contractors stated that program requirements changed after training and were not communicated to them.
- Contractor descriptions of the participation process were consistent with the program design. Interviewees appeared to understand the program process and documentation requirements, and few issues were noted with the program software tool. Contractors also indicated that proposals were approved in a reasonable period of time.
- Interviewed contractors stated that the measures offered through the program met the needs of the small businesses they work with. The primary barrier to participation identified by contractors was skepticism about the legitimacy of program offerings. Additionally, measure costs are a factor. Contractors indicated that the reason for customers not pursuing a project is the cost of the project.
- Most surveyed program participants were satisfied with the energy assessment and the proposal provided by the contractor. All participants were satisfied with the quality of the installation. Seventeen percent were dissatisfied with the amount of time between completion of the audit and the installation of the equipment.

5.5.1.2 Program Marketing and Outreach

- The program is designed to have contractors perform the majority of direct customer outreach. Interviewed contractors indicated that they were performing direct outreach to customers.
- Program staff recruited contractors through direct outreach and referrals from staff operating similar programs in the region. Although staff indicated that the number of contractors participating is generally sufficient, staff also stated that the program was seeking to recruit additional contractors.
- Participants most frequently reported learning of the program from a contractor (50%) or a program representative (25%).

5.5.1.3 Quality Control and Verification Processes

- The program has sufficient verification procedures in place. The first five projects completed by a new contractor receive pre and post verification. Interviewed staff indicated that 20% to 25% of subsequent projects are verified. However, the program manual indicates that 10% of subsequent projects are verified. This discrepancy is not critical to program operations because interviewed staff are notified which sites to inspect and are not performing the site selection.

- Projects are identified for pre- and post-inspection by central CLEAResult staff located in Austin. CLEAResult employs two regional program consultants who perform pre- and post-inspections.
- Inspection procedures include review of documentation, verification of building type (which determines operating hours), photographs of baseline conditions and efficient equipment, and verification that lamps installed are DesignLights Consortium (DLC), CEE listed, or ENERGY STAR® qualified.
- Contractors determine that a site meets program qualifications using the program software tool. However, two contractors reported having projects not approved by program staff because the customer did not meet the peak demand requirement.
- During on-site verification visits, the Evaluators found that 14% of sampled businesses had closed permanently.

5.5.1.4 Customer and Contractor Satisfaction

- Contractors were generally satisfied with the program including the participation process, the incentives, measures offered, and support from program staff. There was greater dissatisfaction with the wait time to receive the rebates, with one-third of contractors reporting that they were dissatisfied with this aspect of the program.
- Most participants were satisfied with their experience with the program overall. One respondent indicated dissatisfaction with the program overall and 18% of respondents reported dissatisfaction with the length of time between the audit and the installation of the equipment.

5.5.2 Recommendations

The Evaluators' recommendations for the Small Business Program are as follows:

- **Correct the OPEN Tool calculator to account for EISA baseline wattages.** When installing screw-in LEDs and CFLs, ex ante calculations used listed wattage (40W, 60W, 75W, and 100W) as the baseline. The baseline values need to account for the Energy Independence and Security Act (EISA) baseline values (29W, 43W, 53W, 72W), as the remaining useful life of incandescent lighting is too short to use as the baseline for the life cycle savings of a lighting retrofit. No sampled sites in this evaluation were affected by this issue, however other AEP programs which use the same OPEN tool have needed to address this.
- **Recruit a refrigeration trade ally and refer them to grocery and restaurant facilities that completed lighting retrofits.** This group of participants would likely be receptive to opportunities for improving the efficiency of their refrigeration system. The SWEPCO trade allies are exclusively lighting

contractors, and as such these facilities still have potential opportunity for high-return refrigeration projects.

- **Provide regular updates to contractors on program requirements.** Staff should consider an email communications to keep contractors informed of program updates.
- **Communicate to contractors the availability of program marketing collateral and provide it as requested.** This material is important for promoting the program and may help reduce customer skepticism about the legitimacy of the program.
- **Review the list of approved contractors to verify that the contractors listed are providing services to SWEPCO customers.** While scheduling interviews with contractors, the Evaluators staff found that some phone numbers were out-of-service.
- **Consider providing pre-approved co-branding materials.** Contractors may apply to use program logos and names in cobranding materials they develop, but none have exercised this option. Development of materials such as flyers that include the gridSMART® logo and a space for contractors to put their information may increase use and limit staff's need to approve contractor developed materials.
- **Consider materials that also illustrate non-energy benefits.** Program marketing materials focus on energy and cost saving benefits. However, participants reported also being motivated by other factors such as acquiring the latest equipment.
- **Develop strategies for improving data quality.** Data quality issues were identified for a portion of the project tracking records. In particular, participant name was missing for 16% of the projects and the record appeared to be a business name for an additional 11% of the projects. Phone numbers in the SBDI Participant Phone field were missing for 18% of the projects. Data in the Application Signature Date field was missing for 14% of the projects. Additionally, measure level records had fields populated that did not match column headers. Specifically, the Rebate Payable To (Project) field contained telephone numbers; the Application Received Date (Project) field contained contractor firm names; and the Participant Name contained a mix of person and business names. Two fields appeared to contain participant telephone numbers. Staff should seek strategies to minimize data quality issues. Strategies may include training of contractors on data requirements, incorporating data validation functions into program software, and periodic reviews of data quality.

6. Commercial & Industrial Solutions Program

6.1 Program Description

The SWEPCO Commercial and Industrial Solutions Program is designed to support larger commercial and industrial customers by identifying electric energy savings opportunities and overcoming the market barriers to implementing cost-effective energy efficient investments. The program includes both prescriptive and custom measures that have savings deemed per the Arkansas TRM 3.0.

The program is designed to help customers identify projects that they might not otherwise undertake, or have the staff expertise to identify. The Program utilizes an extensive list of trade allies to put customers in contact with qualified contractors capable of installing high efficiency equipment. This will help drive the comprehensiveness of the Program by promoting an investment in a large, diverse pool of measures:

The Program encourages larger C&I customers to consider performing custom and prescriptive projects that result in substantial energy savings. These projects may include direct install, process improvements, other system level custom projects and/or projects involving unique equipment not part of the prescriptive offerings. Program staff pre-approves projects for customer and measure eligibility and provides M&V services or review as needed to verify savings. The Program provides technical support for large C&I customers to identify energy waste, prioritize energy improvements, and provide energy assessments, educational resources, and incentives for the installation of energy efficiency measures.

The Program offers technical assistance in identifying and qualifying energy efficiency measures as well as incentives for measures that result in a verifiable electric reduction. Incentives are paid on a \$/kWh saved per project basis. Incentives may be transferred from the customer to the contractor in order to reduce first cost to the customer. Incentives are capped by either total project costs, maximum incentive amount, or both. Incentives could be capped at 80% of total project costs. They can also be capped by a maximum of \$25,000 per project.

Pre-approval of project and customer eligibility is required to participate. SWEPCO will provide review and approval of claimed savings. Prescriptive and custom projects must be able to show specific and verifiable energy savings and must be cost-effective to obtain incentive approval. Customer savings claims may be developed by a third-party engineering firm and are subject to measurement and verification activities.

6.2 Impact M&V Methodology

Evaluation of the C&I program requires the following:

- Stratified Random Sampling, selecting large saving sites with certainty (as detailed in Section 2.2.1)
- Review of deemed savings parameters for prescriptive projects;
- On-site verification;
- Interviewing of program participants and trade allies.

Parameters required for evaluation of the C&I program are presented in Table 6-1.

Table 6-1 Data Sources for Gross Impact Parameters – C&I program

<i>Parameter</i>	<i>Source</i>
Project Details	Program Tracking Data
Energy Efficient Equipment Specifications	Manufacturer's Literature
Lighting Hours of Operation	Arkansas TRM deemed hours
HVAC Interactive Factors	Simulations of archetypical buildings using local weather data
Lighting Peak Coincident Factor	Review of deemed values, assignment of new values based upon facility operating hours should deemed values not provide accurate estimates

6.3 Impact Findings

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

- Data for the study have been collected through review of program materials, on-site inspections, and end-use metering. Based on data provided by SWEPCO, sample designs were developed for on-site data collection for the impact evaluation.
- On-site visits were used to collect data for savings impacts calculations. The on-site visits were used to verify installations and to determine any changes to the operating parameters since the measures were first installed. 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.

Gross savings were estimated using proven techniques, including engineering calculations using industry standards and verification of computer simulations developed by program contractors to determine energy savings. Table 5-2 summarizes the total participation in the PY1 C&I Program.

Table 6-2 PY1 C&I Program Participation Summary

# Projects	Expected kWh	Expected kW
18	2,939,410	298.42

Data provided by SWEPCO showed that during PY1, there were 18 projects which were initially expected to provide gross savings of 2,939,410 kWh and a peak reduction of 298.42 kW. The resulting overall sample is presented in Table 5-3.

Table 6-3 C&I Sample Summary

# Sites in Population	Site Visit Sample Size	# Surveys
18	6	5

6.3.1 C&I program Gross Savings Estimates

Sampling for evaluation of SWEPCO’s LCIP was developed using the stratified random sampling, in which the program population of projects were ranked by expected kWh savings. Then sites were randomly chosen from the lower, middle and multiple that expected large kWh savings. This procedure provides precision with a significantly reduced sample than a census review would require, by selecting the highest saving facilities with certainty, thereby minimizing the variance that non-sampled sites can contribute to the overall results.

6.3.1.1 Sample Design

The participant population for the LCIP was ranked by kWh savings. Table 6-4 summarizes the population for the LCIP.

Table 6-4 C&I Program Sample Design

Site	Expected kWh Savings	Sampled	%age of Expected Savings
1	7,918	Yes	0.27%
2	17,246		
3	24,415		
4	27,288		
5	56,150		
6	58,666		
7	64,810	Yes	2.24%
8	69,531	Yes	2.41%
9	82,064		

10	83,226		
11	145,004		
12	153,478		
13	240,700		
14	250,858		
15	269,784	Yes	9.33%
16	325,115		
17	502,375	Yes	17.38%
18	511,780	Yes	17.71%
Sampled Total	1,426,198		49.34%
Non-Sampled Total	1,464,210		50.66%
Overall	2,890,408		100.00%

6.3.1.2 C&I Site-Level Realization

Sites chosen are visited in order to verify installation of rebated measures and to collect data needed for calculation of ex post verified savings. The realization rates for sites are weighted by expected kWh and kW for overall realization rates applied to non-sampled projects.

Table 6-5 shows the expected and realized energy savings for the program by project.

Table 6-5 Expected and Realized Savings by Project

Project ID(s)	City	Facility Type	Expected kWh Savings	Realized kWh Savings	Realization Rate
PRJ-402114	Bossier City	K-12 School	7,918	6,784	85.7%
PRJ-374814	Shreveport	Storage Facility	64,810	64,706	99.8%
PRJ-336866	Shreveport	Storage Facility	69,531	69,440	99.9%
PRJ-292124	Shreveport	Manufacturing	318,786	316,789	99.4%
PRJ-292072	Shreveport	Auto Dealership	502,375	502,375	100.0%
PRJ-292122	Shreveport	Auto Dealership	511,780	510,112	99.7%
Overall			1,475,200	1,470,206	99.7%

6.3.1.3 C&I Program-Level Gross Realization

Using the realization rates presented in Table 6-5 *Expected and Realized Savings by Project*, the Evaluators extrapolated results from sampled sites to non-sampled sites in developing program-level gross savings estimates. Table 6-6 C&I Program-Level Realization by for kWh presents results for kWh and

Table 6-7 presents the results for peak kW demand reductions.

Table 6-6 C&I Program-Level Realization by for kWh

<i>Site</i>	<i>Expected kWh Savings</i>	<i>Sampled Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Weight</i>	<i>Total Realized kWh Savings</i>	<i>Realization Rate</i>
1	7,918	6,784	85.7%	0.5%	6,784	85.7%
2	17,246				17,188	99.7%
3	24,415				24,332	99.7%
4	27,288				27,196	99.7%
5	56,150				55,960	99.7%
6	58,666				58,467	99.7%
7	64,810	64,706	99.8%	4.4%	64,706	99.8%
8	69,531	69,440	99.9%	4.7%	69,440	99.9%
9	82,064				81,786	99.7%
10	83,226				82,944	99.7%
11	145,004				144,513	99.7%
12	153,478				152,958	99.7%
13	240,700				239,885	99.7%
14	250,858				250,009	99.7%
15	318,786	316,789	99.4%	21.6%	316,789	99.4%
16	325,115				324,014	99.7%
17	502,375	502,375	100.0%	34.1%	502,375	100.0%
18	511,780	510,112	99.7%	34.7%	510,112	99.7%
Total	2,939,410	1,470,206		100.0%	2,929,459	99.7%

Table 6-7 C&I Program-Level Realization by for Peak kW

Site	Expected peak kW Savings	Sampled Realized peak kW Savings	Peak kW Realization Rate	Weight	Total Realized peak kW Savings	Realization Rate
1	1.47	1.26	85.7%	1.1%	1.26	85.7%
2	4.90				4.89	99.6%
3	7.63				7.60	99.6%
4	1.98				1.97	99.6%
5	14.51				14.46	99.6%
6	1.69				1.68	99.6%
7	17.81	17.75	99.6%	15.8%	17.75	99.6%
8	20.33	20.31	99.9%	18.1%	20.31	99.9%
9	14.36				14.31	99.6%
10	11.87				11.83	99.6%
11	18.44				18.37	99.6%
12	27.70				27.60	99.6%
13	27.74				27.64	99.6%
14	35.12				35.00	99.6%
15	52.84	52.70	99.7%	47.0%	52.70	99.7%
16	11.03				10.99	99.6%
17	20.00	20.00	100.0%	17.9%	20.00	100.0%
18	0.00					
Total	289.42	112.02		100.0%	288.36	99.6%

6.3.1.4 C&I – Causes Savings Variance

Table 6-8 summarizes the causes of kWh savings shortfalls and overestimates for projects with high savings variance.

Table 6-8 Large C&I – Causes of Low Realization

Project ID(s)	Expected kWh Savings	Realized kWh Savings	Realization Rate	Causes of Savings Variance
PRJ-402114	7,918	6,784	85.7%	This facility is a middle school. Ex ante calculations assumed operation of (7) lamps that were not operational: (1) 400W metal halide and (6) 300W incandescents. This is 41% of lamps by count, exceeding the allowable 10% threshold for non-operational fixtures. These lamps were non-operational before the retrofit and cannot be included in the savings calculations. Additionally, ex ante calculations also assumed the following incorrect input wattages: (8) 400W metal halides were listed as drawing 312 watts each, whereas the specified draw for each these fixtures is 453 watts. (6) 300W incandescent lamps were listed as drawing 206 watts each, and (3) 200W incandescent lamps were listed as drawing 138 watts each, whereas the specified draw of each of these lamps are 300 and 200 watts, respectively. The increased baseline specified wattage brought the realization rate up, but not enough to fully account for the reduced savings due to the non-operational fixtures.
PRJ-374814	64,810	65,706	99.8%	This site is a self-storage facility. During ex ante calculations, the one incandescent fixture was given a wattage of 100W. During ex post calculations, the wattage was changed to 72W to account for EISA standards, resulting in a slightly low kW realization rate. Additionally, (9) fixtures were on daylighting control, 'Outdoor' with an 'Undetermined' heating type. The evaluators a corrected energy interactive term of 1.00 in ex post calculations.
PRJ-336866	69,531	69,440	99.9%	This site is a self-storage facility. During ex ante calculations, the one incandescent fixture was given a wattage of 100W. During ex post calculations, the wattage was changed to 72W to account for EISA standards, resulting in a slightly low kW realization rate. Additionally, (9) fixtures were on daylighting control 'Outdoor' with an 'Undetermined' heating type. The evaluators a corrected energy interactive term of 1.00 in ex post calculations.
PRJ-292124	318,786	316,789	99.4%	This site in a manufacturing facility. During the verification visit, the evaluators found that (60) fixtures which listed occupancy sensor controls on application materials were not controlled by sensors. Instead, occupancy sensors were affixed to other fixtures in the

				facility with a similar connected load. Additionally, the evaluators were able to confirm electric resistance heating in areas left “undetermined” in ex ante calculations.
PRJ-292122	511,780	510,112	99.7%	This site is an auto dealership. Ex ante calculations assumed all fixtures on daylight controls, however during the verification visit (9) fixtures were found in the ‘service’ area of the facility. The hours of this area are similar to traditional business hours, so in ex post calculations 3,406 HOA (Service: Excluding Food) were used instead of 3,996 (Outdoor). This accounts for the slightly low kWh realization rate as well and the peak kW savings.

Table 6-9 Large C&I Realized kWh and Peak kW Savings

<i>Expected kWh Savings</i>	<i>Realized kWh Savings</i>	<i>kWh Realization Rate</i>	<i>Expected Peak kW Savings</i>	<i>Realized Peak kW Savings</i>	<i>Peak kW Realization Rate</i>
2,939,410	2,929,622	99.7%	289.42	288.36	99.6%
2,939,410	2,929,622	99.7%	289.42	288.36	99.6%

Key issues identified in site-level analyses include:

- **Use of the “Undetermined” space heating type.** Many trade allies defaulted to using the “Undetermined” space heating value, which has an Energy Interactive Factor of .98, including outdoor spaces. The Evaluators found that electric radiant heating was used in a large share of small business projects, and savings were reduced when the Energy Interactive Factor was corrected to .87.
- **Excess non-operational fixtures counted in baseline.** The program allows for up to 10% (by count) of non-operational fixture to be included in the baseline. Evaluators found 41% non-operational baseline fixtures on one sampled site, however ex ante calculations did not account for this. Error-checking within the calculator needs to be examined.
- **Improper baseline for screw-in lighting.** When installing screw-in LEDs and CFLs, ex ante calculations used listed wattage (75W and 100W) as the baseline. The baseline values need to account for the Energy Independence and Security Act (EISA) baseline values (53W and 72W), as the remaining useful life of incandescent lighting is too short to use as the baseline for the life cycle savings of a lighting retrofit.

6.4 Process Findings

This section presents the results of the process evaluation of SWEPCO's C&I Solutions Program. The process evaluation focuses on aspects of program policies and organization, as well as the program delivery framework.

The process chapter begins with an overview of the program. This is followed by a discussion of the methodological approach used in the evaluation. A summary of findings and recommendations for program improvement follow the discussion of the methodology. This discussion is followed by detailed findings of the evaluation activities.

6.4.1 Data Collection Activities

The process of evaluation of the LCIP included the following data collection activities:

- *SWEPCO Program Staff Interview.* The Evaluators interviewed staff at SWEPCO involved in the administration of the C&I Program. These interviews were to collect information from program staff as to any changes or developments, as well as response to program recommendations.
- *CLEAResult Program Staff Interviews.* The Evaluators interviewed staff at CLEAResult, who implements the program. These interviews were to collect information on implementation activities and clarify questions about program design or processes.
- *Participant Surveying.* The Evaluators surveyed a sample of program participants. These surveys addressed issues including participant satisfaction with the program offerings, demographics, and other contextual issues regarding the participation process.
- *Contractor Interviews.* The Evaluators interviewed a sample of contractors that completed projects through the program. The interviews addressed topics such as contractors' perception and understanding of the program participation process, efforts to market the program, perception of barriers to participation that their customers may face, and satisfaction with the program.

6.4.2 Program Overview

The Program provides financial incentives and technical services to encourage nonresidential customers with greater than 100 kW peak demand to implement energy efficiency measures. The Program is designed to help this customer segment overcome barriers to energy improvement, such as higher first-cost of efficiency equipment and a lack of technical knowledge or resources.

In addition to encouraging the adoption of energy efficiency measures, the program also intends to transform the energy efficiency market in SWEPCO's service territory through training, education, and program implementation.

The program offers incentives for efficiency measures as well as facility assessments and other forms of technical assistance to help customer identify and develop energy efficiency projects.

Financial incentives are based on expected savings for the measure implemented and vary by end–use. The targeted incentive amounts for different end-uses are summarized in Table 6-10.

Table 6-10 Incentive Amount by End-Use for the C&I Program

<i>End- Use</i>	<i>Incentive Amount</i>
Lighting	\$0.10 / kWh Saved
HVAC / Non-lighting	\$0.15 / kWh saved
Custom	\$0.08 / kWh saved

The program also offers the direct installation of low-flow devices to reduce hot water consumption, vendor economizers, and CFLs at no cost to the customer.

The incentive amounts may be based on one of three calculation methodologies described below.

- **Deemed or Stipulated Savings:** This approach is the most typical and utilized for projects for which savings can be reasonably estimated using previously collected data on operating hours and energy consumption of pre-existing equipment. This approach does not require the participant to perform any measurement and verification (M&V) activities.
- **Simplified Measurement and Verification:** This approach is for projects which require short-term metering and utilizes this data in simple engineering calculations to estimate energy savings. Participants are required to submit an M&V plan before beginning the project.
- **Full Measurement and Verification:** Projects requiring full M&V estimate savings utilizing procedures based on the International Performance Measurement and Verification Protocol and may utilize metering, statistical analysis of billing data, or energy modeling. Participants are required to submit an M&V plan before beginning the project.

6.4.3 Methodology

6.4.3.1 Materials Reviewed

The Evaluators reviewed materials provide by program staff. These materials included the program manual, the initial application form, the final application form, a program informational flyer, and the program website.

6.4.3.2 Program Staff Interviews

Interviews were completed with two implementation contractor staff and one utility staff member. The interviews provided information on program operations and covered the following topics:

- Program goals and objectives;
- Marketing and outreach;
- Communication processes;
- Program management and staffing; and
- Quality control and verification processes.

6.4.3.3 Participant Survey

Surveys were administered to a sample of program participants. The survey covered the following topics:

- Source of program awareness and preferred outreach methods;
- Decision making regarding participation;
- Project implementation; and
- Participant satisfaction.

In total, five program participants completed the survey out of six contacts that had completed projects at the end of September.

6.4.3.4 Interviews with Participating Contractors

The Evaluators attempted to complete interviews with all four contractors who had completed projects as of September. Each contact was contacted five times but only one responded to the interview request. The interview covered the following topics:

- Motivations for participating;
- Program marketing;
- The participation process;
- Program impacts on contractor's business; and
- Participant satisfaction.

6.4.4 Detailed Findings

6.4.4.1 Participation Data Quality Review

The evaluators reviewed the final program participant tracking data submitted by CLEAResult. The fields in the file were largely populated with valid data.

The Evaluators recommend that a 'premise ID' field be added to the report.

6.4.4.2 Analysis of Participation Data

All of the projects completed by C&I Program participants involved the installation of lighting measures.

Figure 6-1 displays the share of savings for each of the 18 projects completed during the program year. As is often the case in energy efficiency programs, a relatively small share of projects accounted for a disproportionately large share of the expected energy savings.

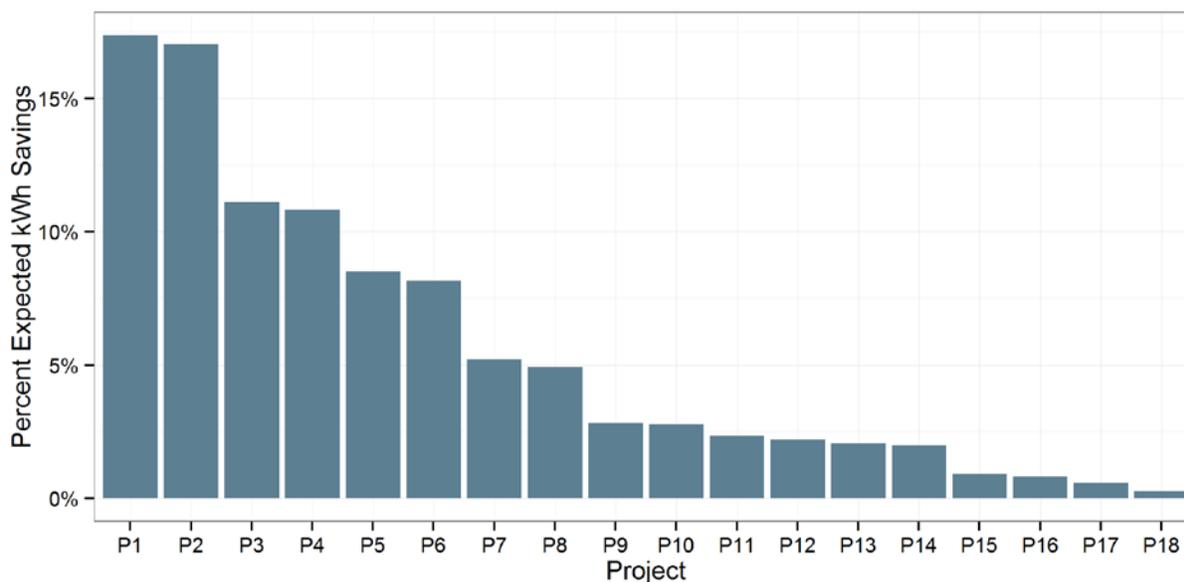


Figure 6-1 Project Share of Expected kWh Savings

6.4.4.3 Program Design, Operations, and Activities

The following sections describe program design, operations, and activities and were developed from reviews of program documentation and interviews with program staff.

6.4.4.3.1 Program Objectives

The primary program objective is to assist non-residential customers in achieving electric energy savings and peak demand reductions through provision of technical support and financial incentives for energy efficiency measures. The energy savings goal for the first year of program operations was 2,004,691 kWh. The peak demand reduction goal was 522.00 kW. To meet the energy savings and peak demand reductions goals, the program has ancillary objectives to mitigate barriers to energy efficiency such as lack of knowledge of energy efficient technologies and lack of awareness of energy saving opportunities in facilities. Additionally, through the incentives and services provided, the program intends to transform the market for energy efficiency in the targeted sector.

SWEPSCO staff indicated that the efficiency programs may be a means of building customer satisfaction through educating them about energy efficiency and providing financial assistance.

The program met its energy saving goal during its first year of operations.

6.4.4.3.2 Program Participation Process

For interested customers, CLEARResult staff will complete a facility walk-through to identify energy saving opportunities at the customer's location. This assessment may be targeted towards a specific project (e.g., a lighting retrofit) or may be a full facility assessment. Staff noted that the primary function of the assessment is to reduce the uncertainty for the customer regarding incentives, expected savings, and the program participation process. Staff indicated that customers are generally interested in the energy assessments and noted that these have been important for initiating program projects. However, customers may decline to complete projects or have assessments performed because they lack funds for efficiency projects.

Once a preliminary project is identified, the customer submits a signed initial application form. The initial application form outlines the program's commitments to help the customer identify and assess efficiency measures, assist in the review of new construction projects, and provide incentives for eligible energy savings projects. The participant acknowledges that a signed copy of the form is required to reserve funds and agrees to allow the program to use its name to promote the program. Additionally, customers provide information on the measure type, estimated kWh savings, estimated incentives, and the estimated completion date. The submission of the initial application reserves funds for a 30 day period. During the 30 day period, CLEARResult staff reviews the project information and completes a pre-installation inspection of the site. The purpose of the inspection is to verify the accuracy of the material provided on the type of baseline equipment and its operational condition, confirm that the M&V plan outlined for the project is appropriate, and to verify that the proposed efficient equipment is not yet installed. During the 30 day period, the project specifics or scope may be refined as a result of the pre-inspection or other factors.

After finalizing the project scope and other specifics, the customer submits a final application form. With the final application, the customer submits information about the site, building occupancy and operating schedules, a description of the existing and proposed equipment, savings estimations, and if required, a project measurement and verification (M&V) plan. CLEARResult staff review the submission and notify the customer upon approval. Incentive funds are reserved for 120 days from approval and execution of the customer agreement. During this period, the customer implements the project.

Upon project completion, the customer submits the notice of completion along with supporting documentation such as specification sheets, facility drawings, and invoicing or purchase orders. CLEARResult then reviews documentation and completes a post-

installation inspection. Once approved, incentive payment is made to the customer or another party designated by the customer.

6.4.4.3.3 Roles and Responsibilities

CLEAResult is responsible for the primary program implementation tasks, namely:

- Conducting outreach to potential program customers;
- Recruiting and educating contractors;
- Approving customer eligibility;
- Providing technical assistance and recommending energy efficiency measures;
- Communicating with and supporting program participants;
- Performing onsite pre- and post-installation inspection;
- Quality control and calculating energy savings for all projects; and
- Reviewing submitted application forms and documentation.

CLEAResult staffs the program with a consultant who splits time between the Small Business Program and the Large Commercial & Industrial Program. Oversight is provided by the program manager who oversees all of the SWEPCO programs operating in Louisiana as well as programs operating in two other states. Additionally, CLEAResult indicated that they also have additional support from the company, such as support for program marketing and engineering analyses.

SWEPCO is responsible for authorization and issuing incentive payments for projects and oversight of the implementation contractor.

6.4.4.3.4 Program Communications

CLEAResult holds weekly internal meetings with staff supporting all of the non-residential and residential SWEPCO programs. During these meetings, staff review each program's status including project timelines, changes of project status (e.g., from site assessment performed to project proposal submitted), and program budgets. Additionally, the program consultant meets regularly with the Small Business and C&I Program coordinator. Staff assessed the current internal communication processes as effective and meeting program management needs.

The program manager attends a monthly meeting with other regional CLEAResult program managers. The purpose of these meetings is to share best practices, troubleshoot issues that managers may be facing, share information about items of concerns such as the quality of contractors working across program lines, and provide evaluation, measurement, and verification updates for the region.

The program manager meets on a biweekly basis with SWEPCO program staff. The primary objectives of this meeting are to review program status and to discuss any recommendations CLEAResult may have. During this meeting, a program status report

generated by CLEAResult is reviewed. Additionally, a more comprehensive monthly status report is generated that includes additional metrics and highlights program successes and future outlook. SWEPCO staff also reported regular communication with the CLEAResult program manager. Both SWEPCO and CLEAResult indicated that communications between the two parties were effective and sufficient to manage the program operations.

CLEAResult staff also indicated that there is significant coordination and communication between SWEPCO customer service and account managers. These groups are copied on biweekly reports detailing program activity and participated in program training at launch. Additionally, staff noted that multiple project referrals have come from SWEPCO staff and are considered a key program asset.

SWEPCO staff attends a bi-weekly meeting with staff operating programs in other states. During the meetings, program status, goals, budgets, safety and human resources issues are discussed.

6.4.4.3.5 Program Marketing and Outreach

A strategic decision was made to prioritize incentive payments over marketing efforts. Staff noted that they had assessed a high level of “pent up demand” for incentives to help business owners implement energy saving projects and decided that the program would succeed with minimal marketing effort.

The primary outreach strategies that were used during the year included information posted on the program website and development of a network of contractors who are informed about the program and can promote the incentive offerings. To develop a network of contractors, staff engaged in direct outreach efforts to contractors and vendors in the area. Program staff also noted that word-of-mouth has been an important means of information dissemination.

The facility energy assessments are another important component of customer outreach.

CLEAResult and SWEPCO staff indicated that account managers are well informed about the program and promote it with their key accounts. Staff stated that account managers have facilitated meetings with key account customers and program staff to discuss the incentive offerings and potential projects.

Program marketing planning is utility specific but coordinated across states where CLEAResult implements programs for SWEPCO. An example of this coordination is the use of a common website template across all three states. Additionally, staff reported that regional program managers share information about leads for customers that have operations in multiple utility jurisdictions.

The program has developed a one page program overview flyer. The flyer is primarily informational and details the steps for completing an incentive project, incentive levels, customer eligibility requirements, and examples of typical measures implemented. The flyer provides the address for the SWEPCOgridSMART.com website, which is the website for the Arkansas, Louisiana, and Texas programs. It also contains email and telephone contact information.

The program website provides details about the program, the types of measures that may receive incentives, customer eligibility requirements, participation steps, and forms. The website also states that an Energy Advisor can help customers develop a project.

Additionally, contractors can apply to use the gridSMART® logo, but as of the interview, none had done so.

6.4.4.3.6 Barriers to Participation

Staff noted that the primary barriers to participation are financial; some customers do not have the funds available to complete an energy efficiency project. Staff indicated that the technical services provided through the program such as the walkthrough assessments have been effective at reducing informational barriers and that these assessments have initiated several projects. Additionally, it was noted that there was some “pent-up demand” for incentive programs in the state and that word of the program spread quickly through the business community, suggesting that there was a relatively high level of program awareness during the initial year.

6.4.4.3.7 Quality Control and Verification Processes

Several activities are integrated into the program processes to verify that projects are implemented in accordance with program requirements. The key activities are:

- Review of pre-application materials for completeness, eligibility requirements, and estimated timelines.
- Pre-installation inspection of all projects to verify and document the existence and condition of the baseline equipment.
- Review of final application and incentive reservation form for completeness and supporting documentation such as specification sheets, facility layouts, and purchase orders.
- Post-installation inspection of all projects to identify any changes between the proposed and completed project and to verify that the equipment listed is installed and operating.

All projects receive engineering review in addition to verification of installation. The program works with other CLEAResult regional engineering staff and is able to draw on the engineering expertise of the broader company in its project reviews.

6.4.4.3.8 Contractor Recruitment and Management

SWEPSCO staff considers the development of a network of local contractors to be an important task for CLEAResult. Staff indicated that CLEAResult has been fairly successful at developing a network of contractors that provide services to customer that qualify for the C&I Program.

There is no training required of contractors. Program staff support contractors through providing information and communicate any issues identified through verification and auditing tasks.

6.4.4.4 Participant Survey Results

Participants of the C&I Program were surveyed to provide insight into the participants experience with the program. A total of five program participants responded to the survey. Forty-percent of respondents held an engineering position and the remainder a managerial position.

Of facilities surveyed, all were of a company with several other locations, and all owned and occupied the facility of interest. The business types surveyed ranged from industrial/manufacturing (40%), a K-12 school (20%), a car dealership (20%), and a rental storage facility (20%).

1.1.1.1.2 Preferred Outreach and Sources of Awareness

Participants learned of the program through an internet search (40%), a contractor (40%), or a program representative (20%). The most commonly preferred methods of outreach included, email (40%), bill inserts (20%), direct mail (20%), exhibits at a convention, and visits from the utility company.

Table 6-11 Best Forms of Outreach

<i>What are the best ways to reach companies like yours with information about incentives for energy savings opportunities?</i>	<i>% of Respondents (n = 5)</i>
Email	40%
Bill inserts	20%
Direct mail	20%
Exhibits at convention	20%
Visits from utility company	20%
Other	20%

1.1.1.1.3 Decisions to Participate

When evaluating energy efficiency improvements, 100% of respondents calculate the internal rate or return, while 60% use simple payback, 60% use initial cost, and 40% use life cycle cost. These results indicate that participants use multiple financial metrics

to evaluate an efficiency project and that all look at the longer term financial performance of the investment.

Survey respondents provided information on factors that helped them decide to participate in the program. All respondents were motivated by an interest in saving money on their energy bills. Other important factors, each mentioned by 80% of respondents, were saving energy, protecting the environment, the recommendation made by a contractor, and the financial incentive. Additionally, 60% of respondents were motivated by the ease of participation.

Table 6-12 Reasons for Participating in the Program

<i>Which of the following factors helped you decide to participate in the program?</i>	<i>% of Respondents (n = 5)</i>
Saving money on energy bills	100%
Saving energy	80%
Protecting the environment	80%
Recommendation from a contractor	80%
Financial incentive	80%
Replacing broken equipment	60%
Participation was very easy	60%
Recommendation from program staff	20%
Something else	20%

Three of the five respondents indicated that a program representative recommended the measure. Of these, two-thirds indicated that they probably would not have installed the measure if the recommendation was not provided.

Table 6-13 Likelihood of Installation without the Recommendation

<i>If the program representative had not recommended the measure, how likely is it that you would have installed it anyway?</i>	<i>% of Respondents (n = 3)</i>
Definitely would have installed	33%
Probably would have installed	0%
Probably would not have installed	67%
Definitely would not have installed	0%

Forty-% of respondents indicated that they probably would not have installed the measures had incentive not been available.

Table 6-14 Likelihood of Installation without Financial Incentive

<i>If the financial incentive or discount from the program had not been available, how likely is it that you would have installed the measure?</i>	<i>% of Respondents (n = 5)</i>
Definitely would have installed	40%

Probably would have installed	20%
Probably would not have installed	40%
Definitely would not have installed	0%

All respondents said participating in the program was an easy decision and that they had no initial concerns.

1.1.1.1.4 Project Implementation

The most common persons who worked on completing the program application included the survey respondent (100%), another member of the company (60%), a contractor (40%), or an equipment vendor (40%).

Table 6-15 People who Worked on Completing Program Application

<i>Which of the following people worked on completing your application for program incentives (including gathering required documentation)?</i>	<i>% of Respondents (n = 5)</i>
Yourself	100%
Another member of your company	60%
A contractor	40%
An equipment vendor	40%
Program staff	40%

Seventy-five percent of respondents thought the program provided clear information on how to complete the application, and none reported that the information was unclear.

Finally, all respondents said they had a clear sense of whom to go to for assistance with the application process and the financial incentive they received was about the amount expected.

6.4.4.4.1 Participant Satisfaction

All participants were satisfied with each element of the program and the program overall.

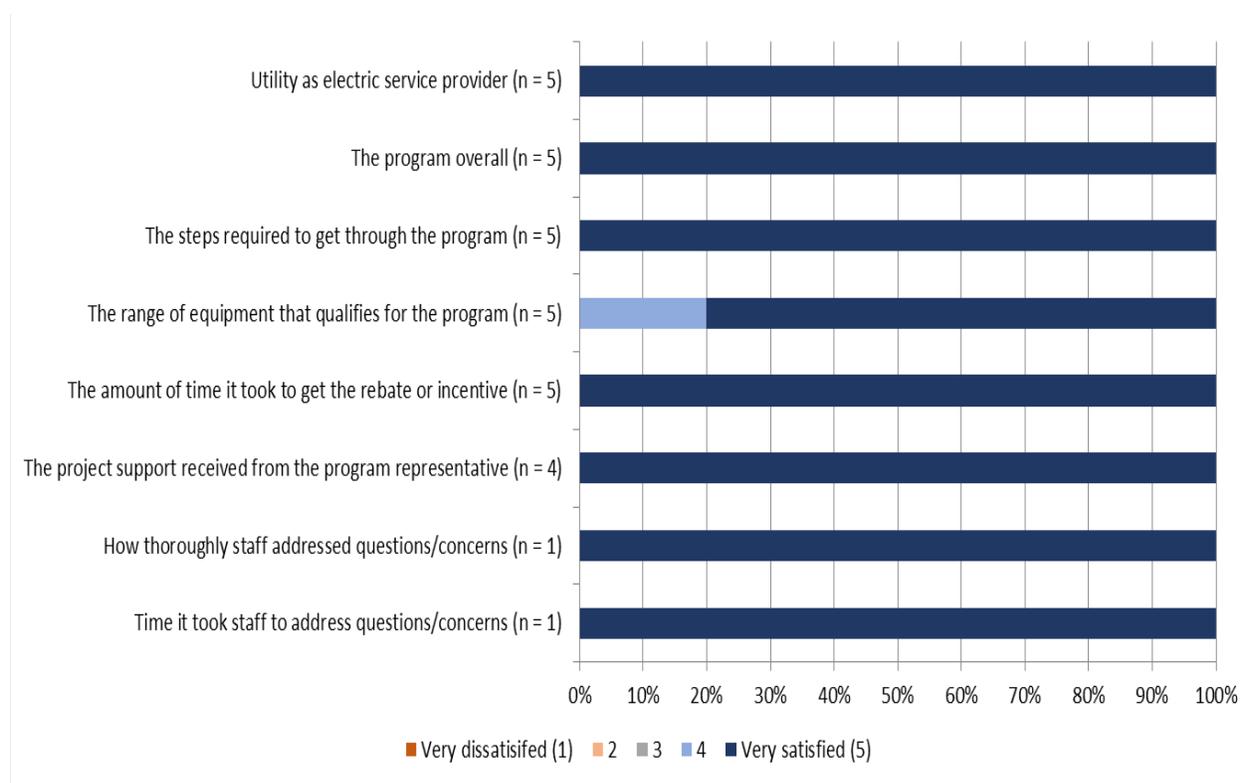


Figure 6-2 Participant Satisfaction Scores

Eighty percent of survey respondents said program participation increased their satisfaction with the utility, while 20% reported no change in satisfaction.

Table 6-16 Effect of Program Participation on Satisfaction with Utility

<i>Effect of participation in the Utility's Program?</i>	<i>% of Respondents (n = 5)</i>
Greatly increased your satisfaction with the Utility	60%
Somewhat increased your satisfaction with the Utility	20%
Did not affect your satisfaction with the Utility	20%
Somewhat decreased your satisfaction with the Utility	0%
Greatly decreased your satisfaction with the Utility	0%

6.4.4.5 Participating Contractor Interviews

One contractor was interviewed about his or her experience with the program. The respondent specializes in energy efficient lighting, and does not specialize in providing services to a specific business type.

6.4.4.5.1 Motivations for Participating

The contractor reported becoming aware of the C&I Program through a customer.

The factors that influenced his or her decision to participate in the program was the fact that it was good for the economy, good for the customer, and because it was expensive for the customer to make energy efficiency improvements.

6.4.4.5.2 Program Marketing

When asked whether their company or the customer first brings up the program, the contractor stated that other than the customer that made them aware of the program, no other customers brought up the program. However, the contractor noted that most customers are generally aware of the program.

The contractor reported actively marketing the program through their Facebook page and their company website. The contractor stated that they promote the program to both existing and potential customers.

The contractor did not note anyways that the program could help them promote the program more effectively.

6.4.4.5.3 Customer Awareness and Barriers to Participation

The respondent stated that they had not encountered customers that raised initial concerns about the program once it was explained to them.

The main reason the respondent reported that customers do not follow through with a project is because the incentive does not cover enough of the costs for them to participate.

The respondent stated that they thought the measures offered through the program met their large business customer's needs. The contractor stated that there were no program requirements that prevented certain types of businesses from participating.

When asked about the financial incentives, the contractor stated that they financial incentives were sufficient, but they wished they were higher.

6.4.4.5.4 Participation Process

The key documentation that the contractor collected during the initial assessment was a copy of the business's energy bill, sales slips, and photographs of the existing equipment. The respondent stated that the customer generally fills out the application form. When asked if they had any recommendations on how to improve the application process, the respondent did not have any suggestions, stating that they had no problems with it.

6.4.4.5.5 Training and Staff Support

The respondent stated that they had attended program related training. The contractor stated that the training "included everything that was required" to understand the program.

The contractor reported receiving written documents that explained the program procedures and requirements, and stated that the materials met their needs for understanding the program, and had no suggestions for improving them.

The respondent stated that CLEAResult was “really good to work with,” and helped them with anything they needed.

6.4.4.5.6 Program Influence on Business

The contractor stated that as a result of SWEPCO’s program, their business began pushing lighting upgrades, and had expanded its business.

The contractors reported that they did not increase staffing as a result of the program.

6.4.4.5.7 Overall Satisfaction

The contractor was asked a series of questions rating various aspects of the program using a 0-10 scale, where zero meant very dissatisfied, and ten meant very satisfied.

The respondent rated the program very highly, giving a rating the application process, the range of measures, the service from utility staff, and the overall program as a 10.

The respondent gave a score of eight to the wait time to receive the rebate and the incentive levels.

6.5 Conclusions and Recommendations

6.5.1 Conclusions

6.5.1.1 Program Design and Participation Process

- Incentives are based on energy savings. The program appropriately offers higher incentives for HVAC projects of \$0.15 per kWh that typically have longer payback periods. Lighting incentives are \$0.10 kWh. Incentives of \$0.08 per kWh saved are offered for other custom projects.
- The interviewed contractor did not have suggestions for improving the application process and indicating that training provided by the program and written materials met their needs.
- All participants reported satisfaction with the steps required to participate, the equipment covered, the time to receive the rebate, and the project support received from a program representative. One respondent reported contacting a program representative with a question or concern and was satisfied with the response received.
- All participants reported the incentive amount was what they were expecting to receive. Most customers reported that it took two to four weeks to receive the incentive, but one customer reported that it took seven to eight weeks.

6.5.1.2 Program Marketing and Outreach

- Although the program opted to limit expenditures on program marketing, the program did not have difficulty achieving its energy saving goal. The primary means of marketing the program included: working with SWEPCO account managers, the program website, using the energy assessments to promote efficiency improvements, and using contractors to promote the program.
- The interviewed contractor reported promoting the program to customers and expanding energy efficient lighting offerings.
- Participant survey respondents reported that internet searches, contractors, and program representatives were the most common sources of program awareness.

6.5.1.3 Quality Control and Verification Processes

- The program has robust quality control and verification procedures in place. These include pre-installation and post-installation site visits for all projects, engineering review of all projects, and a review of all projects by at least two staff members.

6.5.1.4 Contractor and Participant Satisfaction

- The interviewed contractor was satisfied with the program and did not offer suggestions for improving it.
- All participants were very satisfied with the program overall. Eighty percent reported that participation increased their satisfaction with SWEPCO and none indicated that it decreased their satisfaction with the utility.

6.5.2 Recommendations

- **The program manual should clarify whether or not the HVAC/non-lighting incentive amounts apply to non-HVAC projects as well and how these differ from custom measures.** The one page program overview suggests three incentive amounts are provided for lighting, HVAC projects, and custom projects.
- **Update calculators to reflect EISA guidelines.** The baseline values need to account for the Energy Independence and Security Act (EISA) baseline values as the remaining useful life of incandescent lighting is too short to use as the baseline for the life cycle savings of a lighting retrofit.
- **Make the direct install measures listed in the program manual consistent with those listed on the program website.** The direct install measures listed in the program manual differ from those listed on the program website (which includes CFLs).
- **Use of the “Undetermined” space heating type.** Many trade allies defaulted to using the “Undetermined” space heating value, which has an Energy Interactive Factor of .98, including outdoor spaces.

- **Non-operational fixtures should be removed from baseline calculations.**
The program manual states that all existing equipment must be operational. Evaluators found 41% non-operational baseline fixtures on one sampled site, however ex ante calculations did not account for this. Error-checking within the calculator needs to be examined.

7. Appendix A: Cost-Effectiveness Testing

This appendix provides an overview of each programs' participation, verified reduction in peak load, verified kWh savings, annual admin costs, total program costs, as well as a summary of the cost effectiveness analysis.

7.1 Cost Effectiveness Summary

This appendix covers all verified electricity and peak demand savings, and associated program costs incurred in the implementation of SWEPCO's PY1 energy efficiency and demand response portfolio from November 1, 2014 through October 1, 2015.

The cost-effectiveness of SWEPCO's PY1 programs was calculated based on reported total spending, verified energy savings, and verified demand reduction for each of the energy efficiency programs. All spending estimates were provided by SWEPCO. The methods used to calculate cost-effectiveness are informed by the California Standard Practice Manual.³³

The demand reduction (kW) and energy savings (kWh) presented throughout this appendix represent savings at the generator by adjusting for line losses. Verified savings estimates at the meter were adjusted to account for line losses using a line loss adjustment factor of 7.85% for energy and 8.65% for demand.

In order to calculate the cost-effectiveness of each program, measure lives were assigned on a measure-by-measure basis. When available, measure life values came from the *Arkansas Technical Reference Manual (TRM)*³⁴. Additionally, assumptions regarding incremental/full measure costs were necessary. These costs were taken from the approved SWEPCO program plan.

Table 7-1 lists each program included in this analysis, along with the final verified savings estimates, total expenditures, Utility Cost Test (UCT)³⁵ results, and Total Resource Cost Test (TRC) results. Impacts shown in Table 7-1 are at-generator, reflecting losses as described above.

Based on verified program impacts and spending during PY1, SWEPCO's overall portfolio is cost-effective based on both the UCT and TRC.

³³ California Standard Practice Manual: Economic Analysis of Demand Side Management Programs, October 2001. Available at: http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf

³⁴ <http://www.apscservices.info/EEInfo/TRM.pdf>

³⁵ The UCT is also referred to as the Program Administrator Cost Test (PACT).

Table 7-1 Cost-Effectiveness by Program, PY1

<i>Program</i>	<i>Verified Peak Demand Reduction (kW)</i>	<i>Verified Annual Energy Savings (kWh)</i>	<i>Total Non-Incentive Expenditures</i>	<i>Total Incentives</i>	<i>TRC (b/c ratio)</i>	<i>UCT (b/c ratio)</i>
Residential Solutions	610.11	2,533,74	\$492,555	\$362,219	2.05	2.91
Income Qualified	129.87	419,452	\$157,999	\$107,551	1.72	1.79
Small Business Solutions	315.67	1,246,60	\$193,402	\$190,708	2.18	2.31
Large Commercial & Industrial	288.36	2,929,45	\$260,530	\$229,902	1.80	3.06
Total	1,344.02	7,129,25	\$1,104,486	\$890,380	1.96	2.68

7.2 Program Level Results

SWEPSCO's energy efficiency portfolio in PY1 consisted of four programs with a verified peak demand reduction of 1,344.02 kW and verified net annual energy savings of 7,129,259 kWh (before accounting for line losses). Total spending in PY1 equaled \$1,994,886. Table 7-2 provides a summary of program participation and verified net impacts for each of the energy efficiency programs. Table 7-2 provides a summary of program costs in PY1.

Table 7-2 Energy Efficiency Programs – Verified Impacts

<i>Program</i>	<i>Verified Peak Demand Reduction (kW)</i>	<i>Verified Annual Energy Savings (kWh)</i>
Residential Solutions	610.11	2,533,743
Income Qualified	129.87	419,452
Small Business Solutions	315.67	1,246,605
Large Commercial & Industrial	288.36	2,929,459
Total	1,344.02	7,129,259

Table 7-3 Energy Efficiency Programs – Reported Costs

<i>Program</i>	<i>Total Non-Incentive Expenditures</i>	<i>Total Incentives</i>
Residential Solutions	\$492,555	\$362,219
Income Qualified	\$157,999	\$107,551
Small Business Solutions	\$193,402	\$190,708
Large Commercial & Industrial	\$260,530	\$229,902
Total	\$1,104,486	\$890,380

In the tables that follow, total costs and benefits, and cost-effectiveness test results are provided for each energy efficiency program in the PY1 portfolio.

Table 7-4 Residential Solutions Benefit/Cost

<i>Metric</i>	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Participant Cost Test
Benefit/Cost Ratio	2.91	2.05	.58	4.14
Total Benefits	\$2,486,348	\$2,486,348	\$2,486,348	\$2,982,748
Total Costs	\$854,774	\$1,213,445	\$4,287,540	\$720,890

Table 7-5 Income Qualified Benefit/Cost Tests

<i>Metric</i>	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Participant Cost Test
Benefit/Cost Ratio	1.79	1.72	.58	4.73
Total Benefits	\$476,182	\$476,182	\$476,182	\$562,551
Total Costs	\$265,550	\$276,896	\$817,000	\$118,897

Table 7-6 Small Business Benefit/Cost Tests

<i>Metric</i>	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Participant Cost Test
Benefit/Cost Ratio	2.31	2.18	.64	5.07
Total Benefits	\$889,109	\$889,109	\$889,109	\$1,084,789
Total Costs	\$384,110	\$407,184	\$1,390,137	\$213,782

Table 7-7 Large Commercial & Industrial Benefit/Cost

<i>Metric</i>	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Participant Cost Test
Benefit/Cost Ratio	3.06	1.80	.48	3.55
Total Benefits	\$1,501,245	\$1,501,245	\$1,501,245	\$2,039,124
Total Costs	\$490,432	\$835,285	\$3,142,130	\$574,755

Table 7-8 Overall Portfolio Benefit/Cost

<i>Metric</i>	Utility Cost Test	Total Resource Cost Test	Ratepayer Impact Measure	Participant Cost Test
Benefit/Cost Ratio	2.68	1.96	0.56	4.10
Total Benefits	\$5,352,884	\$5,352,884	\$5,352,884	\$6,669,212
Total Costs	\$1,994,866	\$2,732,810	\$9,636,807	\$1,628,324