



Entergy New Orleans, Inc.
1600 Perdido Street, Bldg #505
New Orleans, LA 70112
Tel 504 670 3680
Fax 504 670 3615

Gary Huntley
Vice President,
Regulatory and Governmental Affairs
ghuntle@entergy.com

June 21, 2013

Via Hand Delivery

Honorable Lora W. Johnson
Clerk of Council
Council of the City of New Orleans
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

Re: *Energy Smart Plan Year 2 Annual Report filing by Entergy New Orleans, Inc. (Docket No. UD-08-02)*

Dear Ms. Johnson:

Pursuant to paragraph 46(a) of the 2009 Agreement in Principle adopted by the Council of the City of New Orleans ("Council") Resolution R-09-136, Entergy New Orleans, Inc. ("ENO") submits this Annual Report for the Energy Smart Plan for the period April 2012 to March 2013. This report also contains the Energy Smart Algiers Quarterly Update. We respectfully request that you file the original and two copies into the record, and return to us a date-stamped copy. Should you have any questions regarding this filing, please contact my office at (504) 670-3680.

Sincerely,

A handwritten signature in black ink that reads "Gary Huntley". The signature is stylized with a large, sweeping "G" and "H".

Gary Huntley

cc: All Councilmembers
 Official Service List UD-08-02



ENERGY SMART PROGRAM YEAR 2

April 2012 - March 2013

Prepared for:

Entergy New Orleans
1600 Perdido St.,
New Orleans, LA 70112

June 18th, 2013



Energy Smart is a comprehensive energy-efficiency plan developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

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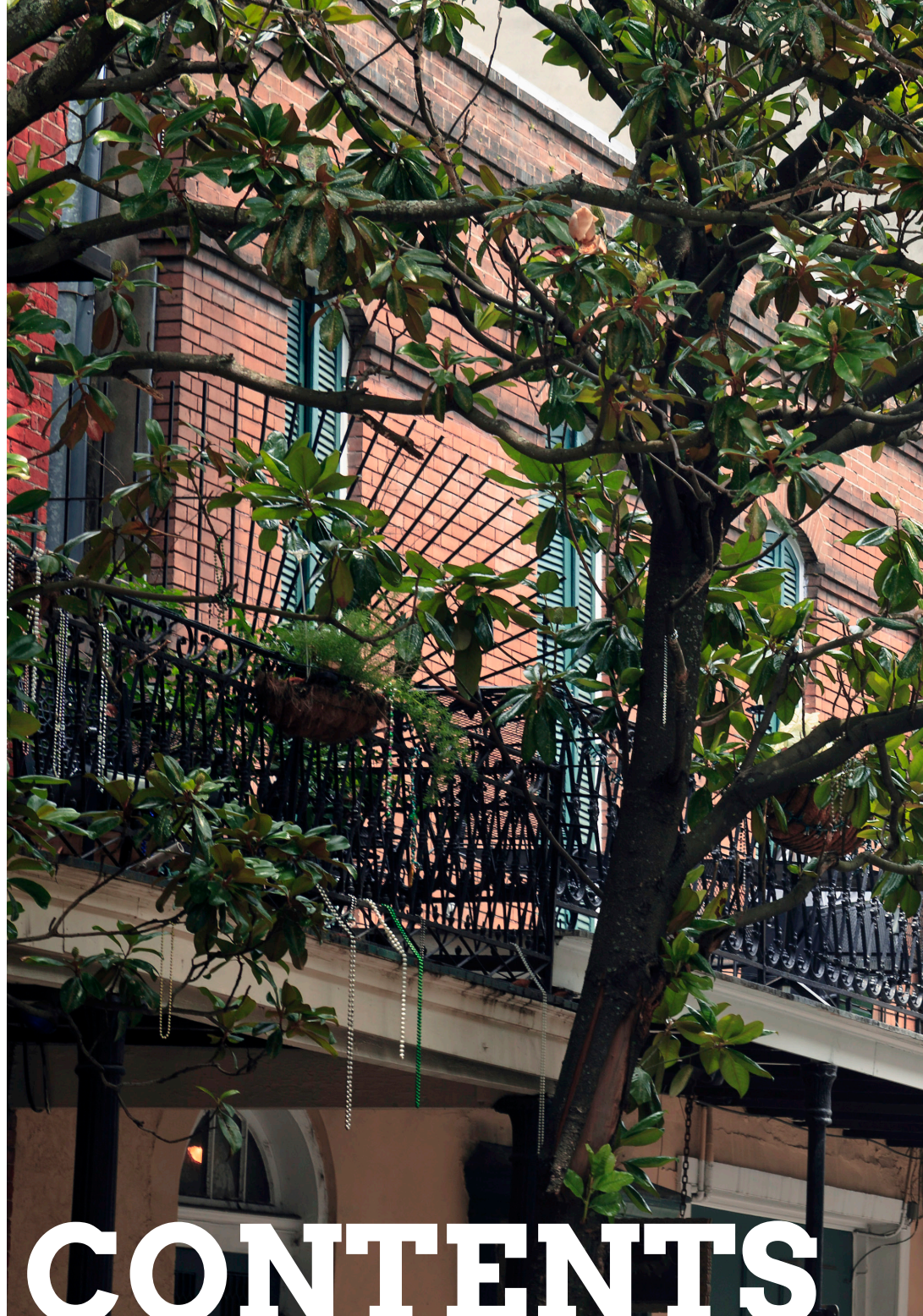
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"To be engaged in some small way in the revival of one of the great cities of the world is to live a meaningful existence by default." — Chris Rose



Executive Summary

Energy Smart was developed by the New Orleans City Council, is administered by Entergy New Orleans and implemented by CLEAResult. Since Energy Smart's launch in 2011, it has helped more than 17,000 New Orleans households and businesses become more energy efficient while saving money and increasing comfort.

Now in its second year, Energy Smart has continued providing New Orleans residents with a suite of options to help them make energy efficiency upgrades in their homes and businesses. Once again, Energy Smart has exceeded its savings goals by saving over 20 million kilowatt hours, or kWh, from April 2012 to March 2013.

Over the last two years, the Energy Smart program has worked to build and grow the energy efficiency market in New Orleans. Energy Smart established itself in the marketplace in its first year by recruiting and training contractors. These contractors used this training, combined with Energy Smart incentives, to offer homeowners, renters and businesses attractive options for making energy efficiency upgrades.

As Energy Smart continued to grow in its second year, it was able to leverage a developing energy efficiency market in order to make informed decisions and drive its success. While continuing to attract new contractors, Energy Smart established regularly scheduled meetings and trainings to enhance communication and propel market penetration. These meetings and trainings created a space for

open dialogue between program contractors and Energy Smart; meeting topics included continuing education on industry best practices, new program developments and structural changes.

Several key milestones in Program Year 2 helped to develop Energy Smart's breadth and identity in New Orleans. In the summer of 2012, Energy Smart became a Home Performance with ENERGY STAR® Partner. The advantages of the national presence and brand recognition of ENERGY STAR has helped the residential element of Energy Smart to exceed expectations. In October of 2012, the Energy Smart program crossed the Mississippi River to start offering services to Entergy Louisiana customers located in Algiers. With this expansion, the Energy Smart program brought energy efficiency services to every resident and business owner in Orleans Parish. Now entering its 9th month of an 18 month program (from October 2012 to March 2014) Energy Smart has already reached 55% of its target goal and is on track to reach all of its goals by the completion.

Energy Smart promoted its name in New Orleans through targeted advertising campaigns and outreach events. Radio ads, mailers, door hangers, robocalls and bill stuffers were employed to help Energy Smart grow its brand recognition in New Orleans. Further details regarding Energy Smart's marketing and outreach are provided later in this report.

Program Year 2 Savings and Budget Snapshot*

	Target	Actual	% of Goal
Electric Savings (kWh)	16,681,090	20,572,422	124.07%
Incentive Budget	\$1,851,000	\$1,730,691	94%

*Savings are from Entergy New Orleans and exclude Algiers

Since the kWh savings goals for Program Year 2 were approved prior to the beginning of Program Year 1, they could not take into account actual results from Program Year 1. This is evidenced in the ENERGY STAR A/C, A/C Tune-Up, and New Homes programs, which fell short of Program Year 1 goals yet still saw an increase in kWh savings goals for Program Year 2. As such, the lower kWh savings percentage for some programs is misleading. Though these programs again fell short of the yearly goal, they all outperformed Program Year 1 results.

Results in the Home Performance with ENERGY STAR program and the Hard to Reach program were boosted by several multifamily projects. Similarly, results in the Large Commercial program were predominantly driven by two large custom projects.





Annual Report Overview

This report will cover all Energy Smart activity from April 2012 through March 2013. It will examine each of the nine programs implemented by Energy Smart during that year-long period, providing in-depth summaries of:

- Home Performance with ENERGY STAR
- ENERGY STAR Air Conditioner
- Air Conditioner Tune-Up
- New Homes
- Hard to Reach
- Solar Hot Water Heater
- Compact Fluorescent Direct Install
- Small Commercial
- Large Commercial
- Pilot Programs

In addition to these programs, Energy Smart developed further options to reach a broader range of New Orleanians. Reaching over 4,000 residents in the first two years, the Multifamily Direct Install initiative has been a great success in providing energy efficiency services to renters living in large apartment complexes. Energy Smart worked with a number of partners including City Hall, Entergy and Tulane University to bring compact fluorescent light bulbs and energy-saving advanced power strips to the tenants of large apartment buildings through several “giveaway” events held in March 2013.

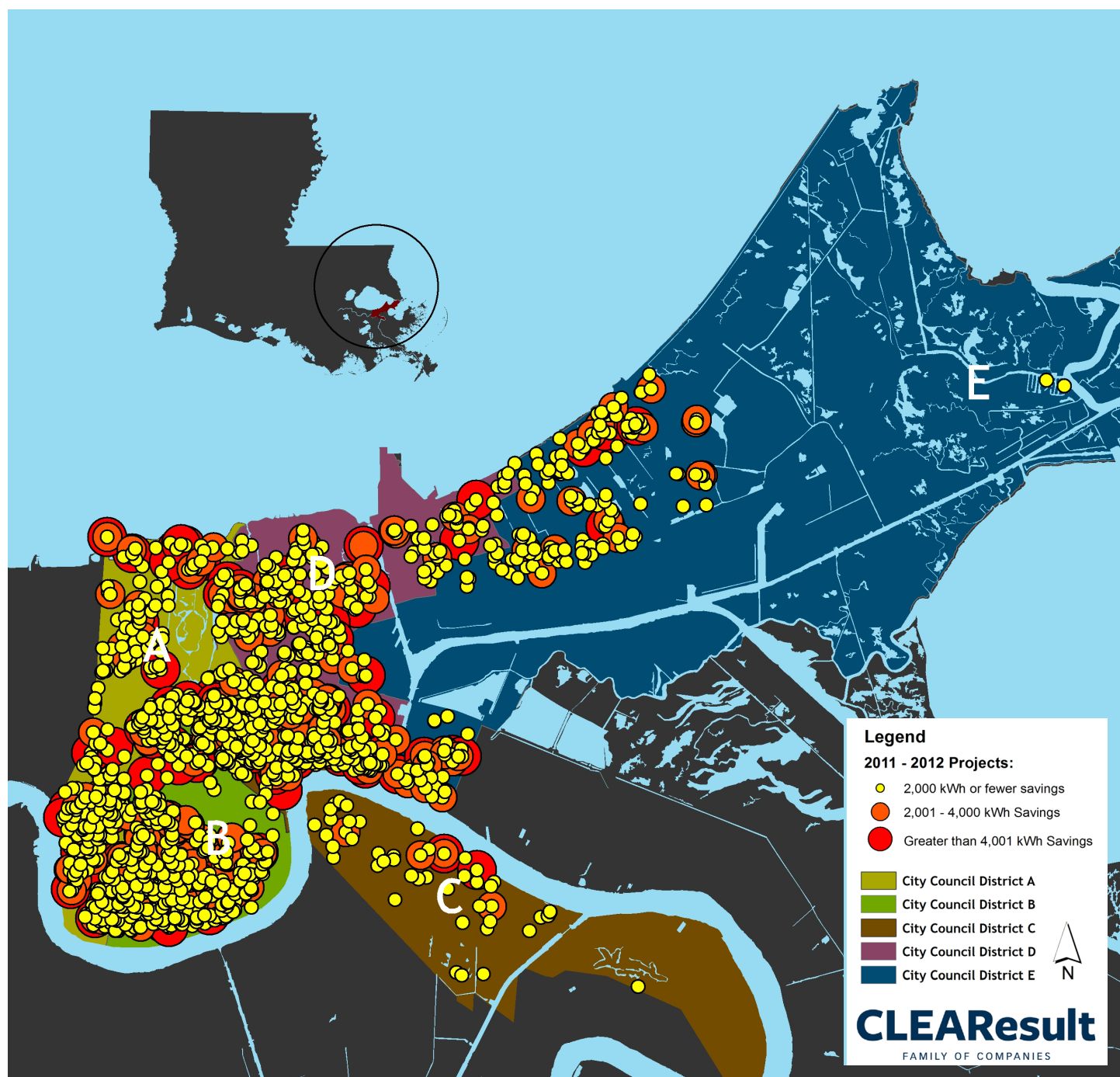
The report also includes:

- Marketing overview and sample material
- Overview of outreach activities coordinated by Bright Moments PR firm
- Review of customer satisfaction surveys gathered by New Orleans company GCR Inc.
- Yearly evaluation of energy savings and program operations by third party evaluation company Optimal Energy
- A look forward to Program Year 3



Project Map

Entergy New Orleans and Entergy Louisiana - Algiers Projects





Program Year 2 Participation and Savings

		Year 2 Savings Goals		Year 2 Total					% Completed Program YTD	
Program Name	Market Focus	kW	kWh	kW	kWh	CO2 Reduction (lbs)	# of Participants	# of Measures	kW	kWh
Home Performance with ENERGY STAR	Residential	293	868,874	832	3,802,170	21,292,152	2,352	31,975	284.0%	437.6%
ENERGY STAR Air Conditioner	Residential	347	1,178,169	85	221,332	1,239,459	402	493	24.5%	18.8%
Air Conditioner Tune-up	Residential	648	1,176,985	224	442,136	2,475,962	958	1,048	34.6%	37.6%
New Homes	Residential	492	2,308,671	144	587,251	3,288,606	216	548	29.3%	25.4%
CFL Direct Install	Residential	660	4,565,349	232	2,654,751	14,866,606	3,445	61,984	35.2%	58.2%
Hard to Reach	Residential	30	122,250	152	900,230	5,041,288	692	11,847	506.7%	736.4%
Solar Hot Water Heater	Residential	NA	NA	0	0	0	0	0	0.0%	0.0%
Small Commercial	Commercial	322	2,230,328	425	2,258,033	12,644,985	87	87	132.0%	101.2%
Large Commercial	Commercial	636	4,130,464	1,272	9,706,519	54,356,507	19	19	200.0%	235.0%
Totals		3,428	16,581,090	3,366	20,572,422	115,205,563	8,171	108,001	98.2%	124.0%



Program Year 1 Vs. Program Year 2

Savings & Expenditure Differences

Program Name	Participants		kW		kWh		Budget	
	Variance	% Variance	Variance	% Variance	Variance	% Variance	Variance	% Variance
Home Performance with ENERGY STAR	336	17%	209	34%	721,340	23%	\$108,187	30%
ENERGY STAR Air Conditioner	184	84%	36	73%	86,677	64%	\$18,620	71%
Air Conditioner Tune-Up	239	33%	1	0%	12,845	3%	-\$2,927	-4%
New Homes	115	114%	79	122%	380,184	184%	\$51,547	138%
CFL Direct Install	-1486	-30%	-372	-62%	-1,071,255	-29%	\$6,959	4%
Hard to Reach	247	56%	85	127%	480,373	114%	\$48,312	44%
Solar Hot Water Heater	-2	-100%	-1	-100%	-5,438	-100%	-\$1,848	-100%
Small Commercial	9	12%	-7	-2%	26,768	1%	-\$135	0%
Large Commercial	-5	-21%	377	42%	4,127,973	74%	-\$7,496	-2%
Totals	-363	-4%	407	14%	4,759,467	30%	\$221,219	15%



ENERGY SMART

RESOLUTION RECOMMENDATIONS

Requirements

On October 18, 2012, the New Orleans City Council Utility Committee issued Resolution R-12-393, recommending changes to the way in which Energy Smart reports and evaluates data. These recommendations of the Council Utility Committee were made after reviewing the first annual Energy Smart report and the program evaluation prepared by third party evaluator Optimal Energy.

In the Energy Smart quarterly report filed on January 28, 2013, each of these recommendations were addressed with specific responses. The responses included in this report contain some of this information, along with plans for the ways in which these recommendations will be implemented in Program Year 3.

Both the recommendations made by the Utility Committee Advisors and the actions taken by CLEAResult to implement the recommended changes are listed below.

Recommendation 1

Identify more non-lighting projects with the goal of significantly increasing savings for the Small and Large Commercial Programs.

Action taken by Energy Smart:

Energy Smart has created marketing material specifically aimed at driving non-lighting measure participation in Small and Large Commercial programs. Examples of these materials are included in the marketing section of this report and include: variable speed drives, occupancy sensors

for HVAC controls, vending machine controllers, chiller replacements, pre-rinse spray valves and electronically commutated motors specifically for refrigeration. Fifty eight percent of Large Commercial energy savings in Program Year 2 was from non-lighting measures.

Most of the commercial projects utilizing Energy Smart incentives have been lighting projects. This is due to the high level of savings and rapid paybacks associated with these measures. While Energy Smart will increase its efforts to attract non-lighting projects, it is important to note that, unlike residential usage, lighting can represent a large majority of energy savings for many commercial customers. Entergy New Orleans recently filed Integrated Resource Plan shows that 44 percent of long-term savings opportunities for commercial customers come from lighting measures, versus 25 percent for space heating and cooling.

Recommendation 2

In all future reporting, include documentation verifying that recommendations of the Independent Evaluator have been implemented, specifically:

- **Capturing all 2012 projects in a new database**
- **Confirmation of specific changes to deemed savings calculations**

Action taken by Energy Smart:

- In 2012, Energy Smart transitioned from capturing project information in several databases to utilizing a single Microsoft Dynamics CRM database.



- This report contains specific examples of the ways in which Energy Smart will institute recommendations made by Optimal Energy.
- All original and changed deemed savings tables are included as an appendix to this report.

Recommendation 3

Submit updated supporting documentation for the Program Year 2 goal, based on analyses of energy efficiency kWh reductions from GCR, Inc. and other more current appliance loads and customer demographic information.

Action taken by Energy Smart:

On February 11, 2013, Energy Smart filed a forecast of energy efficiency kWh reductions for Program Year 3 with the New Orleans City Council.

Recommendation 4

Provide a detailed presentation of the marketing strategies to increase participation in programs that failed to meet the initial program goals and that continue to underperform after the first 4 months of Program Year 2.

Action taken by Energy Smart:

All marketing strategies for underperforming programs are specifically addressed in this report. Energy Smart has identified additional strategies for driving participation in underperforming programs, which are detailed in the summaries of each of these programs. It is worth noting that the ENERGY STAR Air Conditioning Program and the New Homes Program significantly improved their results in Program Year 2.

Recommendation 5

In all future Energy Smart reports, less focus should be placed on review of project files and more focus should be placed on:

- **Evaluation of net savings as opposed to gross savings**
- **Onsite verification to ensure that projects are being installed to the correct specification**
- **Onsite light logging to ensure deemed savings hours of operations accurately reflect actual hours of operation**
- **An evaluation looking at how to improve processes and procedures, as opposed to impacts**
- **Review of specific parameters in the deemed savings document that are perceived to have high uncertainty**

Action taken by Energy Smart:

- Energy Smart had Optimal Energy prepare a review of net-to-gross savings, which is included as an appendix to this report.
- Energy Smart's quality assurance team regularly performs onsite verification to ensure proper installation.
- Based on the feedback provided by Optimal for Program Year 2 processes, Energy Smart is preparing a methodical approach with the CLEARResult planning and evaluation team to improve processes.
- CLEARResult engineering staff has reviewed and provided recommendations for deemed savings changes. These reviews are included as an appendix in this report.

Recommendation 6

Projections showing the use of Energy Smart funds by program and anticipated expenditures through the end of Program Year 3.

Action taken by Energy Smart:

The Program Year 3 forecast filed on February 11, 2013, included information on both kWh savings and anticipated expenditures by program.

Recommendation 7

Provide the Council with documentation showing specific activities and resources that CLEAResult and Entergy New Orleans used to coordinate the ENO and ELL-Algiers Energy Smart Programs.

Action taken by Energy Smart:

With the exception of reporting, and some additional marketing efforts specific to Algiers, Energy Smart is administered and executed as one program.





PROGRAMS

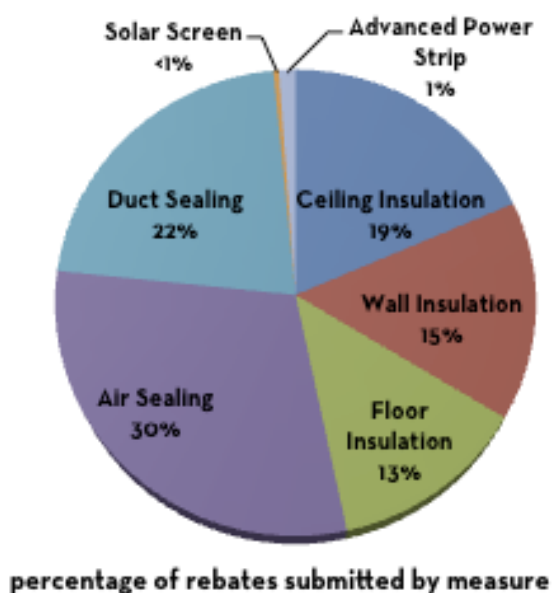
OF ENERGY SMART

Home Performance with ENERGY STAR

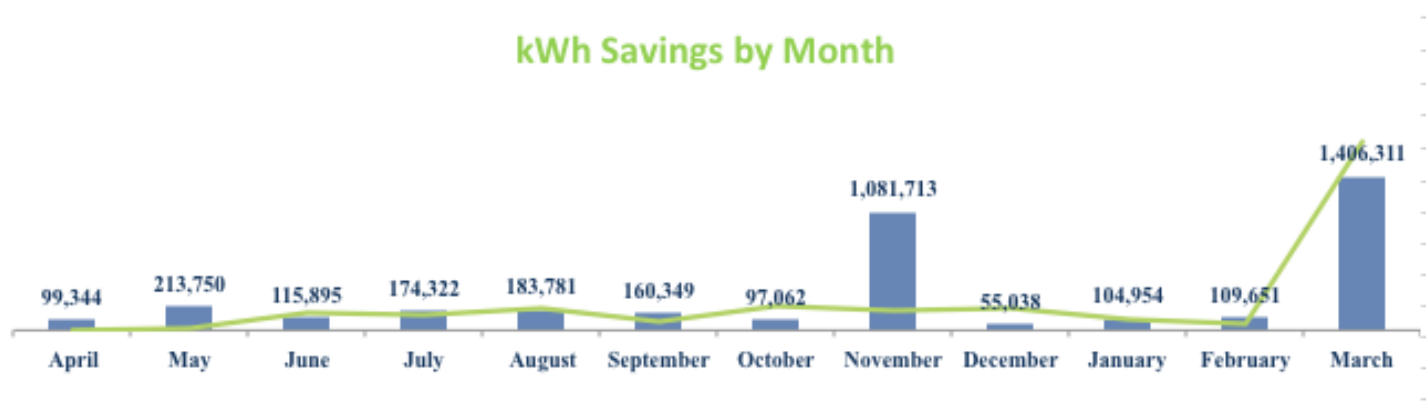
The Residential Solutions program officially became a part of the national Home Performance with ENERGY STAR program in the summer of 2012. Stressing the importance of the “whole home” concept of single-family residential energy efficiency, this program utilizes an energy assessment in order to help homeowners make the best-informed decisions on which measures will add the most energy savings and comfort to their homes.

As shown in the graphic, there are a number of measures for which Energy Smart offers rebates. The most rebates offered through the Home Performance with ENERGY STAR program were for air infiltration reduction and duct sealing. Since many homes already have some insulation in the attic, the energy assessment helps to educate homeowners on their other energy efficiency options, such as air infiltration reduction and duct sealing. This is especially useful as many New Orleans homes were originally built to “breathe” without taking into account the need to balance energy conservation with comfort.

	Target	Actual	% of Goal
Energy Savings (kWh)	868,874	3,802,170	437.6%
Incentive Budget	\$246,000	\$464,767	189%



kWh Savings by Month



In addition to single-family residences, Energy Smart implemented two other programs to drive residential energy efficiency through the Home Performance with ENERGY STAR program:

- Energy Smart conducted installation of energy and cost saving compact fluorescent light bulbs, or CFLs, showerheads and faucet aerators in multifamily apartment complexes across the city. Reaching 1,531 “market rate” units allowed the Energy Smart program to provide an extremely cost-effective service to renters in New Orleans.
- In March 2013, Energy Smart conducted “giveaway” events at City Hall, Entergy’s corporate offices and Tulane University, at which residents of Orleans Parish were given 8 CFLs each along with energy-saving Advanced Power Strips. These events allowed Energy Smart to inform recipients about all of the programs it offers, while giving them a fast and effective way to implement energy savings in their homes.

HAVING REACHED **438 PERCENT** OF ITS GOAL BY SAVING **3,802,170 KWH**, THE HOME PERFORMANCE WITH ENERGY STAR PROGRAM WILL CONTINUE USING THE METHODS IT HAS ALREADY EFFECTIVELY IMPLEMENTED DURING THE FIRST TWO YEARS OF THE PROGRAM.



Compact Fluorescent Light Bulb Direct Install

The Compact Fluorescent Light (CFL) Bulb Direct Install program is implemented in partnership with Green Light New Orleans, or GLNO, a program that utilizes a network of volunteers to install CFLs directly into homes throughout New Orleans. In Program Year 2 alone, GLNO was able to reach 3,445 New Orleans households and install over 60,000 CFLs.

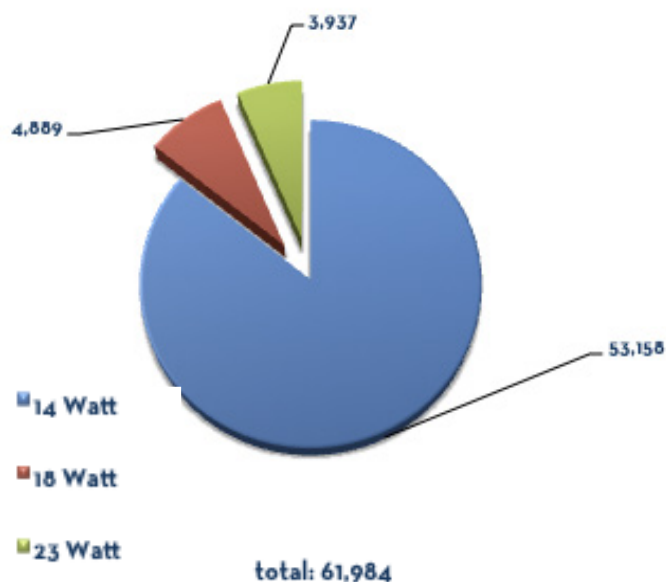
Through this effort, the CFL Direct Install program delivered 2.6 million kWh in savings, which, due to several factors detailed below, was shy of its savings goal of 4.5 million kWh.

While GLNO successfully employed a large network of local and national volunteers to install CFLs in homes, this program came at a greater cost and with less energy savings than anticipated. This is partially due to the ever tightening federal lighting standards, because of which the savings per CFL will continue to diminish. This, combined with the rising cost of CFLs, results in more expensive CFLs delivering less energy savings.

Hurricane Sandy hit the east coast in the fall of 2012, focusing national volunteer efforts on the relief effort there. This had an impact on the number of volunteers GLNO was able to utilize during that time, thereby lowering the number of CFLs that GLNO was able to install.

	Target	Actual	% of Goal
Energy Savings (kWh)	4,565,349	2,654,751	58.2%
Incentive Budget	\$123,000	\$175,970	143%

CFLs Installed



kWh Savings by Month



In order to drive as much volunteer and homeowner participation in the last quarter of Program Year 2, Energy Smart worked with GLNO to launch the “March on Climate Change” initiative. As a part of this effort, GLNO reached out to local businesses to request that they offer gift cards in exchange for volunteer services. Energy Smart assisted by offering a matching sum (up to \$10 per gift card) to help cover the cost. Volunteers received these cards in gratitude for the free service that they provided in support of the program.

In Program Year 3, GLNO will continue to install CFLs at no cost to New Orleans residents. In order to maximize participation and savings, GLNO is experimenting with installing small base and candleabra style bulbs. While these bulbs are slightly more expensive than regular base CFLs, they are important to our efforts in driving as much energy savings as possible. GLNO and Energy Smart will also actively pursue donations of CFLs from charities and corporations in order to bring down the cost of implementing the program.



ENERGY STAR Air Conditioner

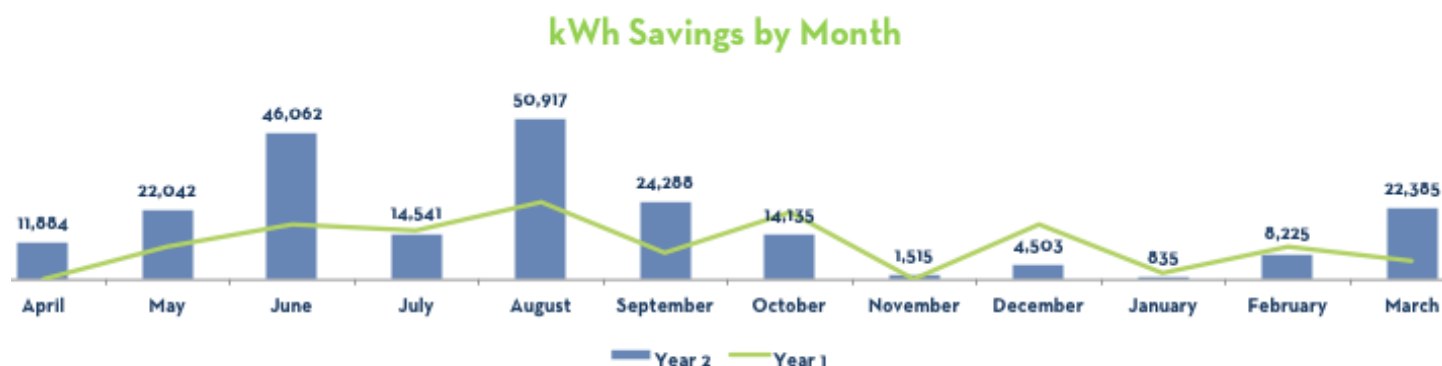
The ENERGY STAR Air Conditioner program offers incentives for both window and central air conditioning, or A/C, units. Energy savings are calculated based on the size of units and their comparison to equally sized but less efficient models. Participation is driven through relationships that Energy Smart has established with retailers offering ENERGY STAR products, such as Home Depot and Lowe's. Participation is also driven through the education of, and outreach to, central A/C installers.

Interest in new A/C units peaks in summer months. To make the most of this, Energy Smart performs two "window A/C trade-in" events per year at which New Orleans residents receive an in-store monetary incentive for both the purchase of a new A/C unit and the recycling of their old one. Energy Smart has worked to make these programs a success through advertising, retailer outreach and contractor outreach. Retailer relationships have provided some participation in summer

months; however, the boundaries of Orleans Parish, combined with the location of large retailers outside of the Parish, leaves Energy Smart with only a few stores in which to promote the ENERGY STAR Air Conditioner program.

Energy Smart has instituted regular meetings with A/C contractors to keep them engaged with the program and to provide a forum for dialogue in which we can creatively look for solutions to drive more participation.

	Target	Actual	% of Goal
Energy Savings (kWh)	1,178,169	221,332	18.8%
Incentive Budget	\$154,00	\$44,700	29%



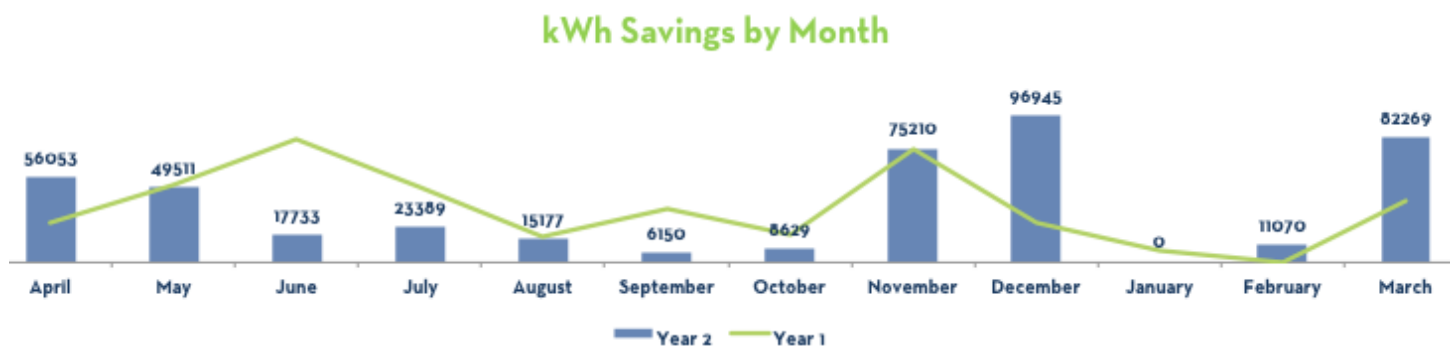
Air Conditioner Tune-Up

The Air Conditioner Tune-up program provides incentives for New Orleans households to have their central A/C system tuned up by a participating contractor. These tune-ups not only save energy for New Orleans renters and homeowners, but also extend the life of A/C units by keeping them properly maintained.

Key to the success of the program is making sure that A/C contractors find the incentive to be easily incorporated into their day-to-day business practice. In order to facilitate this, Energy Smart holds regular meetings to make sure contractors are familiar with the process and techniques necessary to effectively perform the A/C tune-up. By staying in close communication with the contractors, Energy Smart A/C technicians have established a rapport that has been imperative to finding ways to keep contractors engaged and representing the program. Reduction in paperwork requirements, while still ensuring all necessary documentation is collected and validated, has led to a higher volume of participation and interaction from these contractors in the Program Year 2.

Energy Smart also worked through the multifamily direct install program to identify apartment complexes that could take advantage of the A/C tune-up rebates. This work allows Energy Smart to continue driving participation in the program during the winter months when demand for single-family residence A/C tune-ups is not as high.

	Target	Actual	% of Goal
Energy Savings (kWh)	1,176,985	442,136	37.6%
Incentive Budget	\$154,00	\$70,143	46%



Hard to Reach

Through the Hard to Reach program, Energy Smart greatly exceeded Program Year 2 targets of reaching low-income renters and homeowners in New Orleans. Utilizing references from the In Home Display Pilot (a pilot program launched by Entergy to provide New Orleans residents with an easy way to track their in-home energy consumption), the Hard to Reach program was able to identify and provide needed home repair and energy efficiency upgrades for low-income renters and homeowners.

Another crucial piece to the success of the Hard to Reach program was driven by the Multifamily Direct Install program. Through this program, Energy Smart reached over 700 low-income rental households and retrofitted them with energy-saving CFLs, showerheads and faucet aerators.

In February 2013, Energy Smart piloted a new Hard to Reach program that worked directly with Home Performance with ENERGY STAR contractors to identify and qualify homes for the energy efficiency and weatherization upgrades. This new

methodology proved successful by helping Energy Smart reach 29 homes in five weeks. This program is transitioning out of the pilot phase and will be renamed the Assisted Home Performance with ENERGY STAR program. To maximize participation for low-income renters and homeowners, it will use the same methodology in Program Year 3, in tandem with the Multifamily Direct Install program.

	Target	Actual	% of Goal
Energy Savings (kWh)	122,250	900,230	736.4%
Incentive Budget	\$204,000	\$157,214	77%

kWh Savings by Month



Solar Hot Water Heater

Originally intended to be a one-year pilot, this program was launched in Year 1 of Energy Smart. The program initially saw low activity levels due to two factors. First, Energy Smart requires that a homeowner own the solar hot water heater. Since the structure of the Louisiana State tax credit for solar photovoltaic installations causes much of the solar installation activity to use a lease model for payment, this presented a significant barrier to adoption. Second, uncertainty over how the State

of Louisiana Department of Health and Hospitals would regulate backflow preventers on solar hot water heater systems slowed uptake.

Energy Smart has stayed in close contact with its network of installers, and based on their feedback and a change in the Louisiana Solar PV tax credit structure, expects that participation may increase in Program Year 3.

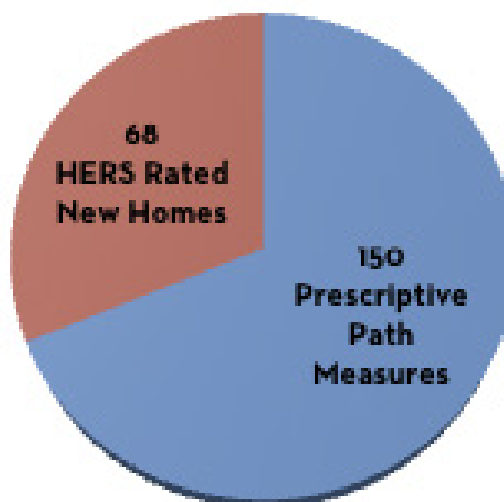


New Homes

Energy Smart's New Homes Program offers several ways in which new homes can receive rebates for installing energy efficiency measures. The "performance path" provides an incentive for new homes that utilize the Home Energy Rating System, or HERS, and achieve a predetermined score. The "prescriptive path" allows homebuilders to choose from a variety of energy efficiency materials to install in a new home and offers an incentive for each of those measures. In Program Year 2, Energy Smart paid incentives for 150 "prescriptive path" measures and for 68 homes with qualifying HERS scores.

Achieving 25 percent of its goal by saving 587,251 kWh, Energy Smart made the most of the New Homes Program due in large part to work in the Lafitte Redevelopment Project and Providence Community Housing Project. The New Homes program saw additional projects submitted by contracting companies who had taken part in Program Year 1. To help drive participation, Energy Smart maintained robust communication with the Home Builders Association of Greater New Orleans.

	Target	Actual	% of Goal
Energy Savings (kWh)	2,308,671	587,251	25.4%
Incentive Budget	\$168,000	\$88,835	53%



kWh Savings by Month

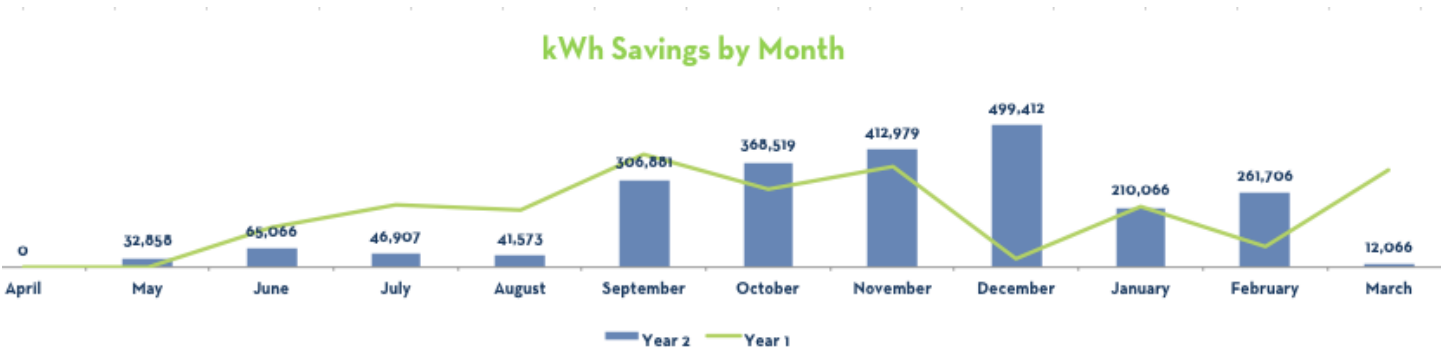


Small Commercial

The Small Commercial program landed right on target in Program Year 2 by hitting 101 percent of its goal. Offering an incentive of up to \$0.14 per kWh saved, the Small Commercial program serves businesses consuming an annual average of less than 100 kilowatts. The most popular measure in this program has continued to be the replacement of lighting in businesses across the city. The low cost-high return nature of lighting replacement is the major reason businesses choose to install lighting retrofits, as in many cases, lighting retrofits for small businesses will pay for themselves in under a year.

Energy Smart has continued to promote other energy savings methodologies through the program. Specifically targeting HVAC controls, occupancy sensors, spray valves for commercial dish washing systems and variable speed drive motors for refrigeration, Energy Smart created marketing materials at the beginning of 2013 to drive participation in restaurants, hotels, non-profits and churches. Outreach materials for these projects can be found in the marketing section of this report.

	Target	Actual	% of Goal
Energy Savings (kWh)	2,230,328	2,258,033	101.2%
Incentive Budget	\$274,000	\$278,041	101%

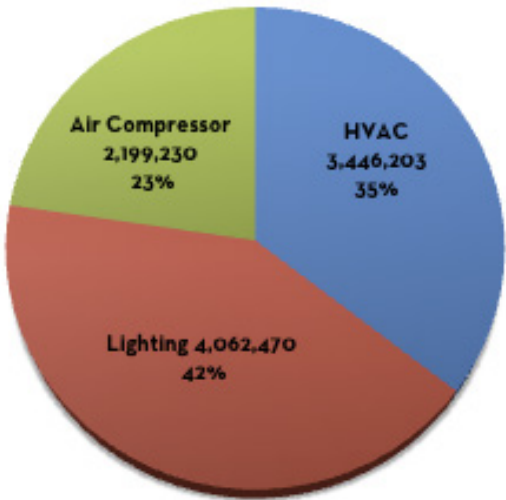


Large Commercial

The Large Commercial program serves New Orleans businesses that consume more than 100 kilowatts on average per year. Since large commercial businesses have a wide array of energy consumption needs, CLEAResult engineers provide Metric and Verification, or M&V, reports to businesses with specific energy consumption reduction needs. These M&V reports are used when a project cannot utilize Energy Smart program-deemed savings specifications to determine energy savings potential.

The Large Commercial program performed exceedingly well in Program Year 2, delivering over 230 percent of its savings goal, due in part to two different M&V projects that brought in over five million kWh in savings.

	Target	Actual	% of Goal
Energy Savings (kWh)	4,130,464	9,706,519	235.0%
Incentive Budget	\$458,000	\$451,022	98%



kWh savings by measure type

kWh Savings by Month



Energy Smart Pilot Programs Summary

Entergy New Orleans administered two one-year pilot programs as part of Energy Smart: the Solar-Monitoring Photovoltaic, or PV, pilot and the In-Home Display, or IHD, pilot.

The Solar-Monitoring PV pilot entailed a third-party study and report to outline PV performance and cost data in the New Orleans area.

The IHD pilot was a behavioral pilot to determine whether customers receiving real-time access to their energy usage and estimated monthly costs would be encouraged to make behavioral changes to lower their electricity usage.

There were no cash incentives associated with either of the pilot programs. There was a kWh savings goal associated with the IHD pilot but not with the Solar-Monitoring PV pilot. Each pilot began and concluded during Energy Smart's Program Year 2. Since the results of both pilots have not yet been finalized, any savings associated with the IHD pilot will be contributed to Program Year 3 savings.

The pilot study analysis and findings for both the Solar-Monitoring PV pilot and the IHD pilot are being compiled, with the final report set to be filed during the third quarter of 2013.

Energy Smart In-Home Display Pilot

The focus of the one-year New Orleans Energy Smart IHD pilot was to determine whether near real-time access to energy usage and estimated monthly electric costs would encourage electric customers to make behavioral changes to lower their electricity usage.

Through use of the new smart meter technology and an IHD monitoring device, customers were provided a tool to view their energy usage and secure estimated monthly electric cost on a near real-time basis.

Approximately 300 customers were targeted to participate in the pilot. Participants were limited to Entergy New Orleans electric customers living on East Bank of the city.

The one-year program was conducted from March 1, 2012, through March 1, 2013.

The approved funding allocated to the program was \$280,000. The current project cost-to-date is approximately \$240,000.

Pilot Program	Dates	Budget Allocation	Approximate Cost to Date
Solar-Monitoring Photovoltaic Pilot	4/1/2012-4/1/2013	\$100,000	\$98,000
Energy Smart In-Home Display Pilot	3/1/2012-3/1/2013	\$280,000	\$240,000

Solar-Monitoring Photovoltaic Pilot

The purpose of the New Orleans Energy Smart Solar-Monitoring PV pilot was to conduct a third-party study, analysis and report of PV performance and costs data in the New Orleans area. The Department of Energy's National Renewable Energy Laboratory, or NREL, was commissioned as the third-party entity.

The one-year pilot, conducted from April 1, 2012, through April 1, 2013, includes data monitoring and collection from 31 residential and three commercial installations.

The 31 residential installations were comprised of 12 locations from Make-It-Right, or MIR, housing

stock, and 19 from typical housing stock throughout the City of New Orleans. Locations selected to participate in the Solar-Monitoring PV pilot program were limited to Entergy New Orleans electric customers living on the East Bank of the city.

Energy Smart used a collaborative approach to outline the focus and framework of the study. Stakeholders participating in the discussions included representatives from Entergy New Orleans, NREL, MIR Solar and Gulf States Renewable Energy Industries Association, or GSREIA.

The approved funding allocated to the program was \$100,000. The current project cost-to-date is approximately \$98,000.





PARTICIPATING

ENERGY CONSULTANTS &
LOCAL CONTRACTORS



Where Can You Get More Information?
Energy Smart Information Center:
(866) 721-0249 or
www.EnergySmartNOLA.com



Participating Energy Consultants

Energy Smart Informational Assessments		
Riverview Construction	504-324-1810	www.riverviewccs.com
Rebirth Energy Solutions, LLC	504-684-4580	www.rebirthenergysolutions.com
Digital Living	504-390-9687	thanh.trang@digitallivingllc.com
E & I	504-231-3424	Roger@maxvalueins.com
Avak Consulting Services	504-617-0844	www.avakconsulting.com
Diversified Energy	504-258-5687	jeffhaag@cox.net
OWL Technologies, LLC	504-289-8766	www.owltechnologies.com
Mr. Green Jeans	504-861-4544	www.mrgreenj.com
HLN Energy Services	504-267-2037	www.hlnenergyservices.com
Wilserv, Inc	985-809-7962	www.wilserv.info
Retro-Fitz	504-250-9487	www.retro-fitz.com
Construction Specialists Group	504-261-0278	Constructionspclstgroup@yahoo.com
In-tech Insulation and Consulting	504-482-8850	www.intechinsulation.com
Project Homecoming	504-942-0444	www.projecthomecoming.net
Global Green, USA	504-525-2121	www.globalgreen.org
Colmex Construction	504-383-8092	colmexconstruction@gmail.com
Core USA	504-298-9556	info@coreusa.org
Greenwood Home Energy	504-800-0351	mwarden@lagreenwood.com
Brotherhood Way General Contractors LLC	504-287-4416	www.teambwc.com
Green Apple Foam Insulation	504-258-2464	www.greenapplefoam.com
Smart Energy Solutions	225-364-4767	www.mysmartenergysolutions.com
The Building Performance Center, LLC	504-261-0278	al@ecgnola.com
No Limit Energy Solutions, LLC	504-322-1536	www.nolimitenergysolutions.com
Green Grants	504-835-2510	www.greengrants.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com



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Walk-through Assessment PLUS Blower Door or Duct Leakage Test

Riverview Construction	504-324-1810	www.riverviewccs.com
Rebirth Energy Solutions, LLC	504-684-4580	www.rebirthenergysolutions.com
Digital Living	504-390-9687	www.thanh.trang@digitallivingllc.com
E & I	504-231-3424	www.Roger@maxvalueins.com
Mr. Green Jeans Insulation	504-861-4544	www.mrgreenj.com
Avak Consulting Services	504-617-0844	www.avakconsulting.com
Diversified Energy	504-258-5687	www.jeffhaag@cox.net
Greenwood Home Energy	504-800-0351	www.mwarden@lagreenwood.com
HLN Energy Services	504-267-2037	www.hlnenergyservices.com
Wilserv, Inc (Blower Door Test Only)	985-809-7962	www.wilserv.info
Retrofitz Insulation and Weatherization	504-250-9487	www.retro-fitz.com
Construction Specialists Group	504-261-0278	www.intechinsulation.com
In-tech Insulation and Consulting	504-482-8850	www.projecthomecoming.net
Project Homecoming	504-942-0444	www.globalgreen.org
Global Green, USA	504-525-2121	Constructionspclstgroup@yahoo.com
Green Apple Foam Insulation	504-258-2464	www.greenapplefoam.com
Core USA	504-298-9556	www.info@coreusa.org
Brotherhood Way General Contractors LLC	504-287-4416	www.teambwc.com
Colmex Construction	504-383-8092	colmexconstruction@gmail.com
Smart Energy Solutions	225-364-4767	www.mysmartenergysolutions.com
The Building Performance Center, LLC	504-261-0278	al@ecgnola.com
Green Grants	504-835-2510	www.greengrants.com
No Limit Energy Solutions, LLC	504-322-1536	www.nolimitenergysolutions.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com

Energy Smart HERS Test

Riverview Construction	504-324-1810	www.riverviewccs.com
Rebirth Energy Solutions, LLC	504-684-4580	www.rebirthenergysolutions.com
Digital Living	504-390-9687	thanh.trang@digitallivingllc.com
E & I	504-231-3424	Roger@maxvalueins.com
Avak Consulting Services	504-617-0844	www.avakconsulting.com
(Continued)		



Where Can You Get More Information?
Energy Smart Information Center:
(866) 721-0249 or
www.EnergySmartNOLA.com



(Continued)		
Diversified Energy	504-258-5687	jeffhaag@cox.net
Greenwood Home Energy Solutions	504-800-0351	mwarden@lagreenwood.com
HLN Energy Services	504-267-2037	www.hlnenergyservices.com
Construction Specialists Group	504-261-0278	www.intechinsulation.com
In-tech Insulation & Consulting	504-482-8850	www.projecthomecoming.net
Project Homecoming	504-942-0444	www.globalgreen.org
Global Green, USA	504-525-2121	Constructionspclstgroup@yahoo.com
Core USA	504-298-9556	info@coreusa.org
Brotherhood Way General Contractors	504-287-4416	www.teambwc.com
Green Apple Foam Insulation	504-258-2464	www.greenapplefoam.com
Smart Energy Solutions	225-364-4767	www.mysmartenergysolutions.com
Colmex Construction	504-383-8092	colmexconstruction@gmail.com
The Building Performance Center, LLC	504-261-0278	al@ecgnola.com
No Limit Energy Solutions, LLC	504-322-1536	www.nolimitenergysolutions.com
Green Grants	504-835-2510	www.greengrants.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com

Rev 6/10/2013



Where Can You Get More Information?
Energy Smart Information Center:
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www.EnergySmartNOLA.com



Local Contractors and Retailers

Please contact these Energy Smart Participating Contractors and retail stores to have the following energy improvements performed. Energy Smart does not set prices for participating contractor services. We encourage you to get multiple estimates for assessments and installations.

ENERGY STAR Central Air Conditioner Replacement

A & H Service Co., Inc.	504-469-2217	www.ahservice.com
Advanced Mechanical, Inc	504-245-8791	www.amicontracting@yahoo.com
Air One Heating & Cooling	504-888-6702	www.airone1996@hotmail.com
ATI Anderson Technicians, Inc.	504-831-9500	www.atianderson.com
Authentic Air LLC	504-421-2647	www.authenticairllc.com
Brotherhood Way General Contractors LLC	504-287-4416	www.teambwc.com
Bryan's United	504-368-3297	www.bryansunited.com
Burkhardt Air Conditioning	504-277-7520	www.burkhardtsair.com
Celestin Mechanical Contractors, LLC	504-329-3469	www.bcelestin@cox.net
Cold Air Now!, LLC	504-444-2233	www.Thomas@coldairnow247.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com
Cool Air, Inc	504-733-1569	www.coolairnola.com
Deltone Electric and AC	504-525-9199	www.mark@deltone.com
Dyer's A/C and Heating	504-352-3130	www.dyersachtg@yahoo.com
Express Heating and AC Services	504-263-0442	www.terry@expressheatandac.com
Flettrich Services, Inc.	504-482-7811	www.flettrichservices@charter.net
GBOB Enterprises	504-393-9062	www.gbobent@earthlink.net
General Heating and Air Conditioning	504-488-0826	www.generalheating-ac.com
Help Heating and Air Conditioning	504-733-5888	www.helpserviceco.com
Hinton A/C	504-522-0326	Letavlin@bellsouth.net
Metro A/C and Heating	504-341-9186	www.phil@metroacandheat.com
National Air	504-341-2822	www.nationalair@cox.net
Pullen Air Conditioning	504-833-1106	www.pullenac.com
Riverview Construction	504-324-1810	www.riverviewccs.com
Robert Refrigeration	504-282-0625	www.robertrefrigeration.com
Southern Services A/C & Heating	504-443-3515	www.bettycefulu@bellsouth.net
Surgi's Heating and Air Conditioning	504-469-4232	www.surgisac.com
Taylor and Tyler, Inc.	504-364-1411	www.taylortylerac.com
The Weatherization Company, Inc.	504-919-4598	msbowen@theweatherizationcompany.com
U&M AC Heating Mechanical Services	504-638-2210	www.umac8789@att.net
Green Grants	504-835-2510	www.greengrants.com

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(Continued)		
Southland A/C	504 469 3132	www.Southlandair@aol.com
Blum Thermal Service, LLC	504-279-0073	www.blumthermsvcs@bellsouth.net
Seruntine Refrigeration Service, Inc	504-833-8831	seruntine@nocoxmail.com
Air-It, Inc	504-340-8541	www.airit.com
Blum Thermal Services, LLC	504-279-0073	blumthermsvcs@bellsouth.net

A/C Tune-Up

A & H Service Co., Inc.	504-469-2217	www.ahservice.com
Air One Heating & Cooling	504-888-6702	www.airone1996@hotmail.com
ATI Anderson Technicians, Inc.	504-831-9500	www.atianderson.com
Authentic Air LLC	504-421-2647	www.authenticairllc.com
Brotherhood Way General Contractors LLC	504-287-4416	www.teambwc.com
Bryan's United	504-368-3297	www.bryansunited.com
Burkhardt Air Conditioning	504-277-7520	www.burkhardtsair.com
Celestin Mechanical Contractors, LLC	504-329-3469	www.bcelestin@cox.net
Cold Air Now!, LLC	504-444-2233	www.Thomas@coldairnow247.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com
Deltone Electric and AC	504-525-9199	www.mark@deltone.com
Dyer's A/C and Heating	504-352-3130	www.dyersachtg@yahoo.com
Express Heating and AC Services	504-263-0442	www.terry@expressheatandac.com
GBOB Enterprises	504-393-9062	www.gbobent@earthlink.net
General Heating and Air Conditioning	504-488-0826	www.generalheating-ac.com
Help Heating and Air Conditioning	504-733-5888	www.helpserviceco.com
Metro A/C and Heating	504-341-9186	www.phil@metroacandheat.com
National Air	504-341-2822	www.nationalair@cox.net
Pullen Air Conditioning	504-833-1106	www.pullenac.com
Riverview Construction	504-324-1810	www.riverviewccs.com
Robert Refrigeration	504-282-0625	www.robertrefrigeration.com
Southern Services A/C & Heating	504-443-3515	www.bettycefalu@bellsouth.net
Taylor and Tyler, Inc.	504-364-1411	www.taylor Tylerac.com
The Weatherization Company, Inc.	504-919-4598	msbowen@theweatherizationcompany.com
Seruntine Refrigeration Service, Inc	504-833-8831	seruntine@nocoxmail.com
U&M AC Heating Mechanical Services	504-638-2210	www.umac8789@att.net

Solar Hot Water Program Contractors

Riverview Construction	504-324-1810	www.riverviewccs.com
Comfort Engineered Systems	504-602-6648	www.airconditioning-neworleans.com
(Continued)		



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(Continued)		
Solar Alternatives	504-267-1660	www.solalt.com
Sunergy Solar Solutions	504-534-8255	www.sunergynola@gmail.com
Brotherhood Way General Contractors, LLC	504-287-4416	www.teambwc.com
Marc Jones Construction	985-215-6624	www.marc@marcjonesconstruct.com
Carimi Contractors, LLC	504-638-6572	www.carimicontractorsnola.com
Pontchartrain Mechanical	504-738-3061	

ENERGY STAR Window Air Conditioner – Retail Locations

Sears East	7300 Read Blvd	New Orleans	504-240-3173	searseast@bellsouth.net
Barto Appliance	1400 Airline Drive	Metairie	504-831-2734	www.bartoappliances.com
Campo Better Living	3020 Clearview Parkway	Metairie	504-454-5104	www.campoappliance.com
Asprion's Air Conditioning	3621 David Drive	Metairie	504-455-2653	www.aspriair@yahoo.com
Wal-mart	1901 Tchoupitoulas Street	New Orleans	504-522-4142	www.walmart.com
Lowe's of Central New Orleans	2501 Elysian Fields Avenue	New Orleans	504-455-2653	www.lowes.com
Lowe's of Jefferson Hwy	121 Jefferson Hwy	Jefferson	504-455-2653	www.lowes.com
Lowe's of East New Orleans	5770 Read Blvd	New Orleans	504-613-1800	www.lowes.com
The Home Depot New Orleans	1100 S. Claiborne Ave	New Orleans	504-592-1251	www.homedepot.com
The Home Depot NO Mid City	500 N Carrollton Ave	New Orleans	504-482-1985	www.homedepot.com
The Home Depot NO East	12300 I-10 Service Rd	New Orleans	504-246-4572	www.homedepot.com

Attic, Wall and Floor Insulation

Riverview Construction	504-324-1810	www.riverviewccs.com
Mr. Green Jeans Insulation	504-861-4544	www.greenj.com
Louisiana Home Specialists, LLC	504-278-8811	www.lahsllc.com
In-tech Insulation	504-482-8850	www.intechinsulation.com
(Continued)		



Where Can You Get More Information?
Energy Smart Information Center:
(866) 721-0249 or
www.EnergySmartNOLA.com



(Continued)		
Retro-Fitz	504-250-9487	www.retro-fitz.com
Wilserv	985-809-7962	www.wilserv.info
Envirogreen	504-273-1077	www.envirogreeninsulation.com
Advanced Mechanical	504-245-8791	www.amicontracting@yahoo.com
OWL Technologies, LLC	504-289-8766	www.owltechnologies.com
Taylor and Tyler, Inc.	504-364-1411	www.taylor Tylerac.com
Calmar Corporation	504-464-6242	www.calmarinc.com
Construction Specialists Group	504-261-0278	www.Constructionspclstgroup@yahoo.com
Bywater Sheet Metal Works and Roofing	504-466-2916	
HLN Energy Services	504-267-2037	www.hlnenergyservices.com
Green Apple Foam Insulation	504-258-2464	www.greenapplefoam.com
Ozone Green Spray Foam	504-756-9663	www.ozonegreenfoam.com
Fontenot Insulation LLC	504-834-4222	www.Fontenot-Insulation@cox.net
Brotherhood Way General Contractors	504-287-4416	www.teambwc.com
Air Conditioning Ambulance	504-467-1400	www.acambulance.com
Project Homecoming	504-942-0444	www.projecthomecoming.net
The Weatherization Company, Inc.	504-919-4598	msbowen@ theweatherizationcompany.com
Green Energy Solutions	225-329-8299	www.greenenergysolutionsofla.net
Rebirth Energy Solutions	504-341-2822	www.rebirthenergysolutions.com
Colmex Construction	504-383-8092	www.colmexconstruction@gmail.com
Global Energy Technologies	985-857-9552	www.globalenergy@triparish.net
The Building Performance Center, LLC	504-261-0278	al@ecgnola.com
Marc Jones Construction	985-215-6624	www.marc@marcjonesconstruct.com
Anderson Real Estate Development, LLC	504-251-7407	www.Patrickanderson29@yahoo.com
Neighborhood Homes, LLC	510-331-3380	dhayward@neighborhoodnola.com
E & I	504-237-3424	roger@maxvalueins.com
Comfort Engineered Systems	504-602-6648	www.Com4t.com



QUALITY

ASSURANCE

Quality Assurance

Quality Assurance, or QA, of work performed through the Energy Smart program is absolutely crucial to ensuring that New Orleanians are receiving a consistent and valuable product. Each member of the Energy Smart team performs QA through initial assessments of potential work opportunities, review of submitted incentive documents and, most importantly, onsite visits with Energy Smart customers to ensure proper workmanship and installation. The Energy Smart team also utilizes QA visits to educate customers on their options and to review best practices with our network of contractors. To the right is a table listing all of the QA site visits that the Energy Smart team performed in Program Year 2. At least one member of the Energy Smart QA team is in the field every day of the week.

Program	QA Inspections
Home Performance with ENERGY STAR	252
ENERGY STAR Air Conditioner	171
Air Conditioner Tune-up	419
CFL Direct Install	113
New Homes	68
Hard to Reach	79
Solar Hot Water Heater	n/a
Small Commercial	87
Large Commercial	17
Total	1214



MARKETING

AND OUTREACH

Overview and Sample Collateral

Energy Smart marketing continued to focus on a consistent, clean and professional branding image during Program Year 2. As a means of increasing customer awareness and brand recognition, CLEAResult has strengthened the Energy Smart brand with the creation of marketing material and on-the-ground outreach to communities across the city. By working closely with the New Orleans PR firm Bright Moments, Energy Smart reached thousands of renters, homeowners, business owners and corporate executives in New Orleans.

The Energy Smart website was prominently featured on all marketing materials in 2012. In total, 16,811 users visited the website, 64 percent of whom were first-time users. Referral traffic represented 41 percent of total traffic with the largest number of referral links coming from entergy-neworleans.com. Direct users (those who typed in the website address) accounted for 35 percent of traffic, while 23 percent searched for the site. The top keyword term search was “energy smart new orleans” representing increased brand recognition among utility customers.

Innovative marketing campaigns were formulated based on both seasonal relevance and with the intention of driving participation in programs that were shy of reaching their target goals. Energy efficiency is a topic that requires a large amount of information to enable customers to understand available options; therefore, extensive program material was made available through the Energy Smart website and call center. With 16,811 visits

to the Energy Smart website and 1,704 phone calls placed to the Energy Smart’s toll free hotline, these sources each played a crucial role in disseminating energy efficiency information to the public. These information gateways served as an intermediary step between advising New Orleans residents regarding Energy Smart offerings and getting them connected with Energy Smart products and services.

Energy Smart marketing designed and coordinated placement of six newspaper advertisements in two publications for the ENERGY STAR A/C Tune-up and ENERGY STAR Window A/C programs. In addition, Energy Smart created and released six radio commercials throughout the year, resulting in interviews with local stations.

Energy Smart marketing created point-of-purchase collateral materials including shelf-talkers, posters and flyers for ENERGY STAR window air conditioners and advanced power strips. These materials promote in-store savings for customers purchasing select items, promoting both energy savings and the Energy Smart program. In addition, Energy Smart executed a Window A/C Rebate and Recycling Event at two participating Lowe’s locations and promoted the event with radio, print and web banner ads, in-store signage and email blasts. The Energy Smart marketing team also created and distributed 2,000 flyers, along with 4,000 robocalls.

In October 2012, Energy Smart launched the Home

Performance with ENERGY STAR program. Energy Smart promoted the program through a press release, the Energy Smart website and email blasts and newsletters. To kick off the program, Energy Smart held a training attended by approximately 30 contractors and staff.

Energy Smart provided program information to residents through a “one-stop shop” mobile information center that made its way around to various city libraries, typically staying in any given location for two to three months. On Wednesday afternoons, this information center was hosted by Energy Smart staff who answered program-related questions from the public.

This information Center was in the following libraries during Program Year 2:

- Main library
- Norman Mayer (Gentilly)
- Robert E Smith (Lakeview)
- East New Orleans Regional
- Rosa F. Keller (Broadmoor)
- Algiers Regional

Energy Smart also executed various outreach activities throughout Program Year 2 to help raise awareness regarding the various programs offered. Furthermore, in March 2013, Energy Smart partnered with LifeCity, a local New Orleans company that works to develop sustainable change through the implementation of environmentally responsible practices. Together, Energy Smart and LifeCity conducted a vast outreach initiative targeting neighborhood associations, nonprofit

organizations, community centers, fairs, festivals and tradeshows.

In addition, Energy Smart would like to thank the following groups for their continued support:

- Home Builders Association of New Orleans
- Apartment Association of New Orleans
- New Orleans Metropolitan Association of Realtors
- Preservation Resource Center
- New Orleans Council on Aging
- Southeast Louisiana Coalition of the Air Conditioning Industry
- Unity Group
- Rebuilding Together New Orleans
- Heat Pump Association of Louisiana





Energy Update

VOL. 1 | WINTER 2013 | www.EnergySmartNOLA.info | (866) 721-0249

Energy Smart Customers Can Save Energy Utility Bills Through the Home Performance ENERGY STAR® Program

In partnership with the U.S. Department of Energy (DOE), Energy Smart is pleased to announce the launch of the Home Performance with ENERGY STAR Program, its newest residential energy efficiency initiative. Designed to help homeowners reduce monthly utility bills, the program offers Entergy customers in Orleans Parish up to \$5,000 in incentives for home energy efficiency improvements.

Rather than focusing on a single measure - like attic insulation, an old air conditioning system or leaky ductwork - participating contractors assess how improvements to all of these measures will provide fewer drafts, more consistent room temperature and lower utility bills.



To learn more about the program, find Energy Smart participating contractors, call toll-free (866) 721-0249 or visit our website at www.EnergySmartNOLA.info.

Developed by the [New Orleans City Council](#) and administered by [Energy Smart](#).



Energy Efficiency News

VOL. 1 | WINTER 2012 | www.EnergySmartNOLA.info | (866) 721-0249

Energy Smart Program Expands to Algiers

The Energy Smart program is crossing the Mississippi River into Algiers, making Louisiana's first energy efficiency program available to all Entergy residential and commercial customers living in Orleans Parish. "We're excited that all Orleans Parish residents, including those living in Algiers, now have the opportunity to take advantage of the Energy Smart program," said councilmember Cynthia Hedge-Morrell, chair of the City Council's utility committee. "Energy Smart provides customers



with tools and incentives that help them take control of their energy use and lower their home energy costs." "This is good news for the people of Algiers," said councilmember Kristin Giesler Palmer. "We have been working diligently for a long time to bring the Energy Smart program to the west bank of Orleans Parish."

Through energy audits, and incentives for energy-efficiency upgrades Energy Smart can help Orleans Parish residents and businesses save energy and save money on their utility bills. Some of the many program options include energy audits, high-performance A/C tune-ups, ceiling and wall insulation, duct and air sealing, solar water heating and free installation of compact fluorescent bulbs. Participants receive rebates for these energy efficient improvements made through a qualified contractor. For more information on Energy Smart, call toll free (866) 721-0249 or visit EnergySmartNOLA.info.

Watch for Phantom Power Users

Simple steps such as using power strips or unplugging chargers can make a difference.

Energy Smart is encouraging New Orleans to be on the lookout for phantoms - phantom power, that is. Phantom power, also known as standby or vampire power is the energy used by certain appliances and electronic devices, even when they are turned off. A variety of products and appliances, such as televisions, microwaves and cell phone chargers, use phantom power.

While it may seem trivial, the amount of wasted energy can add up over time and increase monthly utility bills. According to the U.S. Department of Energy, appliances and home electronics can account for as much as 20 percent of a typical monthly bill and approximately 75 percent of the electricity used to power those products is consumed when the products are turned off.

Fortunately there are some simple ways to control phantom power and help you save money. Here are some simple steps that can help you fight phantom power:



- Purchase an advanced power strip (APS) and plug appliances and electronics into it. Energy Smart is offering a \$15 mail-in rebate for selected advanced power strips. They can be purchased in stores or online - Visit [Energy Smart's APS web page](#) for more information.
- Unplug small transformers (battery chargers and power adapters) when products are fully charged or not in use.
- Check the label. If purchasing an Energy Star product, choose the model that uses the least amount of phantom power. If the amount isn't listed on the label, visit the U.S. Department of Energy's [online database](#) to view manufacturer-supplied data by category.

Heating AC Tune-up Rebate

Make your home cozy and Energy Smart just in time for the holidays

Receive a \$75 instant rebate for a high-performance A/C tune-up and up to \$1,000 in rebates for installing a new



Energy Smart Window A/C Rebate & Recycling Event!

June 1st & 8th

A cool way to SAVE!



**Earn instant rebates up to \$50,
or bring in your old window A/C and
DOUBLE your rebate - up to \$100 on a new unit!**

Available to Entergy customers living in Orleans Parish while supplies last.

EVENT LOCATIONS & TIMES:

Lowe's Central (2501 Elysian Fields):

Saturday, June 1st, noon - 4 p.m.

Lowe's Jefferson (121 Jefferson Hwy):

Saturday, June 8th, noon - 4 p.m.

Register to Win a FREE Home Energy Assessment!*

*Please visit www.EnergySmartNOLA.com for official rules.

Have questions or want to hear about other ways to save energy with the Energy Smart program? Call us toll-free at **(866) 721-0249** or visit www.EnergySmartNOLA.com.

Developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.



©2013 Lowe's Companies, Inc.

Stay cool and receive up to \$100 off during the Window A/C Rebate & Recycling Event.

June 1st & 8th

Lowe's Central (2501 Elysian Fields):

Saturday, June 1st, noon - 4 p.m.

Lowe's Jefferson (121 Jefferson Hwy):

Saturday, June 8th, noon - 4 p.m.

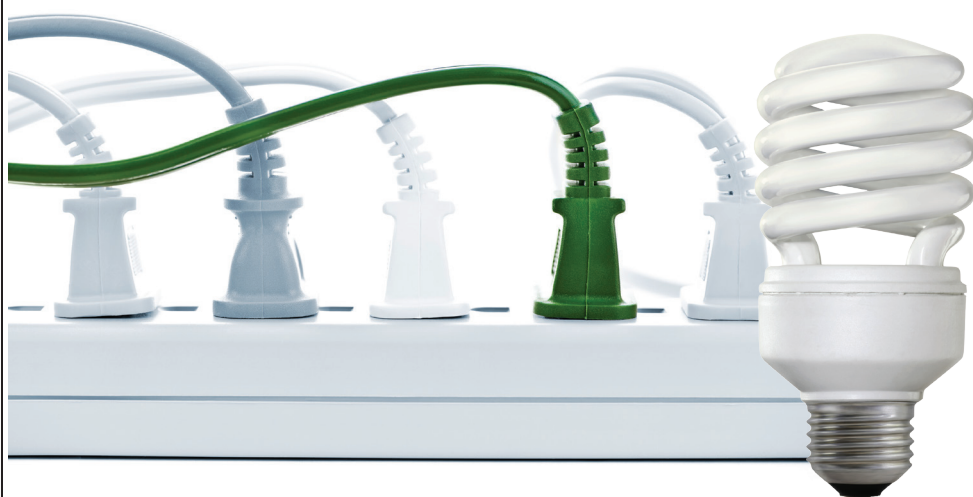
Available to Entergy customers living in Orleans Parish while supplies last.



Call toll-free (866) 721-0249 or visit www.EnergySmartNOLA.com

Energy Smart

**Entergy Customers in
Orleans Parish: Receive 8
FREE CFLs and an Advanced
Power Strip Today!**



EnergySmart
A New Orleans Program

Entergy

Energy Smart, in partnership with Green Light New Orleans, is offering Orleans Parish residents a free CFL bulb and a power strip. By entering your information, you are acknowledging the performance of the bulbs received, not for damages that may be incurred through your use.

For more information about this program, visit
www.EnergySmartNOLA.com

Energy Smart is a comprehensive energy efficiency plan developed by Green Light New Orleans.

Get up to a \$50 Rebate

Energy Smart Window Air Conditioner Rebate

Fill out the reverse side of this form and mail to the address listed on the back with a copy of your dated sales receipt or fax to (866) 908-1504. Limit 4 rebates per customer. See reverse side for complete terms and conditions. Note: Your window air conditioner must be ENERGY STAR® Qualified to receive your rebate.

Small Air Conditioner Units
under 14,000 BTUs

\$35



Large Air Conditioner Units
14,000 BTUs and higher

\$50

For more information about this and other Energy Smart programs, visit www.energysmartnola.com or call (866) 721-0249.

EnergySmart
A New Orleans Program

Entergy
THE POWER OF PEOPLE®

Available for Entergy Customers in Orleans Parish



Energy Smart ENERGY STAR® Central Air Conditioning Rebate

Available for Entergy Customers in Orleans Parish

Customer Name: _____

Service/ Installation Address: _____

City: _____ State: _____ ZIP: _____

Mailing Address (if different): _____

City: _____ State: _____ ZIP: _____

Phone: _____ Email: _____

Energy Smart Participating Contractor

Contractor Phone

Building Information:

Style (circle one): Single / Double / Multi

Required Document Checklist:

- ☐ AHRI Certificate
- ☐ Copy of Customer's Invoice
- ☐ Signed and COMPLETED Energy Smart Rebate Form

Equipment Information:

Old HVAC Information

Estimated SEER: _____ Size (in BTU or tons): _____ Heating Type (circle one): Heat Pump / Gas / Electric Resistance

New HVAC Information

Condenser Brand: _____ Heat Pump (only) HSPF: _____

Condenser Model: _____ *Size (in BTUs): _____

Coil Model: _____ SEER: _____

Air Handler / Furnace Model: _____ EER: _____

Was a new coil also installed? Yes / No Heating Type (circle one): Heat Pump / Gas / Electric Resistance
*Must be 65,000 BTU or less

Installation Date: _____ HVAC Rebate Amount \$: _____

Customer Completion: I acknowledge the above is true and correct. By signing below, I agree to allow Energy Smart or CLEAResult to perform an on-site verification of installed equipment. I also understand that failure to allow an inspection within 60 days may result in forfeiture of the rebate amount.

Customer Signature: _____ Date: _____

Please send this application along with required documents to:

All rebate forms must be received within 45 days of the purchase date.
Please allow 2 - 3 weeks for processing.

Energy Smart Central A/C Program

1615 Poydras - Suite 860
New Orleans, LA 70112
Fax: (866) 908-1504

For more information about this and other programs, visit www.energysmartnola.info, email info@energysmartnola.info or call (866) 721-0249.

Energy Smart is a

Get \$15 Back

Energy Smart Advanced Power Strip Rebate

An advanced power strip can save an average of 85 kilowatt-hours due to phantom loads per year - this is energy that your appliances use when they are turned off!

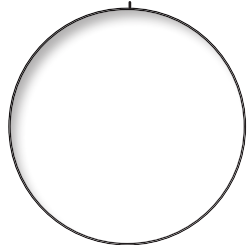
Must be one of the following eligible advanced power strip products to receive your rebate. Fill out the reverse side of this form and mail to the address listed on the back with a copy of your dated sales receipt or fax to (866) 908-1504. Limit 4 rebates per customer. See reverse side for complete terms and conditions.

Manufacturer	Eligible Product Name	Model #
Belkin	8 Outlet Conserve Smart AV	F7C007
BITS Limited	10 Outlet Energy Saving Smart Strip	LCG-5
BITS Limited	10 Outlet Energy Saving Smart Strip with USB	LUG-5
BITS Limited	7 Outlet Energy Savings Smart Strip	SCG-5
Coleman Cable	7 Outlet Energy Saving Smart Strip	04939-88-12
TrickleStar	7 Outlet Advanced PowerStrip	180SS-US-7xx
TrickleStar	12 Outlet Advanced PowerStrip	180SS-US-12CT
TrickleStar	4 Outlet Advanced PowerTap	175SS-US-4CD

For more information about this and other Energy Smart programs, visit www.energysmartnola.info or call (866) 721-0249.

Energy Smart
A New Orleans Program

Available for Entergy Customers in Orleans Parish

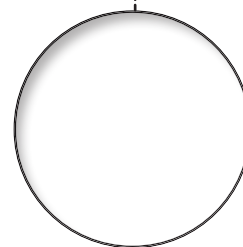


EnergySmart 
A New Orleans Program



\$75 off
A/C Tune-up from
Energy Smart




For more information,
visit www.EnergySmartNOLA.info
or call toll free at (866) 721-0249.



EnergySmart 
A New Orleans Program

**Did you know that you need to
tune-up your A/C every year?**

**Energy Smart can give you \$75
off an A/C tune-up that will:**

-  Make your A/C Run Better and
Use Less Energy
-  Help Extend the Life of Your Unit
-  Keep Money in Your Pocket

**Contact us at:
www.EnergySmartNOLA.info
or call toll free at (866) 721-0249.**

Energy Smart is developed by the New Orleans City Council
and administered by Entergy.

Energy Smart Commercial Solutions Program FOR HOTELS



The Energy Smart
financial assistance
reduce energy costs

REBATES ARE

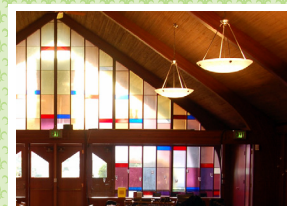
Technology
Lighting
Chillers
Variable Frequency Drives
Air Conditioning
Guest Room Thermostats
Vending Machine Controllers

Schedule your

To learn more about
Program, call toll-free
www.EnergySmartNOLA.info

Developed by the New Orleans City Council

Energy Smart Commercial Solutions Program FOR CONGREGATIONS



The Energy Smart Commercial Solutions Program provides technical and financial assistance for the installation of energy efficiency measures that reduce energy consumption for your congregation.

REBATES ARE AVAILABLE FOR THE FOLLOWING TECHNOLOGIES:

Technology	Description	Potential Rebate
Lighting	T-8 Fluorescent Lighting Retrofits	Up to \$53 per Fixture
	Incandescent to CFLs	Up to \$8 per Bulb
	Incandescent to LEDs	Up to \$18 per Bulb
Air Conditioning	DX Units	Based on New Equipment Efficiency Call for Details
	PTAC Units	Based on New Equipment Efficiency Call for Details
Vending Machine Controllers	Cold Drink Machines	\$190 per Unit
	Snack Machines	\$46 per Unit

Schedule your walk-through energy assessment today!

To learn more about the Commercial Solutions
Program, call toll-free (866) 721-0249, or visit
www.EnergySmartNOLA.info

Developed by the New Orleans City Council and administered by Energy New Orleans, Inc.



Energy Smart Commercial Solutions Program FOR NONPROFITS



The Energy Smart
financial assistance
reduce energy costs

REBATES ARE AVAILABLE FOR THE FOLLOWING TECHNOLOGIES:

Technology
Lighting
Air Conditioning
Vending Machine Controllers

Schedule your assessment

To learn more about the
Program, call toll-free
www.EnergySmartNOLA.info

Developed by the New Orleans City Council

Energy Smart Commercial Solutions Program FOR RESTAURANTS



The Energy Smart Commercial Solutions Program provides New Orleans restaurant owners the opportunity to install energy efficient technologies that help you save energy and money. Rebates are available for technologies that help improve the efficiency of your entire restaurant facility.

REBATES ARE AVAILABLE FOR THE FOLLOWING TECHNOLOGIES:

Technology	Description	Potential Rebate
Lighting	T-8 Fluorescent Lighting Retrofits	Up to \$53 per Fixture
	Incandescent to CFLs	Up to \$8 per Bulb
	Incandescent to LEDs	Up to \$13 per Bulb
Air Conditioning	DX Units	Based on New Equipment Efficiency Call for Details
	Package Units	Based on New Equipment Efficiency Call for Details
Food Service Equipment	ENERGY STAR Electric Steam Cooker	Up to \$1,250 per Unit
Refrigeration	ECM Evaporator Motors	\$80 per Unit
Dishwashing	Pre-Rinse Spray Valve (Electric Water Heater Customer Only)	\$90 per Spray Valve
Vending Machine Controllers	Cold Drink Machines	\$190 per Unit
	Refrigerated Reach-In Coolers	\$130 per Unit
	Snack Machines	\$46 per Unit

Get started today by having a walk-through energy assessment performed on your facility!

To learn more about the Commercial Solutions Program, call toll-free (866) 721-0249, or visit www.EnergySmartNOLA.info

Developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.

EnergySmart
A New Orleans Program



Save Energy and Save Money in Your Home

Contact us today:

- ✱ Visit **EnergySmartNOLA.info**
- ✱ Call toll-free **(866) 721-0249**
- ✱ Email: **info@energysmartnola.com**
- ✱ Meet with an Energy Smart representative. Visit the **Energy Smart Information Center** page at **EnergySmartNOLA.info** for location and hours.
- ✱ For commercial programs, please visit **EnergySmartNOLA.info**.

Energy Smart is a comprehensive energy efficiency plan developed by the New Orleans City Council and administered by Entergy New Orleans, Inc.



What is Energy Smart?

More than 8,000 New Orleans businesses and residents participated in Energy Smart in the first year, saving over 15 million kWh of electricity - enough to power nearly 1,300 homes for an entire year.

Energy Smart helps Entergy customers in Orleans **save energy and money** through energy audits and valuable cash rebates on these efficiency improvements:

- Insulation
- Air and duct sealing
- A/C tune-ups
- ENERGY STAR® qualified central A/C
- Window A/C
- Solar water heaters
- New homes
- Compact fluorescent light bulbs
- Pool pumps
- And more!

Ready to Cool Down and Save?



SAVE MONEY. SAVE ENERGY.

Get up to a \$50 rebate on
ENERGY STAR® qualified
window air conditioners.

Available for Entergy Customers in Orleans Parish

Small A/C units
under 14,000 BTUs

\$35
rebate

Large A/C 14,000
BTUs and higher

\$50
rebate



Developed by the New Orleans City Council and
administered by Entergy New Orleans, Inc.

For more information about the Energy Smart
Program, please visit www.EnergySmartNOLA.info
or call (866) 721-0249.

Window A/C Instant Rebate and Recycling Event!

Save up to \$100 instantly when
you purchase an ENERGY STAR®
qualified window air conditioner!

Same day discounts of \$50 (more than
14,000 BTUs) or \$35 (less than 14,000 BTUs).
DOUBLE your discount if you bring in an old
window A/C to recycle!



- ✿ Sat., June 1 at Lowe's on Elysian Fields, noon - 4 PM
- ✿ Sat., June 8 at Lowe's on Jefferson Highway, noon - 4 PM



Developed by the New Orleans City Council and administered by Entergy New Orleans, Inc. This offer is for Entergy customers in Orleans Parish only. New window A/C unit must be ENERGY STAR qualified. Offer valid on the above dates, while supplies last. Mail-in rebates available year-round at www.EnergySmartNOLA.com. Eligible customers must present photo ID to receive instant coupon. Energy Smart staff will verify all customer eligibility on site. Lowe's cannot verify customer eligibility. Limit of 4 window A/C units per household. ©2013 Lowe's Companies, Inc. All rights reserved. Lowe's, the gable design, and Never Stop Improving are trademarks of LF, LLC. All are used with permission.

¡Evento de reciclaje y reembolso instantáneo en aires acondicionados de ventana!

Ahorre hasta \$100 de
forma instantánea en aires
acondicionados de ventana
ENERGY STAR® que califican.

Descuentos el mismo día de \$50 (más de
14.000 BTU) o de \$35 (menos de 14.000 BTU).
¡DUPLIQUE su descuento si trae un aire
acondicionado antiguo para reciclarlo!



- ✿ Sábado 1 de junio en Lowe's de Elysian Fields, de 12 PM a 4 PM
- ✿ Sábado 8 de junio en Lowe's de Jefferson Highway, de 12 PM a 4 PM



Evento organizado por la alcaldía de la ciudad de New Orleans y es administrado por Entergy New Orleans, Inc. Oferta válida sólo para clientes Entergy del condado Orleans. La nueva unidad de aire acondicionado de ventana debe contar con calificación ENERGY STAR®. Oferta válida en las fechas antes mencionadas, hasta agotar existencias. Reembolsos por correo disponibles todo el año en www.EnergySmartNOLA.com. Límite de 4 unidades de aire acondicionado de ventana por domicilio. ©2013 Lowe's Companies, Inc. Todos los derechos reservados. Lowe's, el diseño del gablete y Siempre Mejorando son marcas de LF, LLC. Todas se utilizan con autorización.



BUDGET

TRANSFERS

Transfer Details

Energy Smart made a series of transfers between residential programs in order to provide funds to high-performing programs. The details of these transfers are below:

Transfer A

As the Home Performance with ENERGY STAR program required additional funding for its high volume of work, Energy Smart transferred \$80,000 from the New Homes Program to supplement that work.

Transfer B

The Compact Fluorescent Light Bulb Direct Install program needed to purchase compact fluorescent light bulbs, or CFLs, in order to keep installation activities going, so Energy Smart transferred \$5,000 from the New Homes Program and \$25,000 from the A/C Tune-Up program.

Transfer C

In the last quarter of Program Year 2, the Home Performance with ENERGY STAR program experienced a high influx of single-family residential work, as well as an increase of direct installs to multifamily apartment complexes. To cover these costs, Energy Smart transferred \$42,000 from the A/C Tune-Up program and \$109,000 from the ENERGY STAR Air Conditioning program to the Home Performance with ENERGY STAR program.

Transfer D

Each of these transfers was made to balance out program spending in the last month of Program Year 2. An influx of Compact Fluorescent Light Bulb Direct Install jobs and available volunteers caused a participation jump in March 2013. Energy Smart also received a number of unexpected New Homes program rebates applications for incentives paid out in March 2013.

Program	Original Budget	Transfers				Deposits + Yr. 1 Rollover + Transfers	Expended	Balance
		A	B	C	D			
Home Performance with ENERGY STAR	\$246,000	\$80,000		\$151,000	(\$10,716.28)	\$467,262.43	\$464,766.52	\$2,495.91
ENERGY STAR Air Conditioner	\$154,000			(\$109,000)		\$45,220.00	\$44,700.00	\$520.00
Air Conditioner Tune-Up	\$154,000		(\$25,000)	(\$42,000)	(\$17,787.50)	\$70,142.50	\$70,142.50	\$0.00
CFL Direct Install	\$123,000		\$30,000		\$22,881.04	\$175,970.30	\$175,970.30	\$0.00
New Homes	\$168,000	(\$80,000)	(\$5,000)		\$5,622.74	\$88,834.94	\$88,834.94	\$0.00
Hard to Reach	\$204,000					\$186,097.72	\$157,214.29	\$28,883.43
Solar Hot Water Heater	\$70,000					\$12,152.00	\$0.00	\$12,152.00
Small Commercial	\$274,000					\$273,823.70	\$278,040.80	(\$4,217.10)
Large Commercial	\$458,000					\$452,109.28	\$451,021.55	\$1,087.73
Totals	\$1,851,000					\$1,771,612.87	\$1,730,690.90	\$40,921.97



CUSTOMER

SATISFACTION

Customer Satisfaction Report & Surveys

Energy Smart serves to facilitate energy efficiency work for Entergy customers across Orleans Parish and regularly surveys program participants to get feedback on their experience with the program and participating contractors. Energy Smart strives to provide excellent customer service and has a goal of receiving ratings of "good" or "excellent" from at least 85 percent of customers surveyed. Below is a table with a summary of results from customer surveys with tabulated results of surveys for individual programs included thereafter:

Sample of Comments from surveys:

"I would recommend to anyone willing to take the time to weatherize."

"Save money, save the planet!"

"As good citizens we should be focused on ways to save energy and Energy Smart is a step in the right direction."

"With Energy Smart it [the A/C Tune Up] allowed me to save lots of money. I never thought I would be able to afford such luxury."

"Makes you more aware of your energy use."

"Free light bulbs! Who doesn't like free stuff that saves money?"

"I recommended Energy Smart to my neighbors and they were pleased."

"It's worth it."

"They have gone the extra mile helping to get our two [A/C] systems balanced."

"Both sub-contractor [Help A/C & Heat] and contractor [Crane Builders of New Orleans, LLC] are tremendous and go the extra mile; could not recommend any team better!!"

"Very good program for the elderly."

"It just makes sense."

"The program incited me to go further on my measures than planned."

"They did a great job and my energy bill shows the proof."

"Polite, professional, and very knowledgeable."

"This is an excellent program for Large Commercial customers."

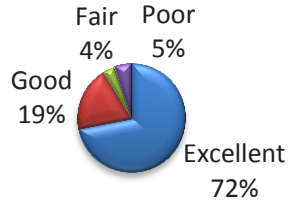
Customer Satisfaction Surveys	
Program	"Good" or "Excellent"
Home Performance with ENERGY STAR	91.52%
ENERGY STAR Air Conditioner	100% Central, 95.60% Window
Air Conditioner Tune-Up	90.55%
CFL Direct Install	96.74%
New Homes	100%
Hard to Reach	100%
Solar Hot Water Heater	n/a
Small Commercial	98.53%
Large Commercial	100%



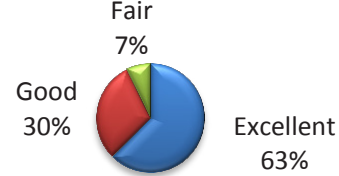
Home Performance with ENERGY STAR Program - Customer Satisfaction Surveys

Total of 59 surveys received through Apr 18, 2013

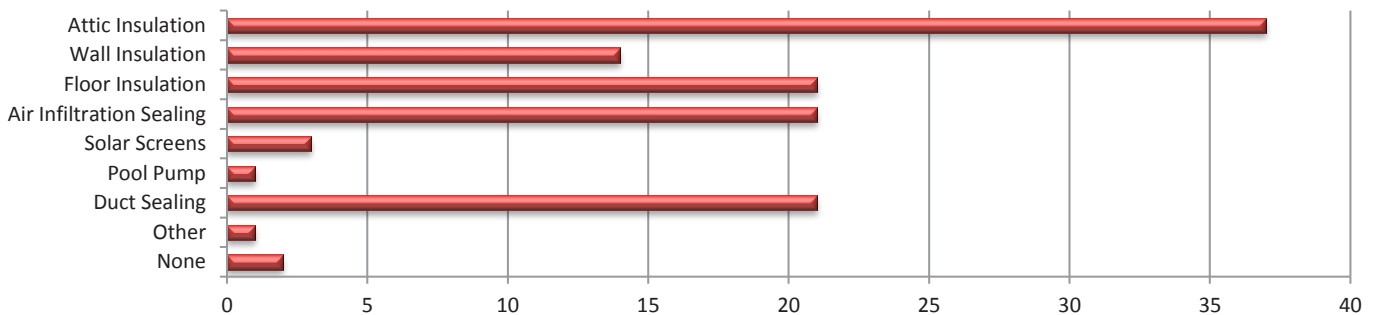
Q1b: How do you rate your experience with the energy consultant?



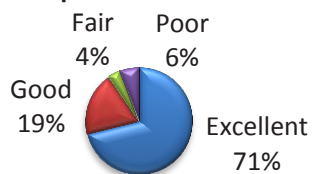
Q1c: How do you rate the value of the Energy Smart assessment?



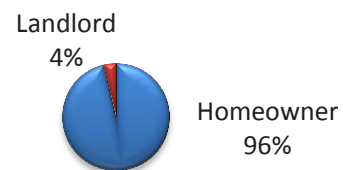
Q1d: What measure(s) did you or do you plan to implement within 60 days for the assessment?



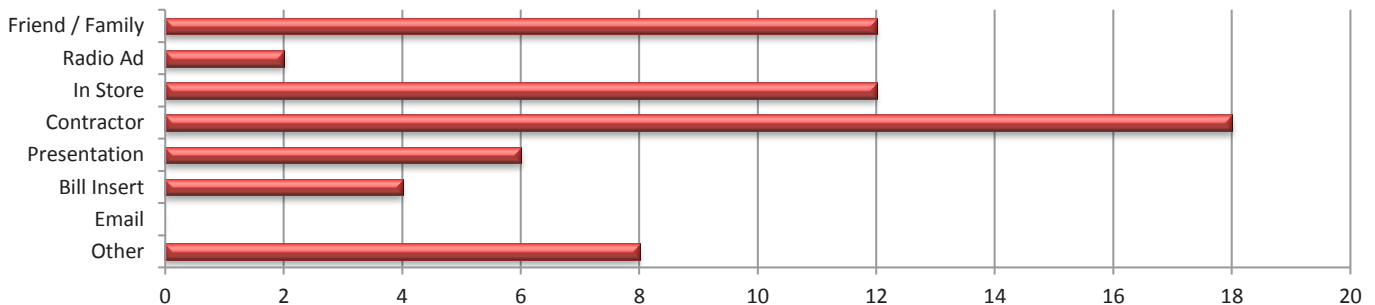
Q2b: What was the contractor's overall level of professionalism?



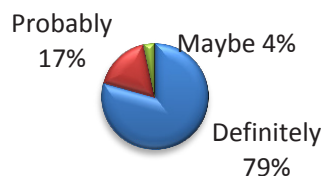
Q3: Are you the homeowner, landlord, or tenant?



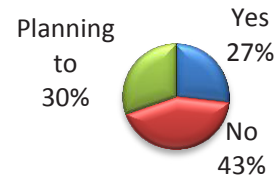
Q5: How did you hear about the Energy Smart program?



Q4: Would you recommend the Energy Smart program to others?



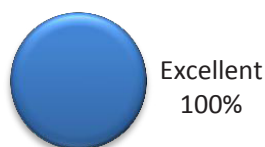
Q6: Have you taken advantage of other Energy Smart programs?



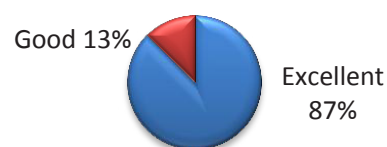
ENERGY STAR A/C Program - Customer Satisfaction Surveys

Total of 8 surveys received through Dec 12, 2012

Q1b: How do you rate your experience with the contractor?



Q2: How do you rate the value of the Energy Star Central A/C Program?



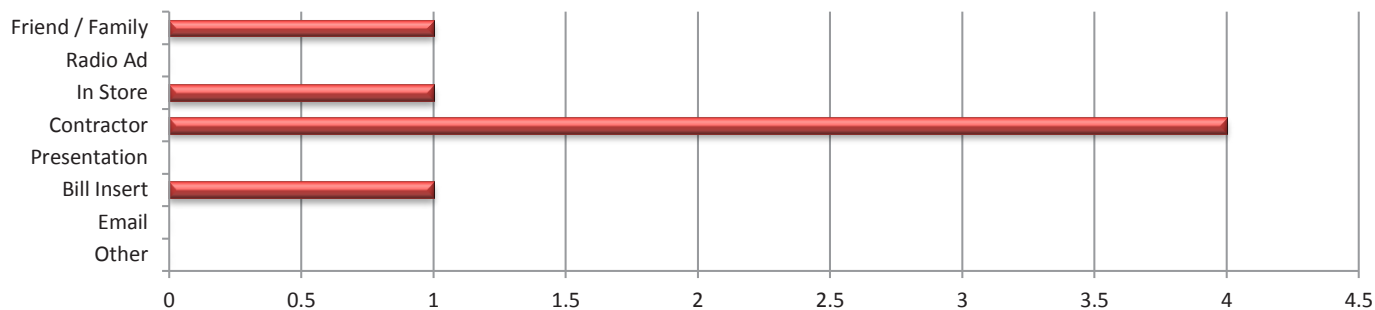
Q3: Are you the homeowner, landlord, or tenant?



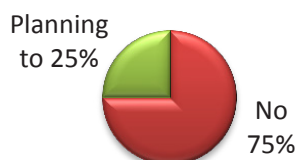
Q4: Would you recommend the Energy Smart program to others?



Q5: How did you hear about the Energy Smart program?



Q6: Have you taken advantage of other Energy Smart programs?

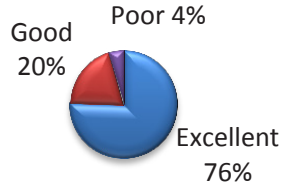




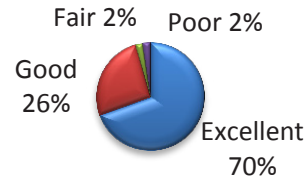
ENERGY STAR Window A/C Program - Customer Satisfaction Surveys

Total of 47 surveys received through Feb 15, 2013

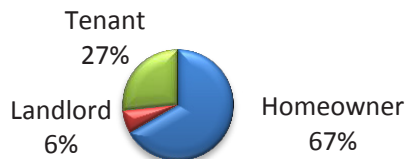
Q1: How do you rate your overall experience with the Window A/C Program?



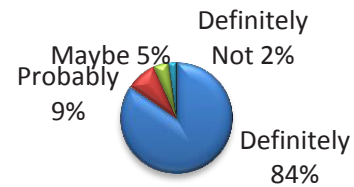
Q2: How do you rate the value of the Energy Star Window A/C Program?



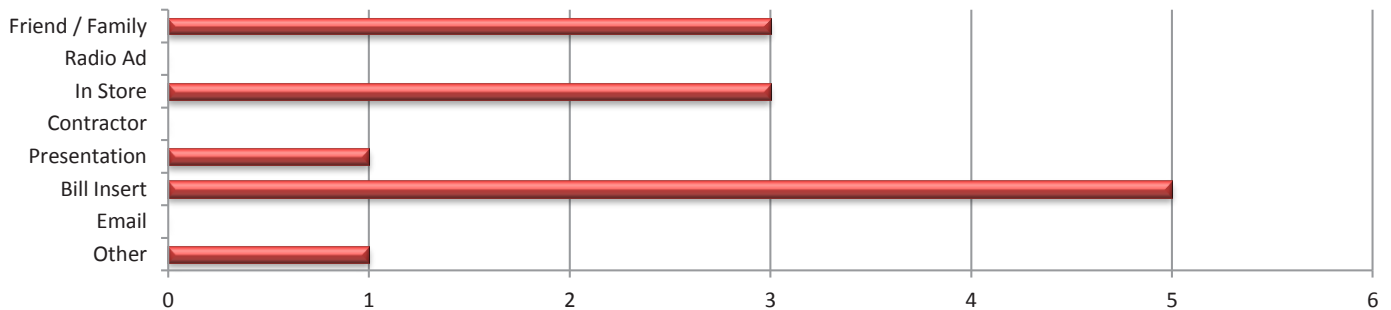
Q3: Are you the homeowner, landlord, or tenant?



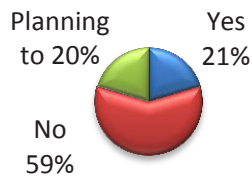
Q4: Would you recommend the Energy Smart program to others?



Q5: How did you hear about the Energy Smart program?



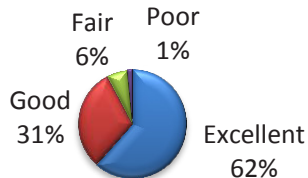
Q6: Have you taken advantage of other Energy Smart programs?



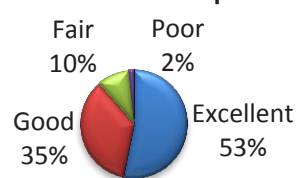
A/C Tune-Up Program - Customer Satisfaction Surveys

Total of 66 surveys received through Apr 3, 2013

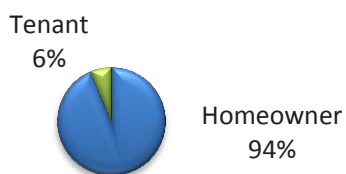
Q1b: How do you rate your experience with the contractor?



Q2: How do you rate the value of the Energy Smart tune-up?



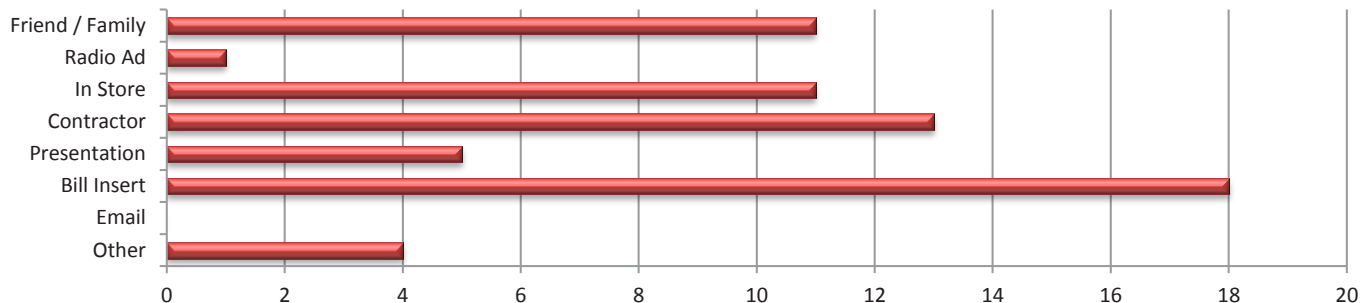
Q3: Are you the homeowner, landlord, or tenant?



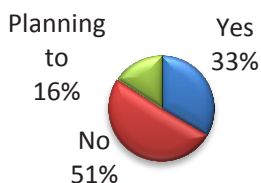
Q4: Would you recommend the Energy Smart program to others?



Q5: How did you hear about the Energy Smart program?



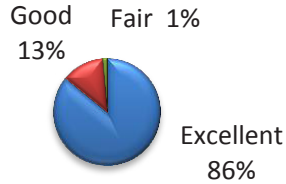
Q6: Have you taken advantage of other Energy Smart programs?



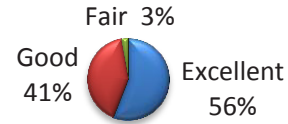
CFL Direct Install Program - Customer Satisfaction Surveys

Total of 78 surveys received through Feb 23, 2013

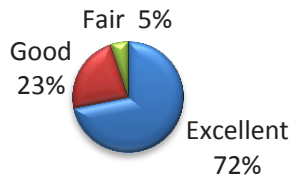
Q1a: How do you rate your experience with the Green Light N.O. volunteers?



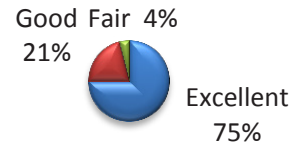
Q1b: How would you rate the ease of contacting Green Light N.O. and scheduling an appointment?



Q2a: How would rate the overall value of your CFL installation?



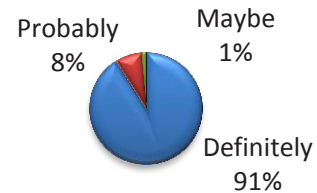
Q2b: How would you rate your level of satisfaction with the CFL bulbs that were installed?



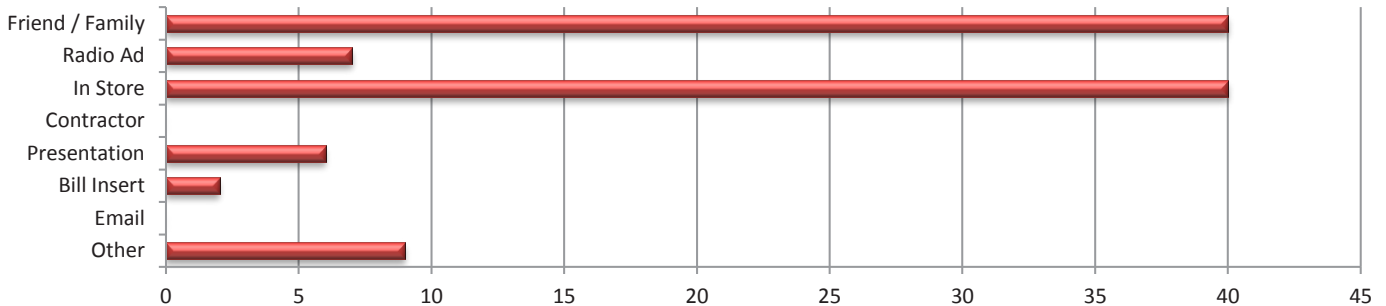
Q3: Are you the homeowner, landlord, or tenant?



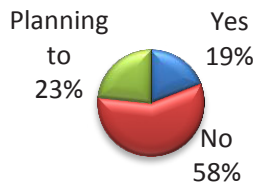
Q4: Would you recommend the Energy Smart program to others?



Q5: How did you hear about the Energy Smart program?



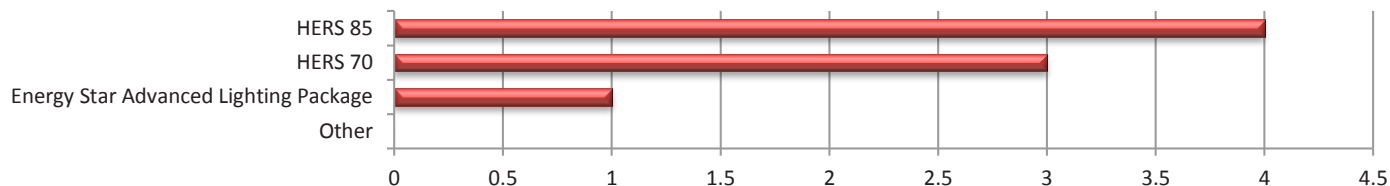
Q6: Have you taken advantage of other Energy Smart programs?



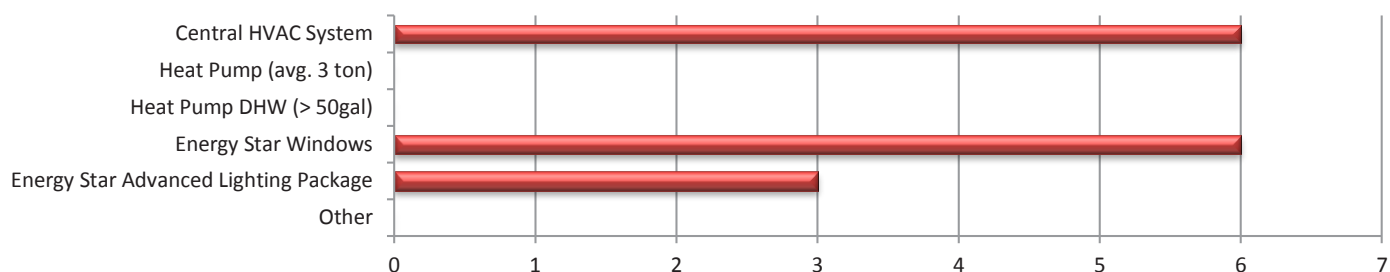
New Homes Program - Customer Satisfaction Surveys

Total of 7 surveys received through Mar 18, 2013

Q1a: Which performance measures did you implement?



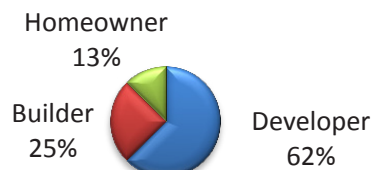
Q1b: Which prescriptive measures did you implement?



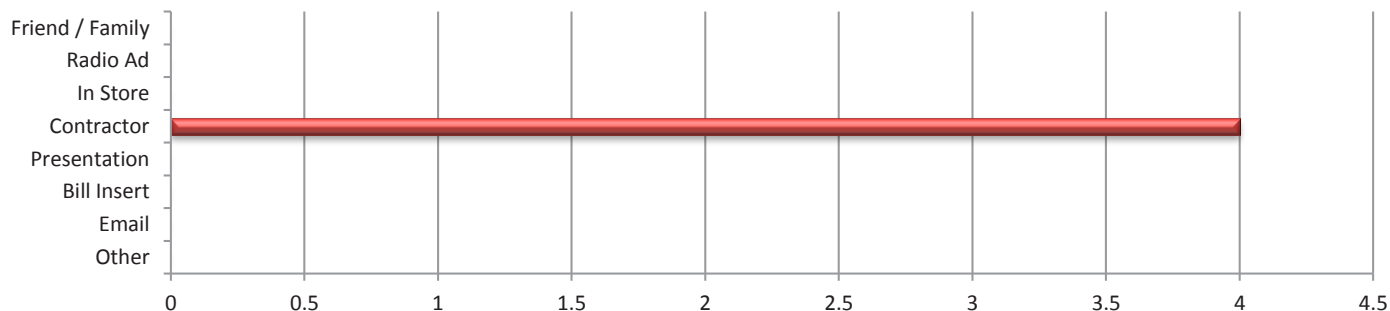
Q2: How do you rate the value of the Energy Efficient New Homes Program?



Q3: Are you the homeowner, landlord, or tenant?



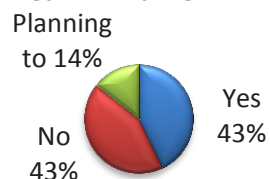
Q5: How did you hear about the Energy Smart program?



Q4: Would you recommend the Energy Smart program to others?



Q6: Have you taken advantage of other Energy Smart programs?



Hard to Reach Program - Customer Satisfaction Surveys

Total of 7 surveys received through Apr 2, 2013

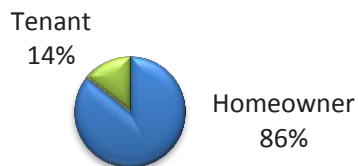
Q1b: How do you rate your experience with the contractor?



Q2: How do you rate the value of the Energy Smart Weatherization Ready Program?



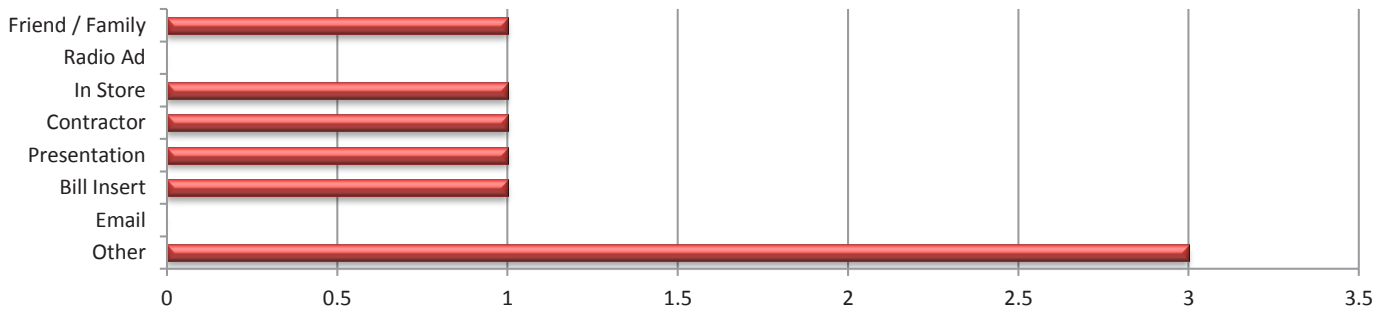
Q3: Are you the homeowner, landlord, or tenant?



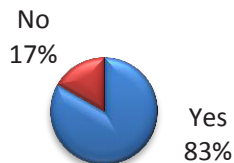
Q4: Would you recommend the Energy Smart program to others?



Q5: How did you hear about the Energy Smart program?



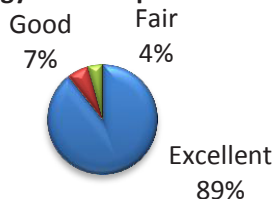
Q6: Have you taken advantage of other Energy Smart programs?



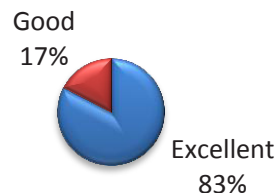
Small Commercial Program - Customer Satisfaction Surveys

Total of 47 surveys received through Mar 20, 2013

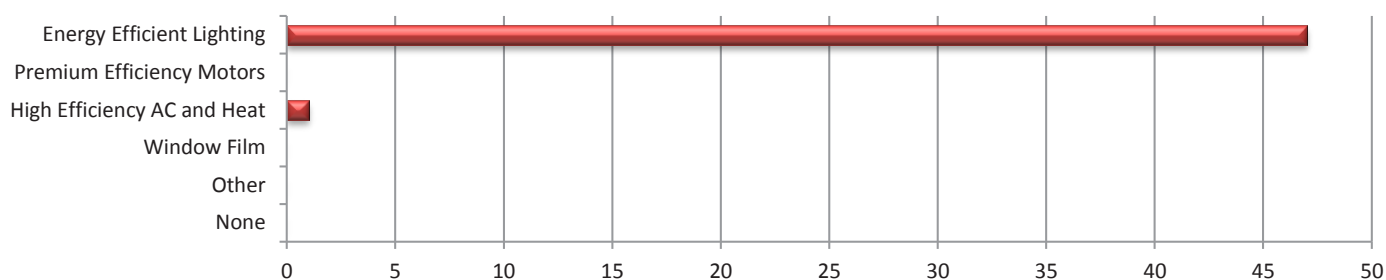
Q1a: How do you rate your experience with the Energy Smart representative?



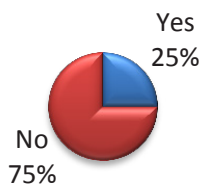
Q1c: How would you rate the overall value of the Energy Smart program?



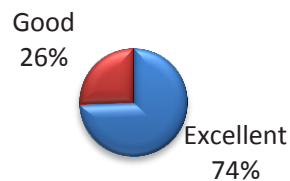
Q1d: What upgrade(s) did you implement as part of the program?



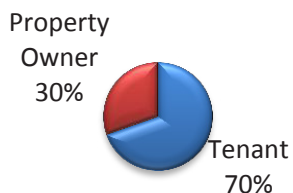
Q1e: Are you planning to implement any other energy efficiency measures?



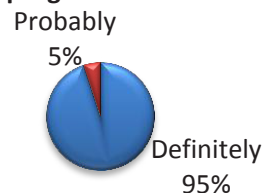
Q2b: How do you rate your experience with the contractor?



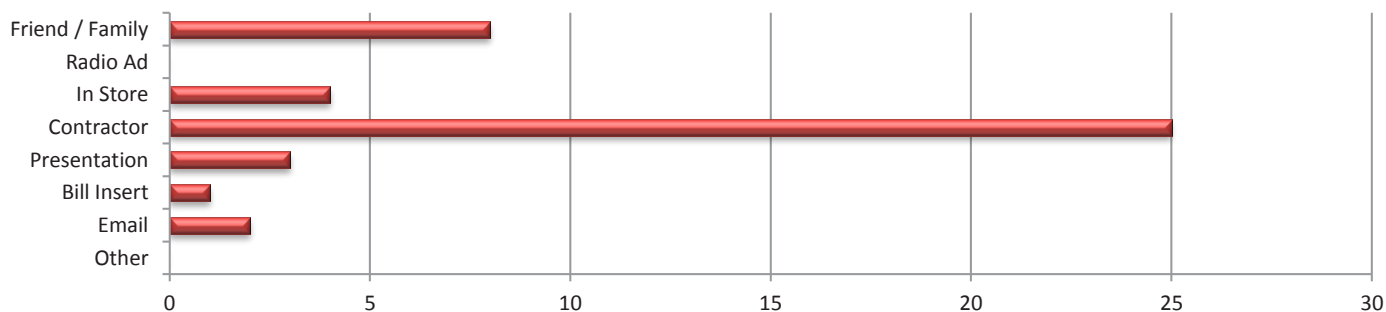
Q3: Are you the tenant or the owner of the property that qualified for this program?



Q4: Would you recommend the Energy Smart program to others?



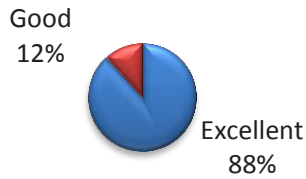
Q5: How did you hear about the Energy Smart program?



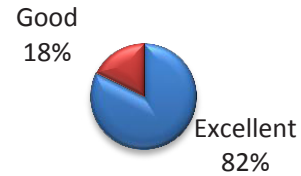
Large Commercial Program - Customer Satisfaction Surveys

Total of 17 surveys received through Apr 22, 2013

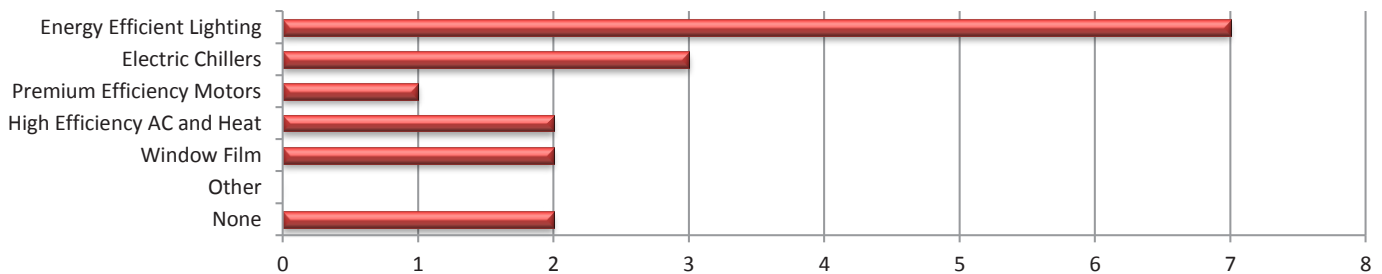
Q1a: How do you rate your experience with the Energy Smart representative?



Q1c: How would you rate the overall value of the Energy Smart program?



Q1d: What upgrade(s) did you implement as part of the program?



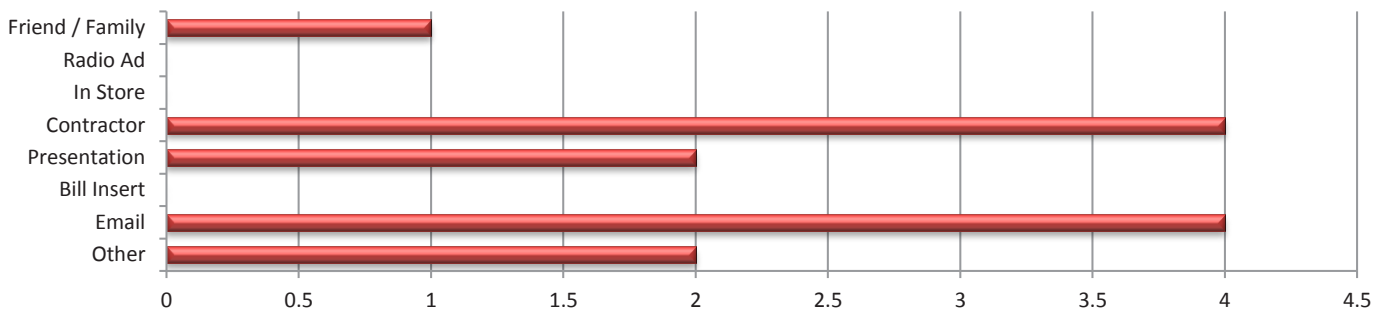
Q1e: Are you planning to implement any other energy efficiency measures?



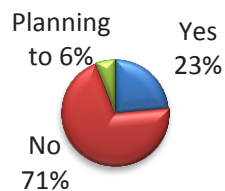
Q2: Would you recommend the Energy Smart program to others?



Q3: How did you hear about the Energy Smart program?



Q4: Have you taken advantage of other Energy Smart programs?



**“We can create a more sustainable, cleaner
and safer world by making wiser energy
choices.” – Robert Alan Silverstein**





EVALUATION

SUMMARY

Evaluation Summary

CLEAResult enlisted Optimal Energy, a third party independent evaluator to do the following:

1. Perform an evaluation summary of all Energy Smart program activity. In this evaluation, Optimal provided a review of all programs to ensure that program materials were documented appropriately and energy savings calculations were tabulated correctly. Optimal also provided a series of specific recommendations on program operations and documentation review. Responses to these recommendations are included below.
2. Perform a survey of impact evaluations in other energy efficiency markets in order to begin quantifying the magnitude of net-to-gross ratios to be expected for Energy Smart New Orleans.

Each of these reports is included as appendices to this report.

Overall, Optimal provided a very positive review of the Energy Smart program, saying:

“We believe that Energy Smart stakeholders should be confident that CLEAResult’s ongoing quality control and data verification procedures are ensuring that reported savings correctly reflect the actual implemented project specifications and correctly apply to the deemed savings documents, especially after the recommendations have been implemented. Therefore, it may be appropriate to conduct a less thorough review of the project files in the future and instead focus on evaluation resources on specific program areas that represent large fractions of overall savings and/or are highly uncertain.”

Energy Smart Responses to Optimal's Recommendations

Optimal provided Energy Smart with a series of recommendations to improve program tracking and implementation. In addition to the responses listed below, Energy Smart is engaging in a process to take action on these recommendations. An update on this process will be included in Energy Smart's first Program Year 3 quarterly report.

Recommendation 1

Ensure that each project file contains complete documentation, including the application, any deemed savings calculations, and, where available, invoices and post-installation inspection forms.

Action taken by Energy Smart:

Over the last year, Energy Smart has migrated all program tracking documents into one database. Depending on the program, not all of the documents listed above are required by Energy Smart in order to accept a complete project application. Energy Smart updates its database with required documentation and information as this information is received.

Recommendation 2

Ensure that instructions for replacement compact fluorescent light bulb, or CFL, wattage are consistent between the Residential Solutions program, the CFL Direct Install Program and the deemed savings documentation. These instructions should be based on the requirement of maintaining the same lumens pre- and post-installation.

Action taken by Energy Smart:

Energy Smart utilizes deemed savings manuals for the proper replacement of CFLs across all

programs. Replacement practices ensure the proper switch from incandescent bulbs to CFLs, taking into account both lumen output and wattage replacement. Energy Smart staff conducts quality assurance of these replacements.

Recommendation 3

Ensure that envelope measures for detached homes with multiple dwelling units are only counted once.

Action taken by Energy Smart:

Energy Smart is aware of the need to provide constant monitoring of this issue due to New Orleans' unique housing stock. Quality assurance for envelope measures is performed on detached homes both in the field and during application submission review.

Recommendation 4

Ensure that all contractors are using the most up-to-date version of the lighting calculator.

Action taken by Energy Smart:

This comment applies to the Small and Large Commercial programs, both of which utilize a lighting calculator to determine the cost and energy savings for lighting replacement projects. Energy Smart updates the lighting calculator as needed for ease of use and to reflect any changes in deemed savings. When these revisions are made, contractors and installers are provided with the most up-to-date calculator. In all cases, the calculators are reviewed by Energy Smart staff to ensure the proper application of deemed savings calculations.

Recommendation 5

Consider a factor recommending HVAC interactive effects for residential lighting savings calculations.

Action taken by Energy Smart:

Energy Smart will perform a review of HVAC interactive effects on residential lighting replacement programs to determine the kWh savings potential. Energy Smart will also examine the steps necessary to provide proper documentation and review for tracking HVAC interactive effects.

Recommendation 6

Ensure that proper documentation is consistent and complete for every project. Incomplete project documentation made it very difficult to perform a thorough third party verification in certain cases. This is especially true for the C&I program, for which each lighting project file should include a copy of any calculation worksheets and each non-lighting project should include a memo explaining the savings assumptions and calculations.

Action taken by Energy Smart:

During the evaluation, Optimal asked for additional project documentation in a small handful of cases for the C&I program in order to get a full understanding of the deemed savings calculations. Energy Smart provided this documentation to Optimal. The metric and valuation reports that are associated with the non-lighting projects and generated by CLEAResult engineering staff for these projects were not kept in the project database, but were furnished to Optimal upon request. In the future, all of these documents will be kept in the project database.





LOOKING AHEAD

TO PROGRAM YEAR 3

Program Year 1 of Energy Smart was focused on trailblazing an energy efficiency market in New Orleans. Program Year 2 built upon that market establishment to continue expanding and to begin fine-tuning program functions while reaching a larger segment of New Orleans renters, homeowners and business owners. As Energy Smart moves into Program Year 3, it will foster the elements that have brought it success thus far while innovating new ways to continue delivering a cutting-edge product.

Focus on Contractors

Energy Smart has been an effective program due to the success of its contractors in delivering energy efficiency to New Orleanians. Providing training, regular meetings and mentoring has ensured that Energy Smart's contracting network is up-to-date and delivering the best possible product. Continuing to grow Energy Smart's network of contractors has also been crucial to its success, especially through a continued focus on recruiting minority contracting companies. Energy Smart quality assurance specialists are on job sites every day working with contractors and talking to customers to make sure that the highest-quality product is being delivered.

In order to manage Energy Smart's increased work volume, the program has developed a new methodology for conducting Home Performance with ENERGY STAR quality assurance:

- All contracting companies will receive quality assurance on 20 percent of the work they perform.
- A "confidence factor" will be assigned to each company based on their performance.
- For the companies that have demonstrated a

need for continued quality assurance and field mentoring, a higher volume of their work will be monitored.

- For the companies that have demonstrated a consistent ability to meet or exceed expectations, a lower volume of their work will be monitored.

Incentive Change for Gas Heated Homes

Gas heated homes accounted for 56 percent of Home Performance with ENERGY STAR incentives during Program Year 2. With the exception of floor insulation, all home weatherization measures were paid at the same incentive rate amount even though gas heated homes realize a lower deemed kWh savings rate. Beginning July 1, 2013, incentive rates for gas heated homes will change for the following two measures:

- Air Infiltration will change from \$0.20 per CFM reduced to \$0.10 per CFM reduced.
- Duct Sealing will change from \$0.24 per sq. ft. to \$0.12 per sq. ft.

The incentive changes are based on the percentage difference in deemed savings of natural gas versus electric heated homes. The following are tables from the Energy Smart deemed savings manual:

Air Infiltration Deemed Savings

kWh Impact per CFM ₅₀ Reduction				kW Impact per CFM ₅₀ Reduction
City	Gas Heat	Resistance Heat	Heat Pump Heat	
New Orleans	.506	.983	.598	0.00049

Duct Efficiency Improved Deemed Savings

Duct Efficiency Improvement				
Weather Zone	Electric AC Gas Heat	Electric AC Electric Heat	Electric AC Heat Pump	Summer Peak
	Avg. kWh savings per sq. ft. of conditioned space	Avg. kWh savings per sq. ft. of conditioned space	Avg. kWh savings per sq. ft. of conditioned space	Avg. kWh savings per sq. ft. of conditioned space
New Orleans (adjusted from Houston)	0.804	1.86	1.187	0.00053

Continued Focus on Multifamily Direct Install

Energy Smart has found great success with directly installing energy efficiency measures in large apartment complexes across New Orleans. It has been a very cost-effective way to generate energy savings while simultaneously providing cost-saving measures to market rate and low-income renters. While participation up until now has come from large apartment complexes, Energy Smart is expanding this direct install service in Program Year 3 by reaching out to smaller apartment complexes.

Driving Participation in Programs with Low Uptake

In the fall of 2012, Energy Smart was directed by the New Orleans City Council to provide information regarding its strategies for driving participation in programs with low uptake. Energy Smart continues to make the success of all of its programs a top priority and has instituted the following initiatives to bolster low-uptake programs:

- Marketing focused specifically on low-uptake programs.
- Engagement to ensure contractors understand and are effectively utilizing programs.
- Process refinement to ensure that low-

uptake programs are easily accessible and understandable by both contractors and customers.

Driving Participation for Small and Large Commercial Non-Lighting Projects

Lighting projects have accounted for the bulk of Energy Smart's Small and Large Commercial program incentives. Businesses have preferred lighting projects in large part due to their relatively low cost and speedy payback time, which in many cases can be less than a year. Over the last year, in order to drive participation in non-lighting measures, Energy Smart has created marketing materials specifically for the types of businesses that have been most active in the program. These materials will inform businesses about the other energy efficiency options they have, and Energy Smart will continue to develop them throughout Program Year 3.



APPENDICES



Contacts

CLEAResult Contacts	Title	Programs	Phone	Email
Jerrel Gustafson	Director	All programs	(504)343-8554	jgustafson@clearesult.com
Alex Scott	Program Manager	All programs	(504) 872-3899	alex.scott@clearesult.com
Bridget Joseph	Program Consultant	HPwES and New Homes	(504) 872-3893	bjoseph@clearesult.com
David Magee	Program Consultant	Small & Large Commercial programs and Small and Large C&I programs	(512) 872-3894	dmagee@clearesult.com
Malcolm Toregano	Program Consultant	Energy Star Window and Central A/C, CFL Direct Install and QA	(504) 872-3889	mtoregano@clearesult.com
Dwayne Haley	Program Specialist	HPwES Field QA Specialist	(504) 872-3896	dhaley@clearesult.com
Ross Murray	HVAC Specialist	A/C Tune-up, Energy Star Central A/C, Office Specialist & Technical Support for all programs	(504) 872-3891	ross.murray@clearesult.com
Leanne Boudreaux	Program Coordinator	HPwES Data QA, Contractor Verification, HPwES, Multifamily Direct Install	(504) 523-9788	lboudreaux@clearesult.com
Aleksandra Sampi	Program Coordinator	Office Specialist & Technical Support for all programs	(504) 872-3877	asampi@clearesult.com
Kim Couch	Marketing Manager	All programs	(512) 416-5909	kcouch@clearesult.com
Caryn Rogers	Outreach Consultant/ Bright moments	All programs	(504) 592-1800	caryn@ brightmomentsnola.com
Linda Baynham	Outreach Manager/Baynham Environmental	All programs	(504) 861-4833	linda@ baynhamenvironmental.com

**Attachment A: Modifications to the commercial and
residential unitary equipment deemed savings**

Commercial and Residential AC and HP equipment

Measure Description

This measure applies to Unitary Air Conditioners (AC) and Heat Pump (HP) equipment for both residential and commercial applications. The following are the major equipment categories covered in this measure:

1. Unitary Air Conditioning (AC) Equipment, air cooled
2. Unitary Heat Pump (HP) Equipment, air-cooled
3. Packaged Terminal Air Conditioners (PTAC)
4. Packaged Terminal Heat Pumps (PTHP)
5. Single-Package Vertical Air Conditioners (SPVAC)
6. Single-Package Vertical Heat Pumps (SPVHP)
7. Room Air Conditioners (RAC)
8. Water Chilling Packages (CH)

Equipment Useful Life (EUL)

Following are the effective equipment useful life (EUL) based on the expected median service life according to ASHRAE.¹

Equipment Category	EUL
Unitary Air Conditioning (AC) Equipment, air cooled	15 years
Unitary Heat Pump (HP) Equipment, air-cooled	15 years
Packaged Terminal Air Conditioners (PTAC)	15 years
Packaged Terminal Heat Pumps (PTHP)	15 years
Single-Package Vertical Air Conditioners (SPVAC)	15 years
Single-Package Vertical Heat Pumps (SPVHP)	15 years
Room Air Conditioners (RAC)	10 years
Water Chilling Packages (CH)	32 years

¹ 2011 ASHRAE Handbook HVAC Applications, Ch. 37 Owning and Operating Cost, Table 4 – Comparison of Service Life Estimates

Measure Baselines

The baseline efficiency is dependent upon three retrofit classifications early retirement (ER), replace on burnout (ROB) and new construction (NC).

Early Retirement Baseline

Early retirement (ER) involves the replacement of an existing system that has a remaining useful life (RUL). For an early retirement retrofit the baseline will be based on the system's manufactured year (for split-dx equipment manufactured year will be based on the outdoor condensing unit) and the corresponding ASHRAE 90.1 standard effective during the existing equipment's manufactured year, which in most part follows the latest federal manufacturing standard.

Further information regarding the concept of early retirement can be found in a recent the section titled Early Retirement Texas PUCT petition².

The purpose for classifying projects as early retirement is it to account for the general practices of commercial HVAC contractors when it comes to repair/replace decisions. Baseline studies have demonstrated that retrofit projects include both replacement on burnout of non-functioning systems and the early retirement of systems that might have only required simple repairs. By demonstrating that contractors participating in rebate programs were more likely to replace systems rather than repair them, the baseline studies show that the existence of a rebate is sufficient incentive to encourage the early retirement of some systems. When this effect is quantifiable, it can be used to define a baseline for retrofit projects that is lower than the minimum efficiency of commercially-available equipment.

This measure proposes, for early retirement projects, the effective baselines will be based on whatever Federal or ASHRAE 90.1 equipment standard was in effect during same year the existing equipment was manufactured. This is a reasonable approach, since the equipment's efficiency would most likely be near such standard. Previously, all replace on burnout projects were treated the same: regardless of whether the system being replaced was still functioning, savings estimates and incentive payments were calculated as though the previously installed equipment no longer functioned. The early retirement methodology will allow utilities to calculate the savings for replacing an inefficient HVAC system that still has remaining useful life.

An early retirement project also requires a method for estimating the remaining useful life (RUL) of replaced systems. The method by which the RUL is estimated for an early retirement project is explained in more detail in a subsequent section titled "Remaining Useful Life".

Replace on Burnout Baseline

Replace on burnout (ROB) involves the replacement of existing equipment that is no longer functioning or does not have a remaining useful life. The effective baseline will be based on ASHRAE 90.1-2007.

² Texas PUCT Docket No. 40083, Petition to approve revisions to commercial hvac deemed savings for energy efficiency programs

New Construction Baseline

A new construction (NC) retrofit involves the installation of new high efficiency system that meets or exceeds the minimum efficiency standard. The baseline for new construction retrofits will be based on ASHRAE 90.1-2007.

Minimum Efficiency

For all retrofit projects the following are the minimum efficiency standards based on equipment and size category:

Equipment Category	Minimum Efficiency
Unitary Air Conditioning (AC) Equipment, air cooled	CEE Tier 1 or 2*
Unitary Heat Pump (HP) Equipment, air-cooled	CEE Tier 1 or 2*
Packaged Terminal Air Conditioners (PTAC)	ASHRAE 90.1-2010
Packaged Terminal Heat Pumps (PTHP)	ASHRAE 90.1-2010
Single-Package Vertical Air Conditioners (SPVAC)	ASHRAE 90.1-2010
Single-Package Vertical Heat Pumps (SPVHP)	ASHRAE 90.1-2010
Room Air Conditioners (RAC)	ASHRAE 90.1-2010
Water Chilling Packages (CH)	ASHRAE 90.1-2010
* Based on highest rating by category, effective CEE specification as of January 6, 2012	

Remaining Useful Life

An early retirement retrofit requires a method for estimating the remaining useful life (RUL) of replaced systems. The method used for estimating the RUL of a replaced system involves taking what is known about a system at the time it is being replaced – that it still works – and re-estimating the survival function for the system based on this information. The survival function used for the purpose was taken from the technical support document produced by the Department of Energy (DOE) in its evaluation of the energy efficiency standards.³ Commercial HVAC Systems have an EUL of 15 years¹, this is consistent with the age at which 50 percent of systems installed in a given year will no longer be in service, as described by the survival function in Figure 1.

³ Source: Life Cycle Cost Analysis Spreadsheet, “lcc_cuac_hourly.xls”.
http://www1.eere.energy.gov/buildings/appliance_standards/commercial/cuac_draft_analysis.html.

APPENDIX A-4

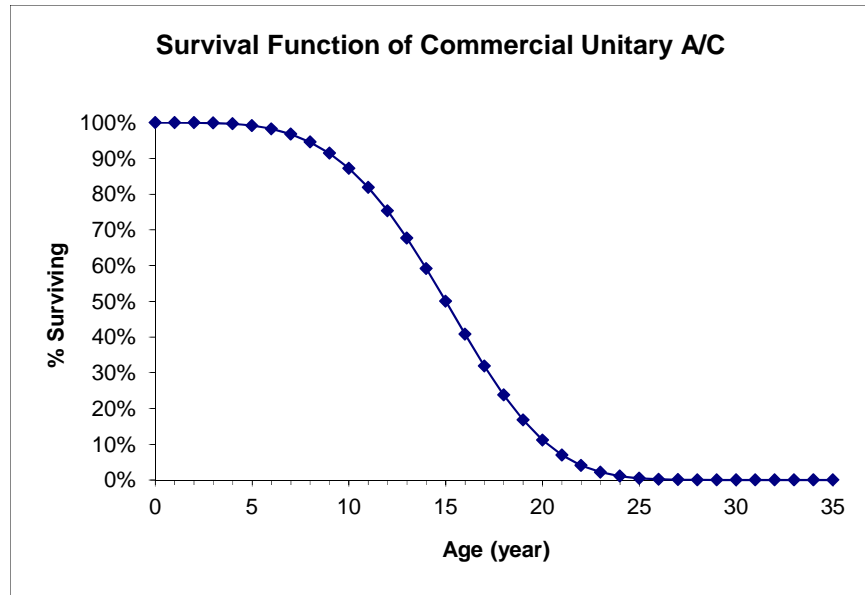


Figure 1 - Survival Function of Commercial Unitary Equipment³

For Room Air Conditioners a new survival curve was developed to account for the different EUL of 10 years. The survival function of Room Air Conditioners Figure 3 was developed by adjusting the survival curve of unitary equipment so that the 50 percent survival rate would correspond to a 10 EUL.

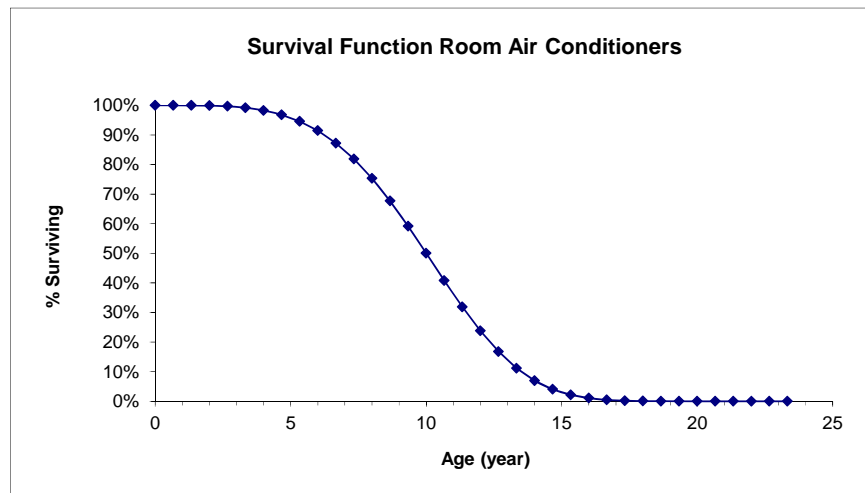


Figure 2 - Survival Function of Room Air Conditioners

Figure 3 - Survival Function of Packaged Chillers was based on data obtained from ASHRAE⁴. By review of the survival curve below at approximately 32 years 50 percent of the chiller population will still be in operation. Hence the EUL is set at 32 years.

APPENDIX A-5

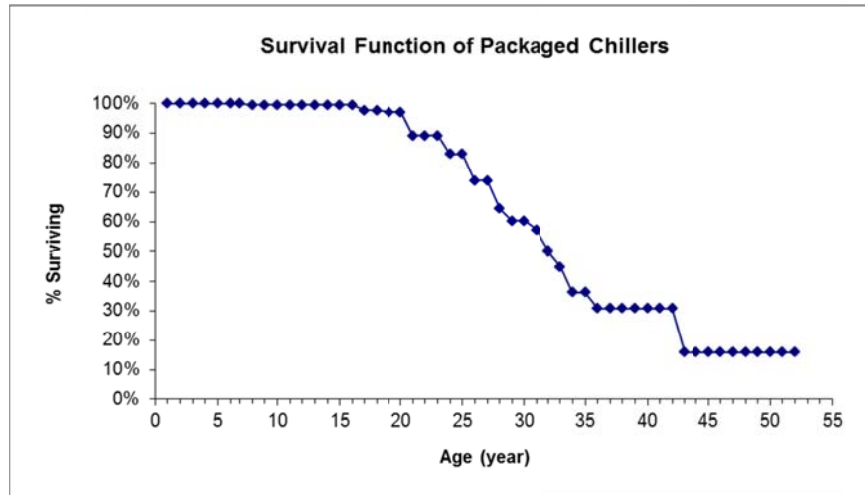


Figure 3 - Survival Function of Packaged Chillers⁴

⁴ 2011 ASHRAE Handbook, HVAC Applications, Ch. 37.3, Figure 1 Survival Curve of Centrifugal Chillers

APPENDIX A-6

The method used to estimate the RUL is based on Figure 1. For example, by the time the systems are 13 years old, the distribution in Figure 1 suggests that about 68 percent of systems remain in operation, meaning that 32 percent have failed. To estimate the point at which 50 percent of the remaining systems will have failed, the 32 percent that have already failed are removed from the distribution, and the percent surviving in each future year are compared against the baseline of 68 percent that continue to operate, rather than 100 percent (at year 0). In this way, as shown in Table 1, a 13 year-old system that is still in working condition is estimated to have 3.8 years of remaining useful life. Table 2 represented the RUL for Packaged Chillers which was developed by using Figure 3 - Survival Function of Packaged Chillers.

Table 1 - Room Air Conditioner and Unitary Equipment Remaining Useful Life (RUL)

Age of Replaced System (yrs)	Room Air Conditioners RUL (yrs)	Unitary Equipment RUL (yrs)
1	9.7	14.0
2	8.0	13.0
3	6.7	12.0
4	6.1	11.0
5	5.5	10.0
6	4.5	9.1
7	4.0	8.2
8	3.0	7.3
9	2.8	6.5
10	2.2	5.7
11	1.8	5.0
12	1.5	4.4
13	1.3	3.8
14	1.0	3.3
15	0.8	2.8
16	n/a	2.5
17	n/a	2.2
18	n/a	1.9
19	n/a	1.7
20	n/a	1.5
21	n/a	1.3
22	n/a	1.1
23	n/a	1.0

APPENDIX A-7

Table 2 - Packaged Chillers Remaining Useful Life (RUL)

Age of Replaced System (yrs)	Packaged Chillers RUL (yrs)	Age of Replaced System (yrs)	Packaged Chillers RUL (yrs)
1	31.0	21	12
2	30.0	22	11
3	29.0	23	10
4	28.0	24	9.4
5	27.0	25	8.4
6	26.0	26	7.9
7	25.0	27	6.9
8	24.1	28	7.8
9	23.1	29	11
10	22.1	30	10
11	21.1	31	9.1
12	20.1	32	8.3
13	19.1	33	7.5
14	18.1	34	6.8
15	17.1	35	5.8
16	16.1	36	5
17	15.3	37	4
18	14.3	38	3
19	13.3	39	2
20	12.3	40	1

Saving Adjusted for Early Retirement Projects

For early retirement (ER) projects the measure's demand and energy savings will be calculated by considering the project to have two separate components:

1. An ER project that provides savings over the RUL of the replaced system defined by the incremental efficiency between the replaced system baseline efficiency and that of the installed system, and
2. An ROB project that would have a standard EUL of 15 years for unitary equipment (10 years and 32 years for RAC and Packaged Chillers, respectively), with savings defined by the incremental efficiency between that of the installed systems and the ROB project baseline efficiency.

Demand and energy savings are most simply calculated according to a single equation that encompasses the efficiency gain from the efficiency of the replaced system to that of the installed system. Since these two components have different measure lives, a weighted average savings is estimated by weighting the RUL of the ER component with the incremental demand/energy savings from the efficiency improvement from the replaced system to the installed system and weighting the EUL of the ROB component with the demand/energy savings from the incremental efficiency between the baseline efficiency and that of the installed system. This weighting helps account for the average annual savings for the standard EUL of the system. Equation A-5 expresses this measure life calculation mathematically:

Equation 1

$$\text{Weighted ER Measure Savings (kW)} = \frac{kW_{ER} \times RUL + kW_{ROB} \times (EUL - RUL)}{EUL}$$

Equation 2

$$\text{Weighted ER Measure Savings (kWh)} = \frac{kWh_{ER} \times RUL + kWh_{ROB} \times (EUL - RUL)}{EUL}$$

Where:

kW_{ER} = Early Retirement (ER) Demand Savings

kWh_{ER} = Early Retirement (ER) Energy Savings

kW_{ROB} = Replace on Burnout (ROB) Demand Savings

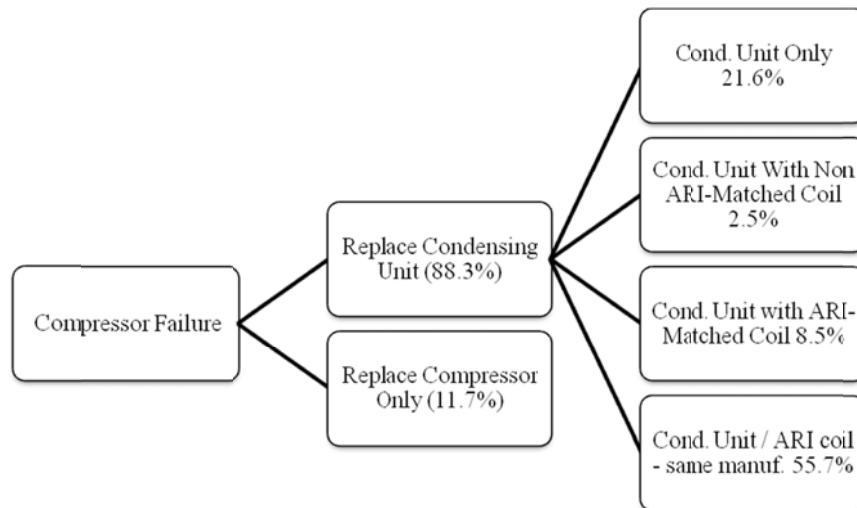
kWh_{ROB} = Replace on Burnout (ROB) Energy Savings

Remaining Useful Life (RUL)

EUL = Room Air Conditioners (10yrs), Unitary Equipment (15yrs), Packaged Chillers (32yrs)

Baseline Adjustment for Unitary Equipment under 65k BTUh

This baseline adjustment applies to unitary air conditioning equipment and unitary heat pumps under 65,000 Btu/h that are undergoing an ER or ROB retrofit. The purpose of this adjusted is to account for the likelihood, that without a utility incentive, there is a decision to partially replace or repair an existing system. For example, research performed by Texas A&M's Energy System Laboratory (ES) indicated that in the event of a compressor failure out of warranty, dealers replaced the compressor 11.7% of the time, and replaced the condensing unit 88.3% of the time. Further, the condensing unit replacements consist of condensing unit-only replacements, replacements with mismatched evaporator coils, and replacements with matching evaporator coils. The percentages for these installations are as follows:



To calculate a weighted average SEER for these installations, ESL assumed that a compressor-only replacement resulted in no increase in SEER, and that the SEER of a condensing unit installed without a matching coil would be 85% of the SEER value for a matched system. The ESL estimate of the baseline SEER for replacement AC units is given by the following equation:

$$\text{SEER}_{\text{Base}} = (\text{SEER}_{\text{CompressorRepl}}) \times (\text{Actual\%CompressorRepl}) +$$

$$(\text{SEER}_{\text{CondenserRepl}}) \times (\text{Actual\%CondenserRepl}) +$$

$$(\text{SEER}_{\text{SystemRepl}}) \times (\text{Actual\%SystemRepl})$$

Substituting ESL SEER estimates and survey data provides the following baseline SEER estimate:

$$\text{SEER}_{\text{Base}} = 9.5 \times 11.7\% + 11.05 \times 24.1\% + 13.5 \times 64.2\% = 12.44$$

In new construction, there is no possibility of a partial system (e.g. condensing unit-only) changeout, so the 12.44 baseline would not be appropriate. Therefore, the baseline for new construction installations is set at the federal government's minimum efficiency standard (ASHRAE 90.1-2007) of 13 SEER.

SEER to EER Conversion for Unitary Equipment under 65k BTUh

Since the efficiency ratings for unitary equipment under 65,000 BTU/h are provided in SEER, the conversion of the efficiency rating to EER is provided in equation below:

$$EER = SEER * 0.697 + 2.0394$$

Part-load Efficiency for Unitary Equipment greater than 65k BTUH

This applies to unitary equipment greater than 65 kBTU/h. Since the partload efficiencies of this equipment category has throughout the various federal standards changed from IPLV to no rating then to IEER a method to account for the partload efficiency was developed as follows. For unitary equipment manufactured prior to 2010 the following adjusted partload efficiency IEERadj was developed as follows:

Unitary Air Conditioning Equipment

$$IEER_{adj} = EER + 0.2 \quad (\text{Cooling capacity} \geq 65k \text{ and } < 240k \text{ Btu/h})$$

$$IEER_{adj} = EER + 0.1 \quad (\text{Cooling capacity} \geq 240k \text{ Btu/h})$$

Unitary Heat Pump Equipment

$$IEER_{adj} = EER + 0.2 \quad (\text{Cooling capacity} \geq 65k \text{ and } < 135k \text{ Btu/h})$$

$$IEER_{adj} = EER + 0.1 \quad (\text{Cooling capacity} \geq 135k \text{ Btu/h})$$

Coincidence Factor

By review of several Texas utility energy program's coincidence factor, the range was between 0.80 to 0.92 for various building types and reference climate cities in Texas (Amarillo, Fort Worth, Houston, Corpus Christi/Brownsville). For all retrofit projects within this measure a demand coefficient of 0.86 will be use the estimate the demand savings.

Cooling and Heating Equivalent Full Load Hours (EFLHs)

Heating and cooling equivalent full load hours (EFLH) were generated for the New Orleans climate using CLEAResult's analysis of multiple data resources; including, cooling degree days (CDD) and heating degree days (HDD) for New Orleans, ENERGY STAR data, the Commercial Buildings Energy Consumption Survey (CBECS), Texas LoanSTAR Guidelines EFLHs, Nexant Texas and Arkansas EFLHs, and empirical data gathered from various CLEAResult utility programs.

Table 3 - Heating and Cooling EFLH

Building Type	Cooling EFLH	Heating EFLH
College	2051	237
Convenience	3904	445
Fast Food	3202	374
Grocery	2846	267
Hospital	2592	208
Hotel	2210	237
Large Office	2584	237
Motel	2325	237
Nursing Home	2311	148
Public Assembly	2370	119
Religious Worship	1910	59
Restaurant	2448	320
Retail	2309	119
School	1546	148
Service	2280	119
Small Office	2007	237
Warehouse	2137	59

Energy and Demand Savings Equations

Following are the main equations used to calculate savings for all major equipment types and retrofit scenarios described in this measure:

Unitary Air Conditioning (AC) and Heat Pump (HP) Equipment, air cooled

Cooling Capacity (< 65k Btu/h)

Equation 3

$$\text{Demand Savings}(kW) = \text{Tons} \times \left(\frac{12}{\text{Old EER}} - \frac{12}{\text{New EER}} \right) \times 0.86$$

Equation 4

$$\text{Energy Savings}(kWh) = \text{Tons} \times \left(\frac{12}{\text{Old SEER}_{adj}} - \frac{12}{\text{New SEER}_{adj}} \right) \times \text{Cooling EFLH}$$

Equation 5

$$\text{Heat Pump Heating } kWh_{savings} = kBTUh \times \left(\frac{1}{\text{HSPF}_{Baseline}} - \frac{1}{\text{HSPF}_{new}} \right) \times \text{Heating EFLH}$$

Cooling Capacity (≥ 65k Btu/h)

Equation 6

$$\text{Demand Savings}(kW) = \text{Tons} \times \left(\frac{12}{\text{Old EER}} - \frac{12}{\text{New EER}} \right) \times 0.86$$

Equation 7

$$\text{Energy Savings}(kWh) = \text{Tons} \times \left(\frac{12}{\text{Old IEER}_{adj}} - \frac{12}{\text{New IEER}_{adj}} \right) \times \text{Cooling EFLH}$$

Equation 8

$$\text{Heat Pump Heating } kWh_{savings} = kBTUh \times \left(\frac{1}{\text{Old COP}} - \frac{1}{\text{New COP}} \right) \times \frac{\text{Heating EFLH}}{3.413}$$

Where (reference Table 4 and Table 5 for efficiency values):

Old EER/SEER_{adj}/IEER_{adj}/HSPF/COP = For early retirement (ER) projects select efficiency in year which corresponds to equipment's manufactured year. For ROB select efficiency in row labeled ROB. For new construction select efficiency in row labeled new construction.

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New EER/SEER_{adj}/IEER_{adj}/HSPF/COP New equipment AHRI rated efficiency which must meet or exceed the minimum efficiency

Heating /Cooling EFLH See Table 3 - Heating and Cooling EFLH

The equations above apply to ROB and NC retrofit projects. To calculate early retirement projects savings see section titled "Saving Adjusted for Early Retirement Projects". Also please note for units less than 65,000 BTUh the conversion from SEER to EER is as follows $EER = SEER \times 0.697 + 2.0394$.

Packaged Terminal Air Conditioners (PTAC) and Heat Pumps (PTHP)

$$Demand\ Savings(kW) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times 0.86$$

$$Energy\ Savings(kWh) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times Cooling\ EFLH$$

$$Heat\ Pump\ Heating\ kWh_{savings} = kBTUh \times \left(\frac{1}{Old\ COP} - \frac{1}{New\ COP} \right) \times \frac{Heating\ EFLH}{3.413}$$

Where (reference Table 6 for efficiency values):

Old EER/COP = For early retirement (ER) projects select efficiency in year which corresponds to equipment's manufactured year. For ROB select efficiency in row labeled ROB. For new construction select efficiency in row labeled new construction.

New EER/COP New equipment AHRI rated efficiency which must meet or exceed the minimum efficiency

Heating /Cooling EFLH See Table 3 - Heating and Cooling EFLH

The equations above apply to ROB and NC retrofit projects. To calculate early retirement projects savings see section titled "Saving Adjusted for Early Retirement Projects".

Single-Package Vertical Air Conditioners (SPVAC) and Heat Pumps (SPVHP)

$$Demand\ Savings(kW) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times 0.86$$

$$Energy\ Savings(kWh) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times Cooling\ EFLH$$

$$Heat\ Pump\ Heating\ kWh_{savings} = kBTUh \times \left(\frac{1}{Old\ COP} - \frac{1}{New\ COP} \right) \times \frac{Heating\ EFLH}{3.413}$$

Where (reference Table 7 for efficiency values):

Old EER/COP = For early retirement (ER) projects select efficiency in year which corresponds to equipment's manufactured year. For ROB select efficiency in row labeled ROB. For new construction select efficiency in row labeled new construction.

New EER/COP New equipment AHRI rated efficiency which must meet or exceed the minimum efficiency

Heating /Cooling EFLH See Table 3 - Heating and Cooling EFLH

The equations above apply to ROB and NC retrofit projects. To calculate early retirement projects savings see section titled "Saving Adjusted for Early Retirement Projects".

Room Air Conditioners (RAC)

$$Demand\ Savings(kW) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times 0.86$$

$$Energy\ Savings(kWh) = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times Cooling\ EFLH$$

Where (reference Table 8 for efficiency values):

Old EER/COP = For early retirement (ER) projects select efficiency in year which corresponds to equipment's manufactured year. For ROB select efficiency in row labeled ROB. For new construction select efficiency in row labeled new construction.

New EER/COP New equipment AHRI rated efficiency which must meet or exceed the minimum efficiency

Heating /Cooling EFLH See Table 3 - Heating and Cooling EFLH

The equations above apply to ROB and NC retrofit projects. To calculate early retirement projects savings see section titled "Saving Adjusted for Early Retirement Projects".

Air and Water Cooled Packaged Chillers

$$Demand\ Savings(kW) = Tons \times \left(\frac{1}{Old\ Full\ Load\ COP} - \frac{1}{New\ Full\ Load\ COP} \right) \times \frac{Cooling\ EFLH}{3.413}$$

$$Energy\ Savings(kWh) = Tons \times \left(\frac{1}{Old\ Partload\ COP} - \frac{1}{New\ Partload\ COP} \right) \times \frac{Cooling\ EFLH}{3.413}$$

Where (reference Table 9 for efficiency values):

Old COP = For early retirement (ER) projects select efficiency in year which corresponds to equipment's manufactured year. For ROB select efficiency in row labeled ROB. For new construction select efficiency in row labeled new construction.

New COP New equipment AHRI rated efficiency which must meet or exceed the minimum efficiency

Heating /Cooling EFLH See Table 3 - Heating and Cooling EFLH

The equations above apply to ROB and NC retrofit projects. To calculate early retirement projects savings see section titled "Saving Adjusted for Early Retirement Projects".

Calculation Example

Replace on Burnout (ROB) Scenario

Consider a 5-ton split system manufactured in 1990 installed at a School building type in New Orleans, which is being replaced upon the burnout of the unit. The system replacing the unit has the same capacity, but has an installed system efficiency of 15 SEER and 13 EER. Other important inputs are the current adjusted efficiency standards for a 5-ton split system (12.44 SEER and 10.7 EER) and the Equivalent Full Load Hours for School (1546 hours). The savings are calculated using

Equation 3 and Equation 4.

$$Demand\ Savings(kW_{ROB}) = 5ton \times \left(\frac{12}{10.7\ EER} - \frac{12}{13\ EER} \right) \times 0.86 = 0.85\ kW$$

$$Energy\ Savings(kWh_{ROB}) = 5ton \times \left(\frac{12}{12.44\ SEER} - \frac{12}{15\ SEER} \right) \times 1546\ hrs = 1273\ kWh$$

New Construction (NC) Scenario

Consider the same new unit installed as a new construction project. For this application, the NC inputs are used (11.1 EER and 13 SEER). These inputs are used in

Equation 3 and Equation 4.

$$Demand\ Savings(kW_{NC}) = 5ton \times \left(\frac{12}{11.1\ EER} - \frac{12}{13\ EER} \right) \times 0.86 = .68\ kW$$

$$Energy\ Savings(kWh_{NC}) = 5ton \times \left(\frac{12}{13\ SEER} - \frac{12}{15\ SEER} \right) \times 1546\ hrs = 951\ kWh$$

Early Retirement (ER) Scenario

Consider a 5-ton split system manufactured in 2005 installed at a School building type in New Orleans, which is being replaced despite being in reasonable operating condition. The system replacing the unit has the same capacity, but has an installed system efficiency of 15 SEER and 13 EER. Other important inputs are the current adjusted efficiency standards for a 5-ton split system (12.44 SEER and 10.7 EER) and the Equivalent Full Load Hours for School (1546 hours). The EUL for Unitary AC Equipment is 15 years, and the RUL for the 7 year old unit is 8.2 years.

Equation 3 and Equation 4 are used to compute the inputs which are utilized by Equation 1 and Equation 2 to calculate the savings.

$$Demand\ Savings(kW_{ER}) = 5ton \times \left(\frac{12}{9\ EER} - \frac{12}{13\ EER} \right) \times 0.86 = 1.76\ kW$$

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$$Energy\ Savings(kWh_{ER}) = 5ton \times \left(\frac{12}{10\ SEER} - \frac{12}{15\ SEER} \right) \times 1546\ hrs = 3092\ kWh$$

$$Weighted\ ER\ Measure\ Savings\ (kW) = \frac{1.76\ kW \times 8.2yr + 0.85\ kW \times (15yr - 8.2yr)}{15yr} = 1.35\ kW$$

$$Weighted\ ER\ Measure\ Savings\ (kWh) = \frac{3092kWh \times 8.2yr + 1273kWh \times (15yr - 8.2yr)}{15} = 2267\ kWh$$

Table 4 - Efficiency Levels for Unitary Air Conditioning Equipment

Manuf. Year ^d	Split System <65,000 Btu/h			Package System <65k Btu/h			All Systems ≥ 65k and < 135k Btu/h ^e		All Systems ≥ 135k and < 240k Btu/h ^e		All Systems ≥ 240k and < 760k Btu/h ^e		All Systems > 760k Btu/h ^e		Applicable Standard
	EER ^f	SEER	SEERadj ^h	EER ^f	SEER	SEERadj ^h	EER	IEER or IPLV	IEERadj ^g	EER	IEER or IPLV	IEERadj ^g	EER	IEER or IPLV	IEERadj ^g
1990	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8	8.3 IPLV	8.2	8	7.0 IPLV	7.9
1991	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8	8.3 IPLV	8.2	8	7.0 IPLV	7.9
1992	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1993	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1994	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1995	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1996	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1997	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1998	9.0	10	10	8.8	9.7	9.7	8.9	8.3 IPLV	9.1	8.3	8.3 IPLV	8.5	8.3	7.3 IPLV	8.1
1999	9.0	10	10	8.8	9.7	9.7	8.9	n/a	9.1	8.3	n/a	8.5	8.3	7.3 IPLV	8.1
2000	9.0	10	10	8.8	9.7	9.7	8.9	n/a	9.1	8.3	n/a	8.5	8.3	7.3 IPLV	8.1
2001	9.0	10	10	8.8	9.7	9.7	8.9	n/a	9.1	8.3	n/a	8.5	8.3	7.3 IPLV	8.1
2002	9.0	10	10	8.8	9.7	9.7	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2003	9.0	10	10	8.8	9.7	9.7	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2004	9.0	10	10	8.8	9.7	9.7	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2005	9.0	10	10	8.8	9.7	9.7	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2006 ^a	10.7	13	12.44	10.7	13	12.44	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2007 ^b	10.7	13	12.44	10.7	13	12.44	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2008 ^c	10.7	13	12.44	10.7	13	12.44	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2009 ^d	10.7	13	12.44	10.7	13	12.44	10.1	n/a	10.3	9.5	n/a	9.7	9.3	9.5 IPLV	9.1
2010 ^e	10.7	13	12.44	10.7	13	12.44	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.8	9.9 IEER	9.6
2011 ^f	10.7	13	12.44	10.7	13	12.44	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.8	9.9 IEER	9.6
2012 ^g	10.7	13	12.44	10.7	13	12.44	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.8	9.9 IEER	9.6
ROB ^h	10.7	13	12.44	10.7	13	12.44	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.8	9.9 IEER	9.6
NC	11.1	13	13	11.1	13	13	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.5	9.6 IEER	9.6
Min Efficiency	12.5	15.0	15	12	15.0	15	12.0	13.8 IEER	13.8	12.0	13.0 IEER	13.0	10.6	12.1 IEER	11.4

- a. For equipment under 65k Btu/h, EER = SEERadj * 0.697 + 2.0394
b. All equipment under 65k Btu/h, the 13 SEER baseline was adjusted to 12.44 to account for partial system changeout (e.g. Compressor or Condensing Unit Only), for ROB and existing equipment retrofits.
c. All efficiencies are based on "All Other" heating section type, if heating section is "Electric Resistance or None", add 0.2 to all efficiency values.
d. Equipment manufactured prior to 2010 and with capacities ≥ 65k and < 240k Btu/h an adjusted IEER (IEERadj) = EER + 0.2.
e. Equipment manufactured prior to 2010 and with capacities ≥ 240k Btu/h an adjusted IEER (IEERadj) = EER + 0.1.
f. Minimum Efficiency based on CEE Commercial Unitary AC and HP Specification Tier 2, effective 1/6/2012.
g. For split-dx equipment manufactured year is based on outdoor condensing unit.
h. For split-dx equipment manufactured year is based on outdoor condensing unit.

Table 5 - Efficiency Levels for Unitary Heat Pump Equipment

Manuf. Year ^a	Split System < 65,000 Btu/h				Package System < 65K Btu/h				All Systems ≥ 65K and < 135K Btu/h ^c				All Systems ≥ 135K and < 240K Btu/h ^c				All Systems ≥ 240K Btu/h ^c				Applicable Standard
	EER ^d	SEER	SEERadj ^b	HSPF	EER ^d	SEER	SEERadj ^b	HSPF	EER	IIEER or PLV	IIEERadj ^e	COP ^f	EER	IIEER or PLV	IIEERadj ^e	COP ^f	EER	IIEER or PLV	IIEERadj ^e	COP ^f	
1990	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8	7.0 PLV	8.1	2.8	8	7.0 PLV	8.1	2.8	ASHRAE 90.1-1989
1991	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8	7.0 PLV	8.1	2.8	8	7.0 PLV	8.1	2.8	ASHRAE 90.1-1989
1992	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1993	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1994	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1995	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1996	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1997	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1998	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 PLV	9.1	3	8.3	7.3 PLV	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1999	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	9.1	3	8.3	n/a	8.4	2.9	8.3	7.3 PLV	8.4	2.9	ASHRAE 90.1-1999
2000	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	9.1	3	8.3	n/a	8.4	2.9	8.3	7.3 PLV	8.4	3.1	ASHRAE 90.1-1999
2001	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	ASHRAE 90.1-1999 (as of 10/29/2001)
2002	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	ASHRAE 90.1-1999 (as of 10/29/2001)
2003	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	ASHRAE 90.1-2004
2004	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	ASHRAE 90.1-2004
2005	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	ASHRAE 90.1-2004
2006 ^a	10.7	13	12.44	7.7	10.7	13	12.44	7.7	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	Federal Standard/ASHRAE 90.1-2004 (as of 1/23/2006) ^b
2007 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
2008 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
2009 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 PLV	8.9	3.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
2010 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	10.8	11.0 IER	11.0	3.3	10.4	10.5 IER	10.5	3.2	9.3	9.4 IER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
2011 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	10.8	11.0 IER	11	3.3	10.4	10.5 IER	10.5	3.2	9.3	9.4 IER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
2012 ^b	10.7	13	12.44	7.7	10.7	13	12.44	7.7	10.8	11.0 IER	11	3.3	10.4	10.5 IER	10.5	3.2	9.3	9.4 IER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
ROB ^a	10.7	13	12.44	7.7	10.7	13	12.44	7.7	10.8	11.0 IER	11	3.3	10.4	10.5 IER	10.5	3.2	9.3	9.4 IER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
New Construction	11.1	13	13	7.7	11.1	13	13	7.7	10.8	11.0 IER	11	3.3	10.4	10.5 IER	10.5	3.2	9.3	9.4 IER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
Minimum Efficiency	12.5	15.0	15	9.0	12	15	15	8.5	11.1	12.1 IER	12.1	3.4	10.7	11.7 IER	11.7	3.2	10.1	10.7 IER	10.7	3.2	CIE Tier 2 ^h

BASELINE EFFICIENCIES

- a. For equipment under 65K Btu/h, EER = SEERadj * 0.697 + 2.0384
b. All equipment under 65K Btu/h, the 13 SEER baseline was adjusted to 12.44 to account for partial system changeout (e.g. Compressor or Condensing Unit Only), for ROB and existing equipment retrofits.
c. All efficiencies are based on "All Other" heating section type. If heating section is "Electric Resistance or None" add 0.2 to all efficiency values.
d. Equipment manufactured prior to 2010 and with capacities ≥ 65K and < 135K Btu/h an adjusted IIEER (IIEERadj = EER + 0.2).
e. Equipment manufactured prior to 2010 and with capacities ≥ 135K Btu/h an adjusted IIEER (IIEERadj = EER + 0.1).
f. COP is based on 47°F db/43°F wb outdoor air.
g. Minimum Efficiency based on CEE Commercial Unitary AC and HP Specification Tier 1 or Tier 2 (where applicable), effective 1/6/2012.
h. For split-dx equipment manufactured year is based on outdoor condensing unit.

Table 6 - Efficiency Level for Packaged Terminal AC and HP (PTAC & PTHP)

Manuf. Year	Air Conditioners - Cooling Mode		Heat Pumps - Cooling Mode	Heat Pumps - Heating Mode	Applicable Standard
	EER		EER	COP	
1990	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1991	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1992	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1993	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1994	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1995	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1996	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1997	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1998	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1989
1999	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1999
2000	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1999
2001	10-(0.16* CAP/1000)		10-(0.16* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1999
2002	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1999 (as of 10/29/2001)
2003	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--1999 (as of 10/29/2001)
2004	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--2004
2005	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	ASHRAE 90.1--2004
2006	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1--2004
2007	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007
2008	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007
2009	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007
2010	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2011	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2012	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
ROB	10.9-(0.213* CAP/1000)		10.8-(0.213* CAP/1000)	2.9-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
NC	12.5-(0.213* CAP/1000)		12.3-(0.213* CAP/1000)	3.2-(0.026* CAP/1000)	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
Minimum Efficiency	13.8-(0.3* CAP/1000)		14-(0.3* CAP/1000)	3.7-(0.052* CAP/1000)	ASHRAE 90.1--2010 (as of 10/8/2012)

CAP = Capacity in Btu/h. If less than 7,000, use 7,000 for calculations. If more than 15,000, use 15,000 for calculations.
 All efficiency based on 95degF db outdoor temperature

Table 7 - Efficiency Levels for Single Package Vertical Air Conditioners and Heat Pumps (SPVAC & SPVHP)

Manuf. Year	SPVAC - Cooling Mode			SPVHP - Cooling Mode			SPVHP - Heating Mode			Applicable Standard
	< 65,000 Btu/h	>=65,000, < 135,000	>= 135,000, < 240,000	< 65,000 Btu/h	>=65,000, < 135,000	>= 135,000, < 240,000	< 65,000 Btu/h	>=65,000, < 135,000	>= 135,000, < 240,000	
	EER	EER	EER	EER	EER	EER	COP	COP	COP	
BASELINE EFFICIENCIES										
1990	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1991	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1992	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1993	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1994	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1995	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1996	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1997	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1998	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1989
1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1999
2000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1999
2001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1999
2002	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1999 (as of 10/29/2001)
2003	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ASHRAE 90.1--1999 (as of 10/29/2001)
2004	8.6	8.6	8.6	8.6	8.6	8.6	2.7	2.7	2.7	ASHRAE 90.1--2004
2005	8.6	8.6	8.6	8.6	8.6	8.6	2.7	2.7	2.7	ASHRAE 90.1--2004
2006	8.6	8.6	8.6	8.6	8.6	8.6	2.7	2.7	2.7	Federal Standard/ASHRAE 90.1--2004
2007	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007
2008	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007
2009	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007
2010	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2011	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2012	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
ROB	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
NC	9.0	8.9	8.6	8.9	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
Minimum Efficiency	9.0	8.9	8.6	9.0	8.9	8.6	3.0	3.0	2.9	ASHRAE 90.1--2010

* EER - 95db/75wb outdoor air

** COP - 47db/43wb outdoor air

Table 8 - Efficiency Levels for Room Air Conditioners & Room Heat Pumps

Manuf. Year	Without Reverse Cycle, With Louvered Sides					Without Reverse Cycle, Without Louvered Sides					With Reverse Cycle (HP), With Louvered Sides		With Reverse Cycle (HP), Without Louvered Sides		Applicable Standard
	< 6,000 Btu/h	>= 6,000, < 8,000 Btu/h	>= 8,000, < 14,000 Btu/h	>= 14,000, < 20,000 Btu/h	>= 20,000 Btu/h	< 6,000 Btu/h	>= 6,000, < 8,000 Btu/h	>= 8,000, < 20,000 Btu/h	>= 20,000 Btu/h		< 20,000 Btu/h	>= 20,000 Btu/h	< 14,000 Btu/h	>= 14,000 Btu/h	
	EER	EER	EER	EER	EER	EER	EER	EER	EER		EER	EER	EER	EER	
1990	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1991	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1992	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1993	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1994	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1995	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1996	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1997	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1998	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1989
1999	8.0	8.5	9.0	8.8	8.2	8.0	8.5	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1999
2000	8.0	8.5	9.0	8.8	8.2	8.0	8.0	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1999
2001	8.0	8.5	9.0	8.8	8.2	8.0	8.0	8.5	8.2		8.5	8.5	8.0	8.0	ASHRAE 90.1--1999
2002	9.7	9.7	9.8	9.7	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	ASHRAE 90.1--1999 (as of 10/29/2001)
2003	9.7	9.7	9.8	9.7	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	ASHRAE 90.1--1999 (as of 10/29/2001)
2004	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	ASHRAE 90.1--2004
2005	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	ASHRAE 90.1--2004
2006	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2004
2007	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007
2008	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007
2009	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2010	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2011	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2012	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
ROB	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
NC	9.7*	9.7	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
Minimum Efficient	9.7*	9.7*	9.8	9.7*	8.5	9.0	9.0	8.5	8.5		9.0	8.5	8.5	8.0	ASHRAE 90.1--2010

* Efficiency is in SEER

Table 9 - Efficiency Levels for Air-Cooled Packaged Chillers

Manuf. Year	Air Cooled w. Condensor						Air Cooled w. out Condensor						Applicable Standard
	< 150 Tons			>=150 Tons			< 150 Tons			>=150 Tons			
	Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	
1972 - 1990	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989
1991	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989
1992	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1993	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1994	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1995	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1996	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1997	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1998	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1999	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1999
2000	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1999
2001	2.70	2.80	COP	2.50	2.50	COP	3.10	3.20	COP	3.10	3.20	COP	ASHRAE 90.1--1999
2002	2.80	2.80	COP	2.80	2.80	COP	3.10	3.10	COP	3.10	3.10	COP	ASHRAE 90.1--1999 (as of 10/29/2001)
2003	2.80	2.80	COP	2.80	2.80	COP	3.10	3.10	COP	3.10	3.10	COP	ASHRAE 90.1--1999 (as of 10/29/2001)
2004	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	ASHRAE 90.1--2004
2005	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	ASHRAE 90.1--2004
2006	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2004
2007	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007
2008	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007
2009	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007
2010	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2011	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
2012	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
ROB	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
NC	2.80	3.05	COP	2.80	3.05	COP	3.10	3.45	COP	3.10	3.45	COP	Federal Standard/ASHRAE 90.1--2007 (as of 1/1/2010)
Minimum Efficiency	9.562	12.50	EER	9.562	12.75	EER	9.562	12.50	EER	9.562	12.75	EER	ASHRAE 90.1--2010

BASELINE EFFICIENCIES

Table 10 - Efficiency Levels for Water Cooled Reciprocating Packaged Chillers

Manuf. Year	Water Cooled Reciprocating												Applicable Standard
	<75 Tons Path A			<150 Tons, >=75 Tons Path A			<300, >=150 Tons Path A			>=300 Tons Path A			
	Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	
1972 - 1990	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989
1991	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1992	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1993	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1994	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1995	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1996	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1997	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1998	3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1-1989 (as of Jan. 1, 1992)
1999	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	ASHRAE 90.1-1999
2000	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	ASHRAE 90.1-1999
2001	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	3.80	3.90	COP	ASHRAE 90.1-1999
2002	4.20	4.65	COP	4.20	4.65	COP	4.20	4.65	COP	4.20	4.65	COP	ASHRAE 90.1-1999 (as of 10/29/2001)
2003	4.20	4.65	COP	4.20	4.65	COP	4.20	4.65	COP	4.20	4.65	COP	ASHRAE 90.1-1999 (as of 10/29/2001)
2004	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	ASHRAE 90.1-2004
2005	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	ASHRAE 90.1-2004
2006	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2004
2007	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007
2008	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007
2009	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007
2010	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2011	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2012	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
ROB	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
NC	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	4.20	5.05	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
Minimum Efficiency	0.78	0.63	Path A - kW/ton	0.78	0.62	Path A - kW/ton	0.68	0.58	Path A - kW/ton	0.620	0.540	Path A - kW/ton	ASHRAE 90.1-2010
	0.80	0.60	Path B - kW/ton	0.79	0.59	Path B - kW/ton	0.72	0.54	Path B - kW/ton	0.639	0.490	Path B - kW/ton	

a - Requirements reduces to 4.7 COP & 4.8 IPLV when R-22 is used or where CFC refrigerators with ozone depletion factors less than or equal to those for R-22 are used

Table 11 - Efficiency Levels for Water Cooled Positive Displacement Packaged Chillers (Rotary Screw & Scroll)

Manuf. Year		Water Cooled - Positive Displacement (Rotary Screw & Scroll)												Applicable Standard
		<75 Tons Path A			<150 Tons, >=75 tons Path A			<300, >=150 Tons Path A			>=300 Tons Path A			
		Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	Full	IPLV	Rating	
1972 - 1990		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989
1991		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989
1992		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1993		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1994		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1995		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1996		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1997		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1998		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.3a	COP	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
1999		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.30	COP	ASHRAE 90.1--1999
2000		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.30	COP	ASHRAE 90.1--1999
2001		3.80	3.90	COP	3.80	3.90	COP	4.20	4.50	COP	5.20	5.30	COP	ASHRAE 90.1--1999
2002		3.80	3.90	COP	4.45	4.50	COP	4.90	4.95	COP	5.50	5.60	COP	ASHRAE 90.1--1999 (as of 10/29/2001)
2003		4.45	4.50	COP	4.45	4.50	COP	4.90	4.95	COP	5.50	5.60	COP	ASHRAE 90.1--2004
2004		4.45	4.50	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	ASHRAE 90.1--2004
2005		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	ASHRAE 90.1--2004
2006		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1--2004
2007		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007
2008		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007
2009		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007
2010		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2011		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
2012		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
RoB		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
NC		4.45	5.20	COP	4.45	5.20	COP	4.90	5.60	COP	5.50	6.15	COP	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
Minimum Efficiency		0.78	0.63	Path A - kW/ton	0.78	0.62	Path A - kW/ton	0.68	0.58	Path A - kW/ton	0.62	0.54	Path A - kW/ton	ASHRAE 90.1--2010
		0.80	0.60	Path B - kW/ton	0.79	0.59	Path B - kW/ton	0.72	0.54	Path B - kW/ton	0.64	0.49	Path B - kW/ton	
a - Requirements reduces to 4.7 COP & 4.8 IPLV when R-22 is used or where CFC refrigerators with ozone depletion factors less than or equal to those for R-22 are used														

**Attachment B: Supporting Documentation from Texas Filing
Addressing T12 Baselines**

- o Excerpts from Texas petition (docket #39146):

Estimated Useful Life (T12 Fixture with Magnetic Ballast) Methodology

An estimated useful life (EUL) is the typical period of time a given type of equipment is expected to last and provide savings under a given program measure. Occasionally, it is necessary to update EUL's in order to properly account for savings over the life of a measure. It is currently appropriate to update the EUL of T12 lighting fixtures with magnetic ballasts.

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The EUL for retrofits of T12 magnetic ballasts to T5 or T8 linear fluorescent equipment shall be 8.5 years in Program Years 2011 through 2014, based upon the findings of the Commercial Lighting T12 Baseline Analysis provided in Appendix C. Per those findings, beginning in Program Year 2015 all 4-foot and 8-foot linear fluorescent retrofit projects will assume a baseline of standard T8 electronic ballast with 32W lamps or better.

Post-retrofit systems using T-12 electronic ballasts or standard T8 electronic ballasts are not eligible for incentives and all post-retrofit technologies must use reduced wattage T-8 systems or high performance T-8 systems and meet the High Performance and Reduced Wattage lamp and ballast efficiency specifications developed by the Consortium for Energy Efficiency (CEE) as published on the CEE website.⁴ This will be a requirement for all T8 systems.

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⁴ Consortium for Energy Efficiency. *Commercial Programs: Commercial Lighting*. Online. Available: <http://www.cee1.org/com-1t/com-1t-main.php3>. Accessed December 29, 2010.

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Appendix C. T12 Baseline Calculation Methodology

This appendix provides the rationale used to determine the remaining useful life of existing magnetic ballasts existing in the marketplace, and based on this estimated remaining useful life, derives the proposed adjustment to the measure life of a lighting retrofit project in which a T12 fixture is replaced by a T5 or high performance T8 system.

Ballast Life

The “Texas Estimated Useful Life Table” gives the current measure life of linear fluorescent fixtures as 15.5 years.² The value of 15.5 years was taken from the 2003 Navigant US Lighting Study that identified T8 and T5 linear fluorescent fixtures as having a 50,000 hour manufacturer rated life and a weighted-average of 3,211 annual operating hours.

Magnetic Ballast Remaining Life

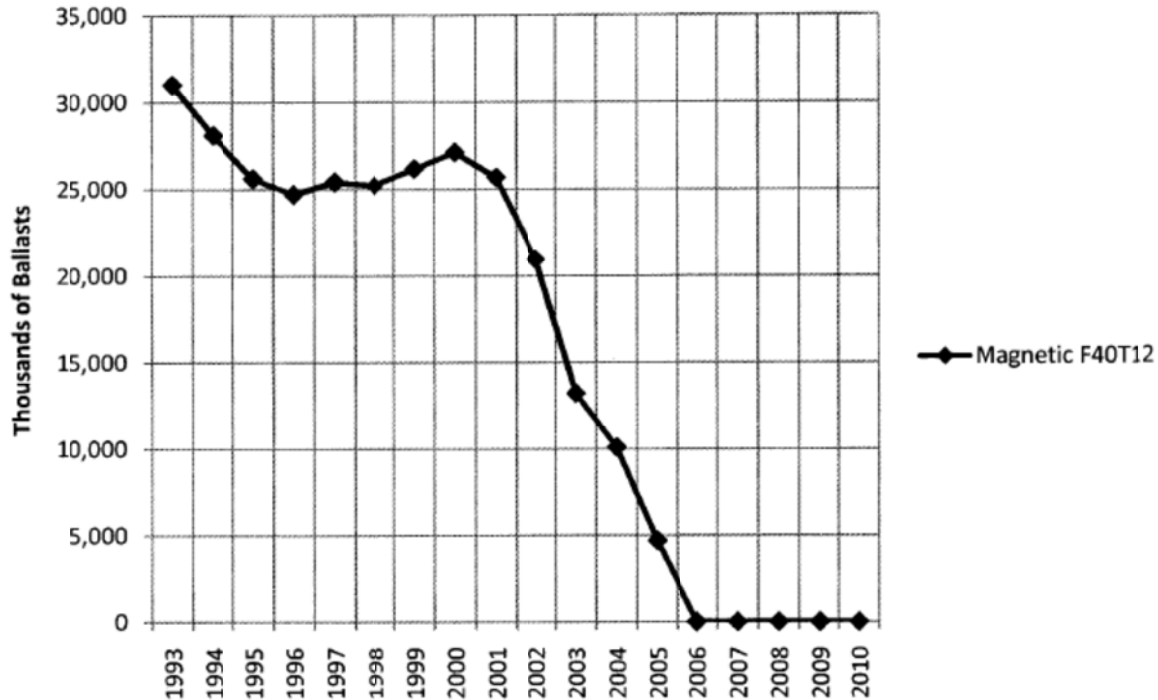
To determine the useful remaining life of T12 magnetic ballast currently in use throughout the United States, historical US Census data for magnetic ballast shipments were analyzed. The ballast “National Impact Analysis” spreadsheet⁵ contains a table of total historical fluorescent ballast shipments from 1990 through 2005. To distinguish between magnetic F40T12 ballasts and electronic F40T12 ballasts, additional data were analyzed from appendix B of the “Fluorescent Lamp Ballast Technical Support Document for the Final Rule, 2000” that contains information on ballast shipments and estimates the impact on ballast sales due to new regulations (DOE 2000b)⁶. The data in the 2000 document break down the F40T12 ballasts into magnetic and electronic categories. Additionally, Appendix B : Table B.18 of the “Fluorescent Lamp Ballast Technical Support Document for the Final Rule, 2000” contains projected ballast sales including the impact of existing programs on state adoption and code compliance.

Data from these sources were combined to determine the number of magnetic F40T12 ballast sales from 1993 through 2010. The difference between the total magnetic ballast and the F40T12 magnetic ballast was calculated for 1993 through 1997. For a conservative estimate of magnetic F40T12 remaining life, the differential was adjusted to take the sales of magnetic F40T12 ballast to zero by the year 2006. Figure 1 is a plot of the adjusted data showing the sales of magnetic F40T12 ballast from 1993 through 2010.

⁵ DOE 2010b. “Fluorescent Lamp Ballasts Preliminary Analytical Tools: National Impact Analysis.” Excel Spreadsheet. U.S. Department of Energy: 2010.

⁶ DOE 2000b. “Fluorescent Lamp Ballast Technical Support Document for the Final Rule, 2000.” September 2000.

Figure C-1. Adjusted magnetic F40T12 ballast sales for remaining useful life calculation



A weighted average of the data in Figure C-1 can be calculated to determine the current average age of magnetic 4-foot T12 MBP ballasts. Table C-1 presents the average age of magnetic 4-foot T12 ballasts based on an assumed ballast life. As determined from Table C-1, for an assumed ballast life of 15.5 years, the average age of magnetic 4-foot T12 ballast for the 2010 year is 9.8 years; thus, the average remaining useful life for magnetic 4-foot F40T12 ballasts is approximately 5.7 years (15.5 years – 9.8 years = 5.7 years). Average remaining Useful Life of T12 Systems at the end of 2012 (midpoint of 2011 and 2014 Program Years) is 4.1 years (15.5 years – 11.3 years = 4.2 years).

Table C-1. Average ballast age and quantity in use calculated from DOE historical shipment data and DOE market analysis using assumed ballast life

Assumed Ballast Life [yrs]	Average Age of Magnetic 4ft F40T12 Ballast [yrs]	Qty of Magnetic 4ft F40T12 Ballast in Use [thousands]
17	11.3	287851
16	10.7	256851
15	10.1	228751
14	9.5	203151
13	9.0	178451
12	8.4	153051
11	7.9	127851



MEMORANDUM

To: New Orleans Council Advisor

From: Jerrel Gustafson, CLEAResult

Date: January 14, 2013

Re: Modifications to Entergy New Orleans EnergySmart Program deemed savings

INTRODUCTION

The purpose of this letter is to summarize the changes CLEAResult made to the deemed savings for the Entergy New Orleans EnergySmart Program and to provide illustrations of how those changes were incorporated into the program documentation and calculation tools. These changes were based on recommendations made by Optimal Energy (3rd party evaluator) to help improve the validity of the savings.

On November 2011, CLEAResult conducted a technical review of the Entergy New Orleans EnergySmart Program's deemed savings. The intent of this technical review was to summarize the basis of the existing deemed savings and highlight any issues or areas of concern that would require updates or modifications to the calculation methods. CLEAResult presented the results of this technical review to Optimal Energy.

Then on February 2012, Optimal Energy, after reviewing CLEAResult's technical review, provided CLEAResult with a set of general recommendations that ultimately defined the basis for the changes made to the deemed savings. For the most part the existing deemed savings were found to be acceptable; however, a few measures were identified as needing some updates and/or modifications.

The following tables highlight the key recommendations made by Optimal Energy and CLEAResult's response and actions taken. They are broken up into logical categories (or measures) and illustrations of how the changes were implemented follow each of the applicable categories.

Table 1: Commercial Lighting Recommendations

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
Lighting Measures: Develop strategy to account for baseline shift due to new federal standards - T12 Linear Fluorescent Lamp and Ballast Rules	<p>CLEAResult developed a modified estimated useful life (EUL) of 8.0 years to account for the diminishing remaining useful life of 4-ft T12 linear fluorescent baseline systems currently operational in the field. The same approach was utilized in a recent filing approved by the Public Utility Commission on Texas (docket #39146). Under this approach, High Performance and Reduced-wattage T8 Systems (per the Consortium for Energy Efficiency - CEE specifications) are required on retrofit projects involving T12 magnetically ballasted baseline equipment.</p> <p>The Lighting measure calculator has been updated to only allow CEE-approved High Performance and Reduced-wattage T8 Systems as an eligible post-retrofit technology for retrofits of systems with T12 magnetic ballasts. It also separately tracks the measure life and savings for each unique technology to ensure accurate reporting.</p>	All Commercial Lighting Measures
	See Attachment B for a more detailed explanation of this approach from the Texas filing.	

Screenshots from Commercial Lighting Calculator:

- Broad view of overall calculation interface with the required inputs and calculated savings results

Line Item	BUILDING INFORMATION				PRE-RETROFIT LIGHTING				POST-RETROFIT LIGHTING				CALCULATED RESULTS		
	Room Number	Room, Area Description or Other Information	Building Type	Air Conditioning Type	Fixture Code	Fixture Description	# Fixtures	# Non-Operating Fixtures	Control Device	Fixture Code	Fixture Description	# Fixtures	Control Device	Demand Reduction (kW)	Energy Saved (kWh)
1	1	Office 1	Office	Refrigerated Case (33 to 41°F)	I44Svs	F48T12/MHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	I44I	T8 Fixtures replacing T12 magnetic equipment must have CEE approved premium efficiency ballasts and lamps	10	None	0.00	0
2	2	Office 2	Office	Air Conditioned	I44Svs	F48T12/MHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	I44Htu	F32T8-28W Fluorescent, (4) 48", T-8 @ 28W lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95) (94 Watt/Unit)	10	None	3.30	15,303
3	3	Office 3	Office	Air-Conditioned	I44Svs	F48T12/MHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	I44I	T8 Fixtures replacing T12 magnetic equipment must have CEE approved premium efficiency ballasts and lamps	10	None	0.00	0

○ Key functionality (close-up of previous screen) showing ineligibility Warning Message & 0.00 Savings:

POST-RETROFIT LIGHTING					CALCULATED RESULTS	
Fixture Code	Fixture Description	# Fixtures	Control Device		Demand Reduction (kW)	Energy Saved (kWh)
					(Total)	(Total)
f44ll	T8 Fixtures replacing T12 magnetic equipment must have CEE-approved premium efficiency ballasts and lamps	10	None		0.00	0
f44lntu	F32T8-28W Fluorescent, (4) 48" T-8 @ 28W lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95) (94 Watt/Unit)	10	None		3.30	15,303
f44ll	T8 Fixtures replacing T12 magnetic equipment must have CEE-approved premium efficiency ballasts and lamps	10	None		0.00	0

- Key functionality (close-up) ; Savings and Estimated Useful Life (EUL) tracked by unique technology:

Savings by Lighting Group				
Lighting Group	EUL	kW	kWh	
Halogen	1.5	-	-	-
High Intensity Discharge (HID)	15.5	-	-	-
Integrated-ballast CCFL Lamps	4.5	-	-	-
Integrated-ballast CFL Lamps	2.5	-	-	-
Integrated-ballast LED Lamps (ENERGY STAR)	9.0	-	-	-
Integrated-ballast LED Lamps (lighting Facts)	4.5	-	-	-
Light Emitting Diode (LED) Fixture	15.0	-	-	-
Modular CFL and CCFL Fixtures	16.0	-	-	-
Linear Fluorescent	15.5	-	-	-
Linear Fluorescent T12	8.0	3.30	15,303.02	-
Occupancy Sensor for Lighting	10.0	-	-	-
Photocell for Lighting	10.0	-	-	-
Timeclock for Lighting	10.0	-	-	-
Project Weighted EUL:		8.0		

Table 1 (cont.): Commercial HVAC Recommendations

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
<p>Add a systematic approach for dealing with early retirement retrofits</p>	<p>For all air conditioning equipment retrofit measures, CLEAResult created a systematic approach to handle early retirement retrofits. This approach accounts for the equipment's expected useful life and estimates the remaining useful life based on the average survival rate of the equipment being replaced.</p> <p>Early retirement (ER) involves the replacement of an existing system that has a remaining useful life (RUL). For an early retirement retrofit the baseline will be based on the system's manufactured year and the corresponding ASHRAE 90.1 standard effective during the existing equipment's manufactured year, which in most part follows the latest federal manufacturing standard.</p> <p>For early retirement (ER) projects the measure's energy savings will be calculated by considering the project to have two separate components:</p> <ol style="list-style-type: none"> 1) An ER project that provides savings over the RUL of the replaced system defined by the incremental efficiency between the replaced system baseline efficiency and that of the installed system, and 2) An replace on burnout (ROB) project that would have a standard EUL (e.g. 15 years for unitary equipment), with savings defined by the incremental efficiency between that of the installed systems and the ROB project baseline efficiency. <p>Since these two components have different measure lives, a weighted average savings is estimated by weighting the RUL of the ER component with the incremental energy savings from the efficiency improvement from the replaced system to the installed system and weighting the EUL of the ROB component with the energy savings from the incremental efficiency between the baseline efficiency and that of the installed system. This weighting helps account for the average annual savings for the standard EUL of the system. The equation below helps summarize this method.</p> <p>Weighted ER Measure Savings (kWh) = $(\text{kWh}_{\text{ER}} \times \text{RUL} + \text{kWh}_{\text{ROB}} \times (\text{EUL} - \text{RUL})) / \text{EUL}$</p> <p>Where:</p> <p>$\text{kWh}_{\text{ER}}$ = Early Retirement (ER) Energy Savings kWh_{ROB} = Replace on Burnout (ROB) Energy Savings Remaining Useful Life (RUL) Estimated Useful Life (EUL)</p>	<p>All Commercial HVAC measures</p>

	See Attachment A for a more detailed explanation and calculator screenshots and other illustrations of how the updates were incorporated into the calculation tools below.	
Commercial HVAC: use less stringent 2008 federal standards, rather than ASHRAE 90.1-2007, as baseline for retrofits	For new construction and replace on burnout, the baseline will be ASHRAE 90.1-2007. For an early retirement retrofit the baseline will be based on the system's manufactured year and the corresponding ASHRAE 90.1 standard effective during the existing equipment's manufactured year, which in most part follows the latest federal manufacturing standard. This is an integral part of CLEAResult's systematic approach to handle early retirement retrofits.	All Commercial HVAC measures
Chillers: Develop algorithm for water cooled chillers from kW/ton	Updated algorithm to handle kW/ton efficiency rating. See Attachment A for a detailed explanation.	Chiller Measures
Unitary AC: update typo in table - IEER should be 9.4, not 94	Table has been updated.	Unitary AC
Commercial HVAC measures: update efficiencies to match current CEE specification	Updated minimum efficiency table to match current CEE specifications (updated on January 6, 2012). http://www.cee1.org/files/CEE_CommHVAC_UnitarySpec2012.pdf The calculator screenshot in the following page helps illustrate the minimum efficiency used based on the CEE specifications. Also see Attachment A-19 and A-20 , which references the baseline lookup tables.	Commercial Unitary AC and HP
Commercial HVAC measures: find documentation for coincidence factor of 1.0, or use 0.8.	CLEAResult will use a 0.86 coincidence factor for all HVAC measure when calculating demand savings. The HVAC calculator screenshot shown on the following page helps illustrate how this factor is used in the demand savings calculation. See Attachment A-10 for further explanation of this factor.	All Commercial HVAC measures

Below is a screenshot of the updated commercial HVAC calculator. On the left is a screenshot of the inputs and resultant savings generated by the calculator. To the right is the step by step calculation on how the savings was calculated. The table below helps illustrate the changes made to address Optimal Energy's recommendations previously mentioned.

HVAC Calculator Screenshot

Commercial HVAC Calculator

1

Application Type	Project Type
Building Type	Early Retirement
Equipment Type 1	Large Office
Equipment Type 2	Existing Equipment Type
Equipment Type 3	DX Air Cooled
Existing Equip Manuf. Year	Unitary Air Conditioner
Cooling Capacity (tons)	Split System Under 5.42 tons
New Full-Load Efficiency	Existing Equipment
New Part-Load Efficiency	2005
Cooling Full-load	5 tons
Cooling Part-load	New Equipment Nameplate
EFLH Cooling	13.00 EER
EUL (yrs)	16.00 IEER
Equipment Age (yrs)	Efficiency Requirements
RUL	Cooling Full-load: 12.50 EER
	Cooling Part-load: 15.00 IEER
	EFLH Cooling: 2584 hrs
	EUL (yrs): 15 yrs
	Equipment Age (yrs): 8 yrs
	RUL: 7.30 yrs
COOLING BASELINES	
ER Full Load	9.00 EER
ER Part Load	10.00 SEER
ROB Full Load	10.70 EER
ROB Part Load	12.44 SEER
Savings	
Demand Savings (kW)	1.30 kW
Energy Savings (kWh)	4,253 kWh

Early Retirement Demand Savings (kW) Calculations

$$kW_{ER} = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times CF = 5 \times \left(\frac{12}{9} - \frac{12}{13} \right) \times 0.86 = 1.764\ kW$$

$$kW_{ROB} = Tons \times \left(\frac{12}{Old\ EER} - \frac{12}{New\ EER} \right) \times CF = 5 \times \left(\frac{12}{10.7} - \frac{12}{13} \right) \times 0.86 = 0.853\ kW$$

$$ER\ Savings\ (kW) = \frac{kW_{ER} \times RUL + kW_{ROB} \times (EUL - RUL)}{EUL} = \frac{1.764 \times 7.3 + 0.853 \times (15 - 7.3)}{15} = 1.30\ kW$$

Early Retirement Energy Savings (kWh) Calculations

$$kWh_{ER} = Tons \times \left(\frac{12}{Old\ SEER_{adj}} - \frac{12}{New\ SEER_{adj}} \right) \times Cooling\ EFLH = 5 \times \left(\frac{12}{10} - \frac{12}{16} \right) \times 2584 = 5,814\ kWh$$

$$kWh_{ROB} = Tons \times \left(\frac{12}{Old\ SEER_{adj}} - \frac{12}{New\ SEER_{adj}} \right) \times Cooling\ EFLH = 5 \times \left(\frac{12}{12.44} - \frac{12}{16} \right) \times 2584 = 2,773\ kWh$$

$$ER\ Savings\ (kWh) = \frac{kWh_{ER} \times RUL + kWh_{ROB} \times (EUL - RUL)}{EUL} = \frac{5,814 \times 7.3 + 2,773 \times (15 - 7.3)}{15} = 4,253\ kWh$$

Where:

Baseline lookups are referenced in the calculator's lookup table shown below.
 CF = Coincidence Factor as 0.86
 EFLH = 2,584 hrs based on large office see Table in Attachment A-11

Screenshot of Calculator's Baseline Lookups for Split Systems Under 65,000 BTU/h

	Manuf. Year ^e	Split System < 65,000 Btu/h			Applicable Standard
		EER ^a	SEER	SEERadj ^b	
BASELINE EFFICIENCIES	2005	9.0	10	10	ASHRAE 90.1--2004
	2006 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1--2004 (as of 1/23/2006) ^b
	2007 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
	2008 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
	2009 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006) ^b
	2010 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
	2011 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
	2012 ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
	ROB ^b	10.7	13	12.44	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010) ^b
	NC	11.1	13	13	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
	Min Efficiency	12.5	15.0	15	CEE Tier 2 ^f

ER Old EER & ER Old SEER

ROB Old EER & ROB Old SEER

Min. Efficiency Based on
CEE Tier2
See Attachment A-19

a. For equipment under 65k Btu/h, EER = SEERadj * 0.697 + 2.0394

b. All equipment under 65k Btu/h, the 13 SEER baseline was adjusted to 12.44 to account for partial system changeout (e.g. Compressor or Condensing Unit Only), for ROB and existing equipment retrofits.

c. All efficiencies are based on "All Other" heating section type, if heating section is "Electric Resistance or None" add 0.2 to all efficiency values.

d. Equipment manufactured prior to 2010 and with capacities ≥ 65k and < 240k Btu/h an adjusted IEER (IEERadj = EER + 0.2).

e. Equipment manufactured prior to 2010 and with capacities ≥ 240k Btu/h an adjusted IEER (IEERadj = EER + 0.1).

f. Minimum Efficiency based on CEE Commercial Unitary AC and HP Specification Tier 2, effective 1/6/2012.

Table 1 (cont.): Residential Solar Screen Recommendations

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
<p>Solar Screen: Update baseline SHGC assumption</p>	<p>The existing deemed savings assumes a base SHGC of 0.75. CLEAResult has program eligibility requirements printed in the Program Manual which ensures that only windows with existing SHGC greater than or equal to 0.75 (e.g. single-pane glass) are incentivized (see Program Manual excerpt below)</p>	<p>Solar Screens</p>

3. All new duct installations should be sealed to the same standards listed in the Repair and/or Sealing of Ducts
4. All new duct installations and repairs shall be tested for air tightness and pass the program standards in place at the time of retrofits.

SOLAR SCREENS

1. An Energy Smart Informational Assessment is required before Solar Screens are installed. Solar Screens must be a recommended measure to qualify for a rebate.
2. Solar Screen must be installed on an existing single-pane clear glass window. Windows on exterior doors are also eligible for solar screen incentives.
3. The windows must be facing predominately east or west.
4. The windows must receive significant direct sun exposure.
5. Solar screen must have a Solar Heat Gain Factor (SHGF) of .35 or less. A copy of the manufacturers' data showing the Shading Coefficient (SC) or Solar Heat Gain Coefficient (SHGC) is required to qualify for a rebate.
6. Screens must be installed securely.

Table 1 (cont.): Residential HVAC Recommendations

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
Heat pump replacement: revise column headers to be more explicit about the range of covered efficiencies - e.g., ">= 8.0 and <8.2"	Deemed savings table has been updated to clarify appropriate savings ranges.	Heat Pump Replacement

Table 1. Heat Pump Energy Savings

Heat Pump – Energy Savings (Heating kWh Only), Climate Zone New Orleans					
HSPF Range					
Size (tons)	< 8.4	≥ 8.4 and < 8.5	≥ 8.6 and < 8.7	≥ 8.8 and < 8.9	≥ 9.0 and < 9.1
1.5	67	90	113	136	158
2.0	89	120	151	180	210
2.5	111	150	188	226	263
3.0	133	179	226	271	316
3.5	155	209	263	316	369
4.0	178	239	301	362	421
5.0	222	299	376	452	527

Table 1 (cont.): Residential Duct Sealing Recommendations

Duct sealing: Require that ducts run through an unconditioned space to be eligible for the measure	The deemed savings documentation defines the condition and unconditioned space criteria and the majority of ducts must run through unconditioned space. To ensure this duct sealing measure is properly applied, language is included in the measure best practices and quality control procedures within the Program Manual (see illustrations below). These details include inspection practices and specific eligibility requirements as they relate to unconditioned space.	Duct Sealing
--	---	--------------

Quality Control	
Post-Installation Inspections (QC)	<ul style="list-style-type: none">All installed measures will be verified by CLEAResult staff to ensure they meet the Best Practice StandardsIf Air Infiltration or Duct Sealing Improvements are made, a final Blower Door or Duct Blaster test is required to measure improvement. If the contractor performing the work is also performing the post test, CLEAResult must be notified prior to test so that a CLEAResult representative will be presentEnergy Consultant will be accompanied by CLEAResult staff on all scheduled home energy assessments until it is determined that assessments are performed according to program standards
QA Inspection Metric General	<ul style="list-style-type: none">Major Violation: A Failure in this category requires immediate resolution that may include a contractor charge back of all or part of the Rebate amount.Minor Violation: The Quality Assurance Specialist will determine the impact of failing these measures and the schedule for their resolution.
QA Inspection Metric- Duct & Air Sealing	<ul style="list-style-type: none">Major Violation Examples (not all inclusive)<ul style="list-style-type: none">Starting vs. finished air leakage rate: Verification reveals a discrepancy of >20%.Minimum Ventilation Rate (MVR): Failure to identify correct MVR or to take the proper action in the event of the MVR not being met.Duct sealing or air sealing materials: Use of improper sealing materials.Combustion Safety Test (CST): Not performing the CST or failing to take proper action on the results.Minor Violations (none)

<p>DUCT EFFICIENCY IMPROVEMENTS</p> <p>These requirements are applicable when customers apply for the duct efficiency improvement rebates for the sealing of existing duct systems and the replacement of existing duct systems. This includes the sealing of supply and return air ducts of the existing homes. To be eligible, at least 50% of the ductwork must be in unconditioned space post-improvement.</p> <p>The duct sealing must create a continuous air barrier throughout the air duct system. The air duct system must be sealed with both a strong mechanical attachment and a separate air seal, using approved latex mastic and a mechanical tie.</p> <p>To qualify for an incentive, total leakage rates must be reduced to less than 10% of total air handler fan flow, verified by a post retrofit duct pressurization test. Beginning duct leakage must be at least 20% of total air handler flow to qualify for a rebate.</p> <p>Before and after any air sealing work is performed, the Contractor must perform a Combustion Appliance Zone (CAZ) test adhering to the standards set forth by BPI, HERS, or any other nationally recognized standard.</p> <p>Installation Standards</p> <ol style="list-style-type: none">Use water-based latex mastic with at least 50% solids reinforced with fiberglass mesh at all duct connections, joints and seams of components that contain conditioned air. "Hard cast" type mastic or equivalent with reinforcing mesh is also acceptable.Foil tapes, including UL 181 A-F type tapes, when used alone, will not be accepted. If tape is used to temporarily hold a seam, it must be overlaid with a coating of mastic that extends at least one inch (1") past the tape on all sides, and is thick enough to hide the tape completely.Ducts shall be mechanically attached as per manufacturer's specifications.All new and replacement ducts shall have R-8, as determined by Air Diffusion Council (ADC) guidelines, local codes, and must be listed by the Underwriters Laboratory (UL) duct program. <p>Duct Efficiency Measure Air Flow Requirements</p> <table><tr><th colspan="3">Air Flow Requirements for Duct Efficiency Measure</th></tr><tr><th>AC Size (tons)</th><th>Minimum Pre-Installation Leakage Rate (CFM)</th><th>Maximum Post-Installation Leakage Rate (CFM)</th></tr><tr><td>1.5</td><td>120</td><td>60</td></tr><tr><td>2.0</td><td>160</td><td>80</td></tr><tr><td>2.5</td><td>200</td><td>100</td></tr><tr><td>3.0</td><td>240</td><td>120</td></tr><tr><td>3.5</td><td>280</td><td>140</td></tr><tr><td>4.0</td><td>320</td><td>160</td></tr><tr><td>4.5</td><td>360</td><td>180</td></tr><tr><td>5.0</td><td>400</td><td>200</td></tr></table>			Air Flow Requirements for Duct Efficiency Measure			AC Size (tons)	Minimum Pre-Installation Leakage Rate (CFM)	Maximum Post-Installation Leakage Rate (CFM)	1.5	120	60	2.0	160	80	2.5	200	100	3.0	240	120	3.5	280	140	4.0	320	160	4.5	360	180	5.0	400	200
Air Flow Requirements for Duct Efficiency Measure																																
AC Size (tons)	Minimum Pre-Installation Leakage Rate (CFM)	Maximum Post-Installation Leakage Rate (CFM)																														
1.5	120	60																														
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3.0	240	120																														
3.5	280	140																														
4.0	320	160																														
4.5	360	180																														
5.0	400	200																														

Table 1 (cont.): Recommendations and responses requiring no further illustration

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
<p>Document sources for all assumptions in deemed savings document. If based on modeling, include a description of all modeling inputs in an appendix.</p>	<p>This comment primarily applies to specific measures in the Residential Solutions Program (see Affected Measures column). These measures were originally developed by Frontier Associates using EnergyGauge or ESPRE, both residential energy modeling tools. To generate the New Orleans deemed savings, Frontier took deemed savings values from the Houston climate zone and weather-adjusted them to New Orleans using heating and cooling degree days. Based on Optimal Energy's review they observed that these deemed savings values were appropriate and "in-line" with deemed savings from other jurisdictions. The intent of this recommendation was to provide additional documentation to "increase transparency and ease of future update".</p> <p>CLEAResult believes the existing documentation to be sufficient, given the savings values are "in-line" with industry accepted values</p> <p>If further information is needed, these measures methodologies were based on deemed savings programs in Texas and the savings documentation is publically available through the Public Utility Commission of Texas (PUCT) filings. These documents provide a more thorough explanation, such that the assumptions used and modeling inputs can be derived from the publically available documentation. Upon request references to the applicable PUCT docket numbers can be provided.</p>	<p>Ceiling Insulation, Wall Insulation, Floor Insulation, ENERGY STAR Windows, Air Infiltration, Solar Screens, Duct Efficiency Improvement</p>
<p>Include O&M and gas savings in deemed savings document</p>	<p>While both O&M and gas savings are counted in Total Resource Cost (TRC) tests in other jurisdictions, Entergy New Orleans' programs focus on electric benefits. As a result, measure costs used in TRC analysis should "net out" both O&M and gas savings to the extent that both resources play a part in participant decisions. CLEAResult has not adjusted the deemed savings document to calculate O&M and gas savings impacts.</p>	<p>All Measures</p>
<p>Add information necessary to calculate TRC</p>	<p>When conducting a cost-effectiveness review, CLEAResult researches and assigns measure costs based upon publicly-available and vetted industry sources. CLEAResult will document its assumptions and can add measure cost information where appropriate to the deemed savings document as cost-effectiveness results are determined.</p>	<p>All Measures</p>

Variable Speed Pool Pumps: Find source documenting assumption of 365 day of pool operation, or use more conservative estimate	CLEAResult maintains that the 365 day assumption is the best available industry data. It is primarily based on a 2002 PG&E Pool Pump metering study performed by ADM Associates of over 300 pool pump residential installation. In addition, based on research of several pool pump manufacturer's literature the best practice is to operate the filtration system daily. Therefore the 365 day assumption appears to be appropriate since the pool's filtration system is typically operational throughout the year.	Variable Speed Pool Pumps
HVAC measures: ensure a consistent methodology in deriving full load hours for residential and commercial HVAC, and describe in deemed savings document.	<p>For residential HVAC measures, the EFLH are based on ENERGY STAR's AC & Heat Pump energy savings calculator.</p> <p>For commercial HVAC measures, the EFLH are based on a regression model derived from multiple publically-available sources (AR TRM, Texas LoanStar program, and ENERGY STAR). The regression model accounted for various building types and weather data (using Heating and Cooling Degree Days), allowing one to calculate the applicable EFLH for a particular city. Upon request a detailed explanation of this approach is available.</p>	All Commercial and Residential HVAC measures

To: Entergy New Orleans Program Team

From: Core Engineering Services

Date: January 18, 2013

Re: CFL Savings for 2013 Program Year

.....

The objective of this memo is to outline the changes in savings for CFL measures in 2013.

2009 Deemed Savings

The following table is from the document “Deemed Savings, Installation & Efficiency Standards” prepared by Frontier Associates dated March 2009.

Table 1: 2009 Deemed Savings

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Incandescent Light (Watt)	Daily usage (Hrs./Day)	Annual Energy Savings (kWh)	Demand Savings (kW)
15	14-18	40	4	36.5	0.006
20	19-21	60	4	58.3	0.009
23	22-25	75	4	75.8	0.012
27	26-28	100	4	106.5	0.016

Changes to assumptions

Measure CFL: As CFL technology advances, the bulbs get more efficient; they can produce the same amount of light using less wattage. Therefore, the range of CFL wattages corresponding to equivalent-incandescent wattage has improved since 2009.

Comparable Incandescent: The Energy Independence & Security Act of 2007 removes incandescent bulbs from the market and replaces them with higher-efficiency halogen bulbs. A summary of the changes is in Table 2. The “Effective Date” assumes the continued market availability for a period of 3 months after the standards are implemented.

Table 2: EISA 2007 baseline changes

Pre-EISA 2007	Post-EISA 2007	Change Date	Effective Date
100 watt	72 watts	January 1, 2012	April 1, 2012
75 watt	53 watts	January 1, 2013	April 1, 2013
60 watt	43 watts	January 1, 2014	April 1, 2014
40 watt	29 watts	January 1, 2014	April 1, 2014

Daily usage: All sources known by CES regarding residential CFL hours of operation show values significantly less than 4 hours per day. A reliable source is the “2010 U.S. Lighting Market Characterization” written by the U.S. Department of Energy dated January 2012. It gives a value of 2.5 hours per day.

Coincidence Factor: The coincidence factor used is not listed in the table, but a simple calculation reveals 0.22 was used. Just like usage hours, this is high compared to all known sources. The source used for the 2012 CFL work papers is “Coincidence Factor Study: Residential and Commercial Industrial Lighting Measures” dated Spring 2007. It gives a CF of 0.08.

2012+ Deemed Savings

The following table is calculated based on the adjusted assumptions stated above.

Table 3: PY 2012 (4/1/2012-4/1/2013) Deemed Savings

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Baseline (Watt)	Daily usage (Hrs./Day)	Coincidence Factor	Annual Energy Savings (kWh)	Demand Savings (kW)
9	7-11	40	2.5	0.08	28.3	0.002
14	12-17	60	2.5	0.08	42.0	0.004
20	18-22	75	2.5	0.08	50.2	0.004
25	23-27	72	2.5	0.08	42.9	0.004

Table 4: PY 2013 (4/1/2013-4/1/2014) Deemed Savings

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Baseline (Watt)	Daily usage (Hrs./Day)	Coincidence Factor	Annual Energy Savings (kWh)	Demand Savings (kW)
9	7-11	40	2.5	0.08	28.3	0.002
14	12-17	60	2.5	0.08	42.0	0.004
20	18-22	53	2.5	0.08	30.1	0.003
25	23-27	72	2.5	0.08	42.9	0.004

Table 5: PY 2014+ (4/1/2014 and beyond) Deemed Savings

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Baseline (Watt)	Daily usage (Hrs./Day)	Coincidence Factor	Annual Energy Savings (kWh)	Demand Savings (kW)
9	7-11	29	2.5	0.08	18.3	0.002
14	12-17	43	2.5	0.08	26.5	0.002
20	18-22	53	2.5	0.08	30.1	0.003
25	23-27	72	2.5	0.08	42.9	0.004

Comparisons between deemed savings are in Table 6 below.

Table 6: Savings Comparison for PY 2013

Measure CFL (Watt)		Energy Savings (kWh)			Demand Savings (kW)		
2009	PY 2013	2009	PY 2013	Change	2009	PY 2013	Change
15	9	36.5	28.3	-23%	0.006	0.002	-55%
20	14	58.3	42.0	-28%	0.009	0.004	-58%
23	20	75.8	30.1	-60%	0.012	0.003	-77%
27	25	106.5	42.9	-60%	0.016	0.004	-77%

**Work Papers for
Low-Flow Showerheads,
Low-Flow Kitchen Faucet Aerators,
And
Low-Flow Bathroom Faucet Aerators
With Electric Water Heater
Savings Calculation Methodology for
Entergy New Orleans
Energy Efficiency Programs**

**Prepared by
Core Engineering Services**

by CLEAResult

May 31, 2012

**Adam Keeling
Rebecca Troutfetter**

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LOW-FLOW SHOWERHEAD – ELECTRIC WATER HEATER

Low-Flow Showerhead

Summary Characteristics for Low-Flow Showerhead

Measure Description	A low-flow showerhead reduces hot water usage and saves energy associated with heating the water. The maximum flow rate of qualifying showerheads is 2.0 gallons per minute (GPM) ¹
Market Sector	Multi-family residential showers
Base Case Description	For retrofits, existing showerhead has a flow rate of 2.5 GPM ²
Measure Unit	Showerhead used in residential showers
Unit Energy Savings	See Table 2
Unit Demand Savings	See Table 2
Unit Therm Savings	Not calculated in this report
Unit Therm Demand Savings	Not calculated in this report
Unit Water Savings	See Table 2
Base Case Cost	\$0 (do nothing for retrofit applications)
Measure Cost	\$7.15 ¹⁰ includes both labor and equipment cost
Incremental Cost	\$7.15 (incremental cost = measure cost for retrofit applications)
Measure Life	10 years ³

Measure Description

Replace an existing showerhead with a new low-flow showerhead, which reduces hot water usage and saves energy associated with heating the water. This work paper assumes the existing showerhead is operational with a flow rate of 2.5 GPM (or higher) in a multi-family residence with electric water heating. Energy savings will be achieved by reducing the usage of hot water.

Baseline Equipment

The nominal baseline showerhead uses 2.5 GPM².

Eligible Equipment

The flow rate required for the Entergy New Orleans Residential Solutions program of qualifying showerheads is 2.0 GPM or less¹.

Savings Calculations

Assuming predictable flow rates and no other losses, the savings per unit equals:

$$\text{Water (Gallons/Unit)} = (F_B - F_P) \times U \times N \times P \times D / S \quad \text{Eq. 1}$$

$$\text{Energy (kWh/Unit)} = (F_B - F_P) \times U \times N \times P \times D \times (T_H - T_C) \times C_H / (S \times C_E \times \text{Eff}) \quad \text{Eq. 2}$$

$$\text{Demand (kW/Unit)} = (F_B - F_P) \times U \times N \times P \times C \times (T_H - T_P) \times C_H / (S \times C_E \times \text{Eff}) \quad \text{Eq. 3}$$

Definition of Variables

The parameters in the above equations are listed in Table 1 below.

Table 1: Calculation Variables

Parameter	Description	Value
F_B	Average Baseline Flow Rate of Showerhead (GPM)	2.5 ²
F_P	Average Post Measure Flow Rate of Showerhead (GPM)	2.0 ¹
U	Average duration of shower (min)	7.81 ⁴
N	Showers taken per person per day	1 ⁴
P	Number of people per residence	2.18 ⁶
D	Days per year	365
C	Peak demand coincidence factor	3.0% ⁵
T_H	Average mixed hot water at point-of-use temperature (°F)	105 ⁷
T_C	Average inlet water temperature for whole year (°F)	65.0 ⁸
T_P	Average inlet water temperature for peak (°F)	74.2 ⁸
C_H	Unit Conversion: 8.33 BTU/(Gallons-°F)	8.33
S	Number of showers per residence	Varies
C_E	Unit Conversion: 1 kWh = 3412 Btu	3412
Eff	Efficiency of Electric Water Heater	98% ⁹

Estimated Savings

Table 2: Water & Electrical Savings

S		Water Savings	Energy Savings	Demand Savings
# of showers/ residence	# of showerheads replaced	Gallons/ year	kWh/ year	kW
1	1	3,107	310	0.020
2	1	1,554	155	0.010
2	2	3,107	310	0.020
3	1	1,036	103	0.007
3	2	2,071	206	0.013
3	3	3,107	310	0.020

The following example calculations are based on a 1-shower residence using Table 1 and Equations 1, 2, and 3.

$$\text{Water (Gallons/Unit)} = (2.5 - 2) \times 7.81 \times 1 \times 2.18 \times 365 / 1 = 3,107$$

$$\text{Energy (kWh/Unit)} = (2.5 - 2) \times 7.81 \times 1 \times 2.18 \times 365 \times (105 - 65) \times 8.33 / (1 \times 3412 \times 0.98) = 310$$

$$\text{Demand (kW/Unit)} = (2.5 - 2) \times 7.81 \times 1 \times 2.18 \times 0.03 \times (105 - 74.2) \times 8.33 / (1 \times 3412 \times 0.98) = 0.020$$

Measure Life

The effective life for this measure is 10 years³.

Measure Cost

The cost of a new low-flow showerhead is estimated at \$7.15¹⁰.

Evaluation Parameters

The evaluation protocol for this measure is verification of installation coupled with estimated energy savings.

References

¹ Program requirement for Entergy New Orleans Residential Solutions

² Current federal standard is 2.5 GPM

³ Estimated Useful Life from Database for Energy-Efficient Resources, 2011

http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls

⁴ Table 12 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory

http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/44816.pdf

⁵ Figure 8 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory

⁶ American Community Survey national averages are 2.45 for owner occupied and 2.18 for renter occupied. Renter occupied value was used with assumption that most multi-family residences are renters.

http://factfinder.census.gov/servlet/STTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2009_5YR_G00_S2501&-context=st&-ds_name=ACS_2009_5YR_G00_&-tree_id=5309&-redoLog=false&-format=

⁷ Table 10 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory

⁸ Department of Energy inlet water temperature calculation

http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/htgp_finalrule_app7d.pdf

⁹ Table 9 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory

¹⁰ Entergy New Orleans actual cost data

LOW-FLOW KITCHEN FAUCET AERATORS – ELECTRIC WATER HEATER

Low-Flow Kitchen Faucet Aerator

Summary Characteristics for Low-Flow Kitchen Faucet Aerators

Measure Description	Low-flow aerators reduce water consumption associated with hand washing and dishwashing, and consequently reduce hot water usage and save energy associated with heating the water. The maximum flow rate of qualifying kitchen faucet aerator is 1.5 gallons per minute (GPM) ¹
Market Sector	Multi-family residential kitchens
Base Case Description	For retrofits, existing standard flow aerator has a flow rate of 2.2 or 2.0 GPM ²
Measure Unit	A low-flow aerator
Unit Energy Savings	See Table 2
Unit Demand Savings	See Table 2
Unit Therm Savings	Not calculated in this report
Unit Therm Demand Savings	Not calculated in this report
Unit Water Savings	See Table 2
Base Case Cost	\$0 (do nothing for retrofit applications)
Measure Cost	\$3.41 ¹⁰ Measure cost includes both labor and equipment costs
Incremental Cost	\$3.41
Measure Life	10 years ³

Measure Description

Installation of low-flow aerators is an inexpensive and lasting approach for water and energy conservation. These efficient aerators reduce water consumption associated with hand washing and dishwashing, and consequently reduce hot water usage and save energy associated with heating the water. This work paper presents the assumptions, analysis and savings from replacing a standard flow aerator with a low-flow aerator in multi-family residences with electric water heating.

Baseline Equipment

The nominal baseline aerator uses 2.2 or 2.0 GPM².

Eligible Equipment

The flow rate required for the Entergy New Orleans Residential Solutions program of qualifying low-flow aerator is 1.5 GPM¹.

Savings Calculations

Assuming predictable flow rates and no other losses, the savings per unit equals:

$$\text{Water (Gallons/Unit)} = (F_B - F_P) \times U \times P \times D \quad \text{Eq. 1}$$

$$\text{Energy (kWh/Unit)} = (F_B - F_P) \times U \times P \times D \times (T_H - T_C) \times C_H / (C_E \times \text{Eff}) \quad \text{Eq. 2}$$

$$\text{Demand (kW/Unit)} = (F_B - F_P) \times U \times P \times C \times (T_H - T_P) \times C_H / (C_E \times \text{Eff}) \quad \text{Eq. 3}$$

Definition of Variables

The parameters in the above equations are listed in Table 1 below.

Table 1: Calculation Variables

Parameter	Description	Value
F_B	Average Baseline Flow Rate of Kitchen Aerator (GPM)	2.2 or 2.0 ²
F_P	Average Post Measure Flow Rate of Kitchen Aerator (GPM)	1.5 ¹
U	Average kitchen sink use per person per day (min)	3 ⁴
P	Number of people per residence	2.18 ⁶
D	Days per year	365
C	Peak demand coincidence factor	4.7% ⁵
T_H	Average mixed hot water at point-of-use temperature (°F)	105 ⁷
T_C	Average inlet water temperature for whole year (°F)	65.0 ⁸
T_P	Average inlet water temperature for peak (°F)	74.2 ⁸
C_H	Unit Conversion: 8.33 BTU/(Gallons-°F)	8.33
C_E	Unit Conversion: 1 kWh = 3412 Btu	3412

Eff	Efficiency of Electric Water Heater	98% ⁹
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Table 2: Water & Electrical Savings

F _B	Water Savings	Energy Savings	Demand Savings
GPM	Gallons/year	kWh/year	kW
2.0	1,194	119	0.012
2.2	1,671	167	0.017

Estimated Savings Calculations

The following example savings calculations are for an existing kitchen flow rate of 2.2 using data in Table 1 and Equations 1, 2, and 3:

$$\text{Water (Gallons/Unit)} = (2.2 - 1.5) \times 3 \times 2.18 \times 365 = 1,671$$

$$\text{Energy (kWh/Unit)} = (2.2 - 1.5) \times 3 \times 2.18 \times 365 \times (105 - 65) \times 8.33 / (3412 \times 0.98) = 167$$

$$\text{Demand (kW/Unit)} = (2.2 - 1.5) \times 3 \times 2.18 \times 0.047 \times (105 - 74.2) \times 8.33 / (3412 \times 0.98) = 0.017$$

Measure Life

The effective life for this measure is 10 years³.

Measure Cost

A new low flow aerator will be estimated at \$3.41¹⁰.

Evaluation Parameters

The evaluation protocol for this measure is verification of installation coupled with assignment of estimated energy savings.

References

- ¹ Program requirement for Entergy New Orleans Residential Solutions
- ² Current federal standard is 2.5 GPM but majority removed were 2.0 or 2.2 GPM.
- ³ Estimated Useful Life from Database for Energy-Efficient Resources, 2011
http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls
- ⁴ CLEARResult assumption
- ⁵ Figure 10 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/44816.pdf
- ⁶ American Community Survey national averages are 2.45 for owner occupied and 2.18 for renter occupied. Renter occupied value was used with assumption that most multi-family residences are renters.
http://factfinder.census.gov/servlet/STTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2009_5YR_G00_S2501&-context=st&-ds_name=ACS_2009_5YR_G00_&-tree_id=5309&-redoLog=false&-format=
- ⁷ Table 10 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
- ⁸ Department of Energy inlet water temperature calculation
http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/htgp_finalrule_app7d.pdf
- ⁹ Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
- ¹⁰ Entergy New Orleans actual cost data

LOW-FLOW BATHROOM FAUCET AERATORS – ELECTRIC WATER HEATER

Low-Flow Bathroom Faucet Aerator

Summary Characteristics for Low-Flow Bathroom Faucet Aerators

Measure Description	Low-flow aerators reduce water consumption associated with hand washing, face washing, and teeth brushing, and consequently reduce hot water usage and save energy associated with heating the water. The maximum flow rate of qualifying bathroom faucet aerator is 1.0 gallons per minute (GPM) ¹
Market Sector	Multi-family residential bathrooms
Base Case Description	For retrofits, existing standard flow aerator has a flow rate of 2.2 or 2.0 GPM ²
Measure Unit	A low-flow aerator
Unit Energy Savings	See Table 2
Unit Demand Savings	See Table 2
Unit Therm Savings	Not calculated in this report
Unit Therm Demand Savings	Not calculated in this report
Unit Water Savings	See Table 2
Base Case Cost	\$0 (do nothing for retrofit applications)
Measure Cost	\$2.41 ¹⁰ Measure cost includes both labor and equipment costs
Incremental Cost	\$2.41
Measure Life	10 years ³

Measure Description

Installation of low-flow aerators is an inexpensive and lasting approach for water and energy conservation. These efficient aerators reduce water consumption associated with hand washing, face washing, and teeth brushing, and consequently reduce hot water usage and save energy associated with heating the water. This work paper presents the assumptions, analysis and savings from replacing a standard flow aerator with a low-flow aerator in multi-family residences with electric water heating.

Baseline Equipment

The nominal baseline aerator uses 2.2 or 2.0 GPM².

Eligible Equipment

The flow rate required for the Entergy New Orleans Residential Solutions program of qualifying low-flow aerator is 1.0 GPM¹.

Savings Calculations

Assuming predictable flow rates and no other losses, the savings per unit equals:

$$\text{Water (Gallons/Unit)} = (F_B - F_P) \times U \times P \times D / S \quad \text{Eq. 1}$$

$$\text{Energy (kWh/Unit)} = (F_B - F_P) \times U \times P \times D \times (T_H - T_C) \times C_H / (S \times C_E \times \text{Eff}) \quad \text{Eq. 2}$$

$$\text{Demand (kW/Unit)} = (F_B - F_P) \times U \times P \times C \times (T_H - T_P) \times C_H / (S \times C_E \times \text{Eff}) \quad \text{Eq. 3}$$

Definition of Variables

The parameters in the above equations are listed in Table 1 below.

Table 1: Calculation Variables

Parameter	Description	Value
F_B	Average Baseline Flow Rate of Bathroom Aerator (GPM)	2.2 or 2.0 ²
F_P	Average Post Measure Flow Rate of Bathroom Aerator (GPM)	1.0 ¹
U	Average bathroom sink use per person per day (min)	2 ⁴
D	Days per year	365
C	Peak demand coincidence factor	4.7% ⁵
P	Number of people per residence	2.18 ⁶
S	Number of bathroom sinks per residence	Varies
T_H	Average mixed hot water at point-of-use temperature (°F)	105 ⁷
T_C	Average inlet water temperature for whole year (°F)	65.0 ⁸
T_P	Average inlet water temperature for peak (°F)	74.2 ⁸
C_H	Unit Conversion: 8.33 BTU/(Gallons-°F)	8.33

C_E	Unit Conversion: 1 kWh = 3412 Btu	3412
Eff	Efficiency of Electric Water Heater	98% ⁹

Table 2: Water & Electrical Savings

F _B	S		Water Savings	Energy Savings	Demand Savings
GPM	# of bathroom sinks/residence	# of aerators installed	Gallons /year	kWh/ year	kW
2.0	1	1	1,591	159	0.016
2.0	2	1	796	79	0.008
2.0	2	2	1,591	159	0.016
2.0	3	1	530	53	0.005
2.0	3	2	1,061	106	0.010
2.0	3	3	1,591	159	0.016
2.2	1	1	1,910	190	0.019
2.2	2	1	955	95	0.009
2.2	2	2	1,910	190	0.019
2.2	3	1	637	63	0.006
2.2	3	2	1,273	127	0.013
2.2	3	3	1,910	190	0.019

Estimated Savings Calculations

The following example savings calculations are for a residence with 2 bathrooms and existing bathroom sink flow rates of 2.2 using data in Table 1 and Equations 1, 2, and 3:

$$\text{Water (Gallons/Unit)} = (2.2 - 1) \times 2 \times 2.18 \times 365 / 2 = 955$$

$$\text{Energy (kWh/Unit)} = (2.2 - 1) \times 2 \times 2.18 \times 365 \times (105 - 65) \times 8.33 / (2 \times 3412 \times 0.98) = 95$$

$$\begin{aligned} \text{Demand (kW/Unit)} &= (2.2 - 1) \times 2 \times 2.18 \times 0.047 \times (105 - 74.2) \times 8.33 / (2 \times 3412 \times 0.98) \\ &= 0.009 \end{aligned}$$

Measure Life

The effective life for this measure is 10 years³.

Measure Cost

A new low flow aerator will be estimated at \$2.41¹⁰.

Evaluation Parameters

The evaluation protocol for this measure is verification of installation coupled with assignment of estimated energy savings.

References

- ¹ Program requirement for Entergy New Orleans Residential Solutions
- ² Current federal standard is 2.5 GPM but majority removed were 2.0 or 2.2 GPM
- ³ Estimated Useful Life from Database for Energy-Efficient Resources, 2011
http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls
- ⁴ CLEARResult assumption
- ⁵ Figure 10 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/44816.pdf
- ⁶ American Community Survey national averages are 2.45 for owner occupied and 2.18 for renter occupied. Renter occupied value was used with assumption that most multi-family residences are renters.
http://factfinder.census.gov/servlet/STTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2009_5YR_G00_S2501&-context=st&-ds_name=ACS_2009_5YR_G00_&-tree_id=5309&-redoLog=false&-format=
- ⁷ Table 10 in Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
- ⁸ Department of Energy inlet water temperature calculation
http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/htgp_finalrule_app7d.pdf
- ⁹ Building America Research Benchmark Definition (December 19, 2008) from National Renewable Energy Laboratory
- ¹⁰ Entergy New Orleans actual cost data

Work Papers for Compact Florescent Lamps in Multifamily Direct Install Applications

Savings Calculation Methodology for Application in Entergy New Orleans Energy Efficiency Programs

Prepared by
Core Engineering Services

Prepared for Entergy New Orleans
by CLEAResult
May 31, 2012

Authors:
Steve McMinn
Rebecca Troutfetter

Revisions:

None

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SAVINGS CALCULATION METHODOLOGY FOR COMPACT FLORESCENT LAMPS IN MULTIFAMILY DIRECT INSTALL APPLICATIONS

CLEAResult proposes the use of three savings calculations methodologies to determine savings for measures implemented as part of the Entergy New Orleans Energy Efficiency Programs:

1. Deemed Savings
2. Measurement & Verification
3. Work Papers

Deemed savings may be used when applicable.

IPMVP compliant measurement and verification will be used for commercial measures that do not fit into deemed savings measure descriptions and provide savings that warrant the rigor of the application of IPMVP*, e.g. custom projects.

The following Work Papers are being proposed for the direct installation of compact fluorescent lamps in multifamily residences. CFLs are included in the Entergy New Orleans Deemed Savings for general installation. The savings derived in this document reflect the known location and hours of operation of the bulbs installed since the delivery mechanism of the program tracks where the lamps are installed as well as the quantity. The savings achieved per facility do not warrant an IPMVP approach.

The Work Papers provide a transparent description of the methodology proposed to estimate and verify savings for the direct install of CFLs used in multifamily residential applications in Entergy New Orleans Energy Efficiency Programs. These Work Papers describe the measure, make appropriate conservative assumptions, list specific user inputs and explicitly outline the calculation steps.

The creation of these Work Papers involved reviewing Technical Reference Manuals (TRMs), case-studies, industry reports, energy codes and standards (IECC), ENERGY STAR, other utility program data, DEER cost information and other such references. When an individual report referenced an original study, or when one critical document was the only source, the original study was also reviewed. A consensus was reached on which reference(s) rigorously documented and explained the savings estimates.

* The IPMVP employs a rule-of-thumb that the costs for performing M&V should not be more than 10% of the value of one year of energy savings on a per facility basis.

SAVINGS FOR MULTIFAMILY DIRECT INSTALL CFLS

Revision # - None

Revision Date - None

Compact Florescent Lamps

Multifamily Direct Install

Summary Characteristics for Compact Florescent Lamps

Measure Description	CFLs reduce lighting energy consumption over standard incandescent lamps
Market Sector	Any multifamily residence where the program delivery mechanism installs the measure directly, that includes recording and tracking the exact locations of all lamps installed
Base Case Description	Federal Standard Incandescent Lamp
Measure Unit	Per lamp installed
Unit kWh Savings	see “Estimated Savings” section for savings by room type
Unit kW Savings	see “Estimated Savings” section for savings by room type
Coincidence factor	0.08 ¹
Base Case Cost	Standard 40 watt incandescent = \$1.00/lamp ² Standard 60 watt incandescent = \$1.25/lamp ²
Incremental Measure Cost	\$4/lamp for material and labor for 9 watt CFLs ² \$2.30/lamp for material and labor for 13 watt CFLs ²
Measure Life	6.6 years ³

Measure Description

CFLs provide the same amount of light as a standard incandescent but use less energy. The savings derived in this document apply specifically to multifamily direct install applications where the room type in which the bulbs are installed is recorded.

Baseline Equipment

The baseline for this measure is a standard incandescent lamp with a wattage of 40, 60, 75, or 72 (previously 100) watts⁴.

Eligible Equipment

The CFLs must be installed at the time of entry at the multifamily residence. The base wattage of the incandescent and the change wattage of the CFL must be recorded. In addition the room type in which the CFL was installed must also be recorded for each lamp.

Efficiency Level Required

Installation and efficiency standards must comply with the existing Entergy New Orleans Deemed Savings⁶.

Savings Calculations

Savings values for CFLs were calculated using the following equations:

$$\text{kWh savings} = (\text{base wattage} - \text{change wattage}) * \text{Annual Hours of Operation} / 1000$$

$$\text{kW Savings} = (\text{base wattage} - \text{change wattage}) / 1000 * \text{Coincidence factor}$$

Where the base wattage is the incandescent lamp wattage and change wattage is the average CFL wattage.

The base and change wattage equivalents applied were as follows:

CFL Wattage Range	Average CFL	Comparable Incandescent
9 to 12	12	40
13 to 17	15	60
18 to 25	23	75
26 to 32	27	72

The hours of operation used in the calculations were specific to the room type in which the lamps were installed. The table below displays the hours of operation by room type for a multifamily residence.

Table 1: Hours of Operation by Room Type⁵

Room Type	Hours of Operation
Porch	0
Kitchen	888
Living Room	1,015
Family Room	453
Dining Room	1,080
Bathrooms	577
Bedrooms	423
Office	401
Den	0
Entryway	0

Estimated Savings

The tables below list the calculated savings.

Table 2: kWh Savings Per Lamp by Room Type

Room Type	Hours of Operation	9-12 W	13-17W	18-25 W	26-32 W
Porch	0	0.0	0.0	0.0	0.0
Kitchen	888	24.9	40.0	46.2	40.0
Living Room	1015	28.4	45.7	52.8	45.7
Family Room	453	12.7	20.4	23.6	20.4
Dining Room	1080	30.2	48.6	56.2	48.6
Bathroom 1	577	16.2	26.0	30.0	26.0
Bathroom 2	577	16.2	26.0	30.0	26.0
Bathroom 3	577	16.2	26.0	30.0	26.0
Bedroom 1	423	11.8	19.0	22.0	19.0
Bedroom 2	423	11.8	19.0	22.0	19.0
Bedroom 3	423	11.8	19.0	22.0	19.0
Bedroom 4	423	11.8	19.0	22.0	19.0
Bedroom 5	423	11.8	19.0	22.0	19.0
Office	401	11.2	18.0	20.9	18.0
Den	0	0.0	0.0	0.0	0.0
Entryway	0	0.0	0.0	0.0	0.0

Table 3: kW Savings Per Lamp by Room Type

Room Type	Hours of Operation	9-12 W	13-17W	18-25 W	26-32 W
Porch	0	0.000	0.000	0.000	0.000
Kitchen	888	0.002	0.004	0.004	0.004
Living Room	1015	0.002	0.004	0.004	0.004
Family Room	453	0.002	0.004	0.004	0.004
Dining Room	1080	0.002	0.004	0.004	0.004
Bathroom 1	577	0.002	0.004	0.004	0.004
Bathroom 2	577	0.002	0.004	0.004	0.004
Bathroom 3	577	0.002	0.004	0.004	0.004
Bedroom 1	423	0.002	0.004	0.004	0.004
Bedroom 2	423	0.002	0.004	0.004	0.004
Bedroom 3	423	0.002	0.004	0.004	0.004
Bedroom 4	423	0.002	0.004	0.004	0.004
Bedroom 5	423	0.002	0.004	0.004	0.004
Office	401	0.002	0.004	0.004	0.004
Den	0	0	0	0	0
Entryway	0	0	0	0	0

Measure Life

The effective life for this measure is 6.6 years.³

Measure Cost

The baseline measure cost was established from real pricing of incandescent lamps at large retail stores such as Home Depot and Lowes. A standard incandescent 60 watt lamp average price was \$1.25 per lamp². The standard price for 40 watt globe lights (for bathroom applications) was \$1.00 per lamp². The installed cost for material and labor for the 13 watt (60 watt equivalent) CFL lamps was \$2.30². The installed cost for material and labor the 9 watt (40 watt equivalent) CFL lamps was \$4.00².

Evaluation Parameters

The most appropriate evaluation protocol for this measure is verification of proper installation coupled with assignment of estimated energy savings.

References

1. “Coincidence Factor Study: Residential and Commercial Industrial Lighting Measures” RLW Analytics. New England State Program Working Group. Spring 2007.
2. Baseline costs are based on a review of major retailer websites, such as Home Depot and Lowes – May 2012. Incremental costs are based on actual program cost data. The program was offered in conjunction with local Energy Smart Participating Contractors which allowed for low cost delivery of the CFLs.
3. DEER 2008 EUL/RUL values updated 10 October 2008. The rated hours of operation for the average lamp installed in the program were 10,000 hours.
4. Due to changes in incandescent baselines under the Energy Independence and Security Act of 2007 on January 1, 2012 federal standard required a standard 100 watt incandescent lamp reduce the standard wattage to 72 watts. Additional incandescent wattages will occur in 2013, and 2014 at which time this work paper will need to be updated to comply.
5. “U.S. Lighting Market Characterization. Volume 1: National Lighting Inventory and Energy Consumption Estimates. Final Report” Navigant Consulting Inc. Prepared for U.S. Department of Energy. September 2002.
6. Deemed Savings, Installation and Efficiency Standards. Entergy New Orleans Inc. Prepared by Frontier Associates. March 2009.

Work Papers for Radiant Barrier Savings Calculation Methodology for Application in Entergy New Orleans Energy Efficiency Programs

Prepared by
Core Engineering Services

Prepared for Entergy New Orleans
by CLEAResult
May 31, 2012

Authors:
Casey Baker
Steve McMinn
Rebecca Troutfetter

Revisions:

None

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SAVINGS CALCULATION METHODOLOGY FOR RADIANT BARRIER

CLEAResult proposes the use of three savings calculations methodologies to determine savings for measures implemented as part of the Entergy New Orleans Energy Efficiency Programs:

1. Deemed Savings
2. Measurement & Verification
3. Work Papers

Deemed savings may be used when applicable.

IPMVP compliant measurement and verification will be used for commercial measures that do not fit into deemed savings measure descriptions and provide savings that warrant the rigor of the application of IPMVP*, e.g. custom projects.

The following Work Papers are being proposed for the installation of radiant barriers in existing and new construction residences. This measure is not included in the Entergy New Orleans Deemed Savings⁷ and the savings achieved per facility do not warrant an IPMVP approach.

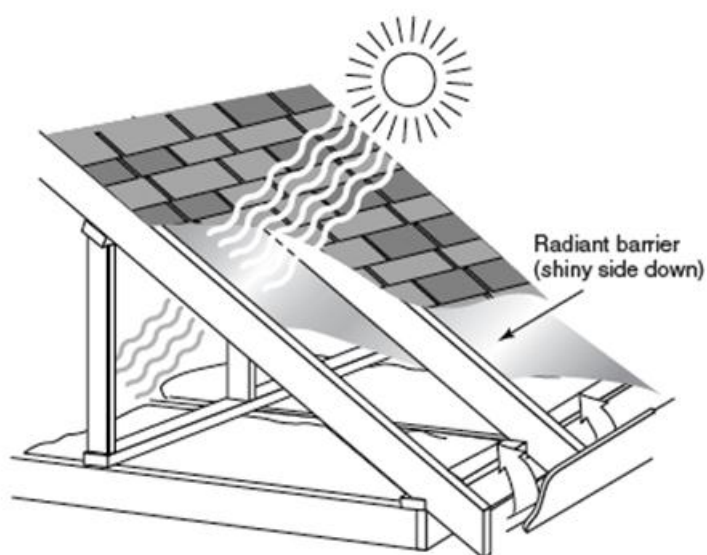
The Work Papers provide a transparent description of the methodology proposed to estimate and verify savings for radiant barriers used in residential applications in Entergy New Orleans Energy Efficiency Programs. The proposed methodology is based on sound engineering, and industry standards for energy modeling. These Work Papers describe the measure, make appropriate conservative assumptions, and list specific energy model inputs.

The creation of these Work Papers involved reviewing Technical Reference Manuals (TRMs), case-studies, industry reports, energy codes and standards (IECC), ENERGY STAR, other utility program data, DEER cost information and other such references. The difference in annual energy usage, with and without radiant barriers should only be solved with computer modeling software due to the complexity of the governing equations and the amount of data. EnergyGauge, the software used to develop these savings, is a widely used RESNET approved residential modeling and rating software.

* The IPMVP employs a rule-of-thumb that the costs for performing M&V should not be more than 10% of the value of one year of energy savings on a per facility basis.

SKETCH DESCRIBING EQUIPMENT

These savings were derived for radiant barriers installed on the underside of the roof decking in an existing or new construction project.



Source: Dropyourenergybill.com



Example installation in a new construction application where the radiant barrier is pre-laminated to the roof decking

Source: Universal Forest Products

SAVINGS FOR RESIDENTIAL RADIANT BARRIERS

Revision # - None

Revision Date - None

Radiant Barrier (Residential)

New Construction and Retrofit

Summary Characteristics for Radiant Barrier

Measure Description	Radiant barriers are designed to block radiant heat transfer between a building roof and the attic space
Market Sector	Any existing or new construction residence with vented attic space
Base Case Description	In the base case, there is no radiant barrier in the home
Measure Unit	Square Feet of roof deck treated with radiant barrier
Unit kWh Savings	see “Estimated Savings” section for savings by heating type
Unit kW Savings	see “Estimated Savings” section for savings by heating type
Base Case Cost	Standard OSB with no radiant barrier= \$0.27/SF
Incremental Measure Cost	\$0.06/SF additional for OSB with radiant barrier in new construction ⁴ \$0.90/SF material & installation cost for retrofits ⁵
Measure Life	20 years ¹

Measure Description

Radiation heat transfer inside an attic is more important than conduction heat transfer and equally important as convection heat transfer. Therefore, radiant barriers are designed to block radiant heat exchange between a building roof and the attic space. They are typically comprised of a metallic foil material, usually aluminum. They are generally installed on the interior surface of the roof decking or beneath roof sheathing. Radiant barriers are effective at reducing cooling consumption by reflecting heat away from the attic space of a home.

Baseline Equipment

This measure applies to:

- New construction projects that would not otherwise have a radiant barrier installed on the underside of the roof decking.
- Existing homes that have been retrofit with radiant barrier.

Eligible Equipment

The Reflective Insulation Manufacturers Association International (RIMA) sets voluntary standards for radiant barriers. RIMA defines a radiant barrier as a reflective material facing an open air space that has a low emittance surface as defined by the American Society of Testing and Materials (ASTM), where emittance is 0.10 or less.² Table 1 shows the pertinent specifications.

Installation Requirements

Eligible radiant barriers must meet the efficiency requirements set by the Reflective Insulation Manufacturers Association International (RIMA). The attic must meet the proper ventilation requirements. Home with unvented attics are not eligible for this measure. The duct work for the HVAC system may be located in the unconditioned attic, or in the conditioned interior.

Table 1: RIMA Required Standards for Radiant Barriers		
Physical Property	Test Method or Standard	Requirement
Surface Emittance	ASTM C1371	0.1 or less
Water Vapor Transmission	ASTM E96 Procedure A Desiccant Method	0.02 for Vapor Retarder 0.5 or more for perforated products
<i>Surface Burning</i>		
Flame Spread	ASTM E84	25 or less
Smoke Density	ASTM E84	450 or less
Corrosivity	ASTM D3310	Corrosion on less than 2% of the affected surface
Tear Resistance	ASTM D2261	
<i>Adhesive Performance</i>		
Bleeding	Section 10.1 of ASTM C1313	Bleeding or delamination of less than 2% of the surface area
Pliability	Section 10.2 of ASTM C1313	No cracking or delamination
Mold and Mildew	ASTM C1338	No growth when visually examined under 5X magnification

Interior radiation control coatings (IRCCs) are **NOT** eligible. IRCCs emittance ratings are substantially higher than true radiant barriers, and therefore do not reduce heat gain at the same rate as a radiant barrier. IRCCs also have a shorter measure life than true radiant barriers. Therefore, all coating materials and spray application materials are ineligible under the methods described here.

All radiant barriers should be installed according to the RIMA Handbook Section 7.4. However, horizontal installations are not eligible due to the likelihood of dust accumulation and wear and tear, damaging the radiant barrier.²

A radiant barrier cannot be in contact with any other materials on its underside or else it becomes ineffective.

Measure Review

This work paper includes definitions and standards from RIMA International. Energy calculations were performed using *EnergyGuage* software. Some cost information was obtained from a Home Depot retailer in Texas. This measure is not prescribed by either state or federal codes and standards, but it is a new requirement for the prescriptive path of ENERGY STAR 3.0 new homes.

Savings Calculations

Savings values for radiant barrier were calculated by modeling a typical residence with the software package *EnergyGuage USA USRR ZB v. 2.8.05*. This software simulates hourly load data specific to the home model inputs and can be used to perform economic analysis of building energy improvements. *EnergyGauge* was developed by the Florida Solar Energy Center and is approved by the Residential Energy Services Network (RESNET) for energy calculations.³ The modeling inputs used to calculate savings in *EnergyGuage* are listed in Table 2.

Definition of Variables

Table 2: Modeling Inputs for a Typical New Construction Residence		
EnergyGauge Inputs	Baseline New Construction (IECC 2009)	Source
Weather Zone	New Orleans	
square footage	1850	Compared to Arkansas Deemed Savings building models ⁶
number of stories	1	Compared to Arkansas Deemed Savings building models ⁶
Number bedrooms	3	Compared to Arkansas Deemed Savings building models ⁶
Number bathrooms	2	Compared to Arkansas Deemed Savings building models ⁶
Foundation Type	slab-on-grade	Compared to Arkansas Deemed Savings building models ⁶
Roof Type	Hip with medium color composite shingles	CLEAResult assumption
Wall insulation R-value	R-13	IECC 2009
Ceiling insulation R-value	R-30	IECC 2009
Window U-Factor	0.35	IECC 2009
Window SHGC	0.30	IECC 2009
Heating Type	Gas heating with AC, Heat Pump, and Electric strip heat with AC	heating types approved in the ENO Deemed Savings document ⁷
Heating System Efficiency	80 AFUE (gas furnace), 1.0 COP (electric), 7.7 HSPF New Construction (heat pump)	Federal Efficiency Standards (federal standard is Furnace AFUE is 78, however all systems available through retail are at 80)
Cooling Type	Central AC	Assumed majority of home will have central AC
Cooling System Efficiency	SEER 13	Federal Efficiency Standard
Thermostat Settings	78 cooling/68 heating	ACCA/IECC default settings
Water Heating Type	natural gas/electric	for gas heated home, gas water heating assumed, for HP and electric heated homes, electric water heating assumed
Water Heating Efficiency	0.59/0.92	standard baselines for 40 gallon storage units
Infiltration	EnergyGauge Default - Average	CLEAResult assumption
Supply Duct location	attic/interior space	both scenarios were modeled separately
Return Duct location	attic/interior space	both scenarios were modeled separately
Duct Leakage	EnergyGauge Default (assumes 88% efficiency due to duct leaks)	CLEAResult assumption
% of fluorescent lighting	EnergyGauge default applied	assumes 10%
Orientation	evenly distributed in 4 cardinal directions	CLEAResult assumption

Table 3: Modeling Inputs for a Typical Existing Residence

EnergyGauge Inputs	Baseline Existing Home	Source
Weather Zone	New Orleans	
square footage	1850	Compared to Arkansas Deemed Savings building models ⁶
number of stories	1	Compared to Arkansas Deemed Savings building models ⁶
Number bedrooms	3	Compared to Arkansas Deemed Savings building models ⁶
Number bathrooms	2	Compared to Arkansas Deemed Savings building models ⁶
Foundation Type	slab-on-grade	Compared to Arkansas Deemed Savings building models ⁶
Roof Type	Hip with medium color composite shingles	CLEARResult assumption
Wall insulation R-value	R-11	Compared to Arkansas Deemed Savings building models ⁶
Ceiling insulation R-value	R-19	Compared to Arkansas Deemed Savings building models ⁶
Window U-Factor	0.55	assumption for double pane clear glass
Window SHGC	0.60	assumption for double pane clear glass
Heating Type	Gas heating with AC, Heat Pump, and Electric strip heat with AC	heating types approved in the ENO Deemed Savings document ⁷
Heating System Efficiency	80 AFUE (gas furnace), 1.0 COP (electric), 7.2 HSPF New Construction (heat pump)	Assumed efficiencies for existing home systems.
Cooling Type	Central AC	Assumed majority of home will have central AC
Cooling System Efficiency	SEER 11	Assumption based on mix of home ages
Thermostat Settings	78 cooling/68 heating	ACCA/IECC default settings
Water Heating Type	natural gas/electric	for gas heated home, gas water heating assumed, for HP and electric heated homes, electric water heating assumed
Water Heating Efficiency	0.59/0.92	standard baselines for 40 gallon storage units
Infiltration	EnergyGauge Default - Average	CLEARResult assumption
Supply Duct location	attic/interior space	both scenarios were modeled separately
Return Duct location	attic/interior space	both scenarios were modeled separately
Duct Leakage	EnergyGauge Default (assumes 88% efficiency due to duct leaks)	CLEARResult assumption
% of fluorescent lighting	EnergyGauge default applied	assumes 10%
Orientation	evenly distributed in 4 cardinal directions	CLEARResult assumption

Estimated Savings

After modeling a typical existing and new construction residence with the characteristics listed above, the same models were simulated again with a radiant barrier. This process was repeated for the different applicable heating types in a home. The savings values were normalized per square foot of roof deck treated with radiant barrier. These values are listed in Table 4 for two different scenarios: ducts located in the unconditioned attic space, and ducts located in the interior conditioned space, both new constructions. Retrofit savings are listed in Table 5.

Table 4: New Construction Savings due to Radiant Barrier in a Typical Residence			
Radiant Barrier - Climate Zone New Orleans, LA (Site Built Home)			
Electric A/C And Heating Type:	kWh Savings per sq. ft. Roof Deck Treated	Therm Savings per sq. ft. Roof Deck Treated	Summer Peak kW Savings per sq. ft. Roof Deck Treated
Ducts Located in Attic Space			
Gas Heat	0.1627	0.0010	0.00011
Electric Heat	0.1831	n/a	0.00011
Heat Pump	0.1707	n/a	0.00011
Ducts Located in Interior Conditioned Space			
Gas Heat	0.1223	0.0010	0.00007
Electric Heat	0.1457	n/a	0.00007
Heat Pump	0.1337	n/a	0.00007

Table 5: Retrofit Savings due to Radiant Barrier in a Typical Existing Residence			
Radiant Barrier - Climate Zone New Orleans, LA (Site Built Home)			
Electric A/C And Heating Type:	kWh Savings per sq. ft. Roof Deck Treated	Therm Savings per sq. ft. Roof Deck Treated	Summer Peak kW Savings per sq. ft. Roof Deck Treated
Ducts Located in Attic Space			
Gas Heat	0.2740	0.0030	0.00024
Electric Heat	0.3263	n/a	0.00023
Heat Pump	0.2969	n/a	0.00023
Ducts Located in Interior Conditioned Space			
Gas Heat	0.2131	0.0025	0.00013
Electric Heat	0.2690	n/a	0.00013
Heat Pump	0.2410	n/a	0.00013

Measure Life

The effective life for this measure is 20 years.¹

Measure Cost

Since the most cost-effective application for radiant barriers is in new construction, the measure cost was established from real pricing of OSB roof decking at Home Depot. A normal 4 ft x 8 ft section of standard OSB costs \$8.67, while the same size piece of OSB with a radiant barrier laminated onto one side costs \$10.47⁴. This is an incremental cost slightly less than \$0.06/square foot of roof decking. Retrofit costs include both materials and installation. These are predicted to be \$0.90/square foot per RS Means Cost Data⁵.

Evaluation Parameters

The most appropriate evaluation protocol for this measure is verification of proper installation coupled with assignment of estimated energy savings.

Examples of Qualifying Equipment

RIMA International has established a Product Verification Program for radiant barriers that satisfy their standards. A third-party accredited laboratory tests each product, and a list of approved products are available on the RIMA website at:
<http://www.rimainternational.org/index.php/verify/>

References

1. DEER2008, 2June08: D03-205
2. RIMA International Verification Program, Verified Products List, <http://www.rimainternational.org/index.php/verify/>
3. *EnergyGauge* Energy and Economic Analysis Software homepage, <http://www.energygauge.com/>
4. Home Depot, Austin, Texas; oriented strand board price comparison, May 2012.
5. RSMeans Cost Data Book Online, May 2012.
6. R2-Work Papers to Residential Arkansas Deemed Savings, Installation and Efficiency Standards. Prepared by Frontier Associates.
7. Deemed Savings, Installation and Efficiency Standards. Entergy New Orleans Inc. Prepared by Frontier Associates. March 2009.

**Energy Smart New Orleans Impact Evaluation
for
Program Year 2**

**Prepared for
Entergy New Orleans
by:
Optimal Energy, Inc.
May 28, 2013**

**Optimal Energy, Inc.
802.453.5100**

www.optenergy.com

**14 School Street
Bristol, VT 05443**

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EXECUTIVE SUMMARY

This report presents the results from the impact evaluation of Energy Smart New Orleans' full Year 2 portfolio of residential, commercial, and industrial efficiency programs. The impact evaluation consisted of two main components: a complete tracking data analysis from all data in Entergy New Orleans' tracking database, and a detailed project file review selected by using stratified random sampling methods on the population of projects in the tracking database. Tables E.1 and E.2 show that the impact evaluation resulted in a realization rate of very close to one, indicating that there are very good data verification and quality control procedures in place.

Table E.1: Total Impact Evaluation kWh Results

Program	Reported kWh Savings	Verified kWh Savings	kWh Realization rate
CFL Direct Install	2,647,012	2,654,751	1.00
AC Tune-Up	441,446	442,136	1.00
Residential Solutions	3,328,273	3,326,202	1.00
Energy Star Air Conditioner	215,512	221,332	1.03
New Homes	582,688	587,251	1.01
Low Income	905,358	900,229	0.99
Commercial and Industrial	11,967,321	11,964,553	1.00
CFL Giveaway	475,968	475,968	1.00
Total	20,563,578	20,572,422	1.00

Table E.2: Total Impact Evaluation kW Results

Program	Reported kWh Savings	Verified kWh Savings	kWh Realization rate
CFL Direct Install	248	232	0.94
AC Tune-Up	224	224	1.00
Residential Solutions	783	788	1.01
Energy Star Air Conditioner	78	85	1.09
New Homes	141	144	1.02
Low Income	153	152	0.99
Commercial and Industrial	1,712	1,697	0.99
CFL Giveaway	44	44	1.00
Total	3,383	3,366	0.99

Our evaluation also identified several key recommendations to ensure that the high quality of the data continues and that program savings estimates are accurate. We suggest the following.

- Ensure that each project file contains complete documentation, including the application, any deemed savings calculations, and, when available, invoices and post-installation inspection forms.
- Ensure that the instructions for replacement CFL wattage are consistent between the Residential Solutions program, the CFL DI program, and the deemed savings documentation. These instructions should be based on the requirement of maintaining the same lumens pre- and post- installation. Any reduction in light output after the direct install will make it more likely for the customer to switch back to incandescent, thus negating the energy savings.
- Ensure that envelope measures for detached homes with multiple dwelling units are only counted once. This was especially an issue for the low-income program, which had many projects in 2-3 family homes.
- Include the lighting calculator with the commercial lighting project files
- Ensure that all contractors are using the most up-to date version of the lighting calculator.
- Consider adding a factor representing HVAC interactive effects for residential lighting savings calculations.

INTRODUCTION

EVALUATION OBJECTIVES

This report presents the results from the impact evaluation of Energy Smart's full Year 2 portfolio of residential, commercial, and industrial electric efficiency programs. The report mirrors the evaluation done for Program Year 1 of the program, but looks at projects completed between April 2012 and March 2013. The key objective from this evaluation is to provide verification of the gross energy impacts reported in the tracking database. To this end, the evaluation uses an engineering review of project files from a statistically significant sampling of projects completed during the year. During the file review, the evaluation asks:

- Are the deemed savings calculations applied correctly for the project?
- Do the efficiency and size assumptions used in the deemed savings calculations match the equipment specifications from the project application?
- Are the project files internally consistent? Do the findings in any post-installation inspections match the application and invoice?
- If the post-installation inspection finds different specifications than the original application, were the reported savings updated in the tracking database?
- Does the equipment specification meet the minimum efficiency required in the program guidelines?
- Is the project appropriately defined as early retirement retrofit vs. lost opportunity?¹ Is the baseline defined appropriately?
- Are the savings calculated from the project files accurately transcribed into the tracking database?

The scope of the evaluation does not include any site visits or participant interviews, and so all evaluation numbers rely on the paper work filed with the evaluated project. In cases where invoices were provided with the project paperwork, it was checked to ensure the specifications of the invoiced equipment match the deemed savings recorded in the tracking database.

PROGRAM DESCRIPTIONS

This evaluation covers Energy Smart's portfolio of nine programs that ran during the first program year. These programs are:

- **Residential Solutions** – rebates on energy audits for residential households, as well as any appropriate shell/air-sealing measures identified during the audit. The Residential Solutions Program also includes a component for the

¹ Early retirement retrofit and lost opportunity are the two main types of efficiency projects. For an early retirement retrofit, an efficiency program encourages retiring a piece of equipment before the end of its useful life, while in a lost opportunity project, the equipment has failed and needs to be replaced anyway, so the efficiency program is trying to encourage the customer to install a high efficiency unit, rather than a code compliant unit. Therefore, the baseline efficiency for the early retirement retrofit is the existing equipment, while the baseline for the lost opportunity is the code-compliant unit. These baselines are often different because code changes over time, and so a lot of older equipment would not be compliant with current code.

direct, no-cost installation of CFLs, low-flow showerheads, and faucet aerators in large multifamily buildings.

- **CFL Direct Install** – free CFLs directly installed in residences
- **Low Income** – free energy audits, insulation, air sealing, and energy star HVAC equipment to low-income households
- **ENERGY STAR Air Conditioning** – rebates on Energy Star certified room air conditioners, central air conditioners, and heat pumps.
- **Energy Efficient New Homes** – rebates for efficient new residential construction, either through lower HERS ratings or through prescriptive paths relating to lighting, HVAC, domestic hot water, and efficient windows.
- **AC Tune-Up** - \$75 towards the tune-up of existing residential central air conditioner or heat pump system
- **CFL Giveaway** – eight 13 watt CFLs and one advanced power strips given free to participants who pledge to be a resident of Orleans parish and had not participated in the CFL direct install program.
- **Small Commercial and Industrial** – rebates for efficiency projects at small commercial and industrial facilities
- **Large Commercial and Industrial** - rebates for efficiency projects at large commercial and industrial facilities.

For each program, Entergy New Orleans has program oversight, administers funds collected through customer base rates, manages the CLEAResult contract, and aids in program communications, marketing and outreach. CLEAResult, as program implementer, conducts outreach, approves customer eligibility, recruits and trains contractors, processes all rebate applications, conducts quality control and post-installation inspections, and tracks the projects and associated savings in centralized tracking databases. Deemed savings were used to calculate the energy reduction in all cases except for certain non-lighting C&I projects, where a custom approach was used. CLEAResult performed ongoing quality control through post-installation inspections for either 100% of installed projects or a random sampling of projects, depending on the program.

METHODOLOGY

In general, stratified random sampling was used for each program to select a statistically significant, representative sample of projects for review. Stratified random sampling is a statistical technique that splits a population into various strata in ascending order of one key value. This can greatly reduce the coefficient of variation in each stratum, thereby reducing the sample size necessary to achieve adequate statistical precision. Specific information on the sampling techniques and results for each program are given below.

PROGRAM LEVEL RESULTS

This section describes the data collection activities and analytic methods implemented as a part of the impact evaluation.

CFL DIRECT INSTALL

Savings data for the CFL Direct Install Program were analyzed by address and project. There were 3,366 unique homes visited as part of the program, and each household achieved an average mean savings of 786 kWh. Table 1 below gives the savings per lamp, the total number of lamps installed, and the total savings reported in the tracking database.

Table 1: Savings by CFL Wattage for the CFL DI Program

	14 Watt CFL	20 Watt CFL	23 Watt CFL	Total
# of Lamps	53,158	4,889	3,937	61,984
kWh Saved per Lamp	42	50	43	n/a
kW Saved per Lamp	0.006	0.009	0.012	n/a
Total kWh Savings	2,735,055	567,609	423,343	3,726,006
Total kW Savings	450	88	67	604

Evaluation activities for the CFL direct install program mainly involved reviewing the database entries and savings calculations. The savings review found three main problems in the tracking savings:

- kW savings were calculated using the same 0.004 kW per lamp for all wattages of CFLs.
- kWh and kW savings for the forty 16-Watt LEDs installed in the program were not included in the totals.
- Savings for the 23- W CFLs were calculating assuming a 25-Watt CFL .

These corrections lower the evaluated kW savings and slightly raise the evaluated kWh savings. Table 2 shows the impact of the modifications on savings and the program realization rate.

Table 2: CFL DI Impact Results

	Reported	Realization Rate	Verified
kWh	2,647,012	1.00	2,654,751
kW	248	0.94	232

The bullets below present our general observations from the database and project file review.

- As was the case last year, the deemed savings used for Energy Smart New Orleans do not include any factor to account for reduced cooling load due to the lower waste heat of the CFLs compared to incandescent lamps. Assuming that these interactive HVAC effects are similar to those used on the commercial side and that most CFLs installed through the program are installed in cooled spaces, this could increase energy savings by 5% and

demand savings by 10%. We recommend that interactive HVAC effects be included in deemed savings calculations going forward. There would also be a corresponding penalty in increased gas or electric use due to heating. Given New Orleans' climate, this would likely be much smaller than the air conditioning savings.

- We found that the savings calculations for the program assumed 25-Watt CFLs replace 72-Watt halogen incandescent lamps, while the program database show that 23-Watt CFLs replace these same lamps. There were similar issues found during the evaluation of Program Year 1. Going forward, it is important to ensure that the program implementers installing the lamps are given clear instructions on which CFL should replace which incandescent, and that these instructions are consistent with the program worksheet and deemed savings assumptions. Further, these assumptions should not result in a significant change in lumens after the CFLs are installed.

AC TUNE-UP

Savings data for the AC Tune-up Program were analyzed by address and application. There were 958 discrete locations visited in Program Year 2. Each project achieved an average mean savings of 461 kWh, for a total reported savings of 441 MWh.

In order to minimize the number of project files requiring review, stratified random sampling was used. Before final sample selection, the database was reviewed to check for outliers and missing values. Project records were sorted from smallest to largest kWh claim and placed into three strata, each with approximately one-third of the total program savings. Since this program uses a highly deemed approach, there was no variation in savings in the first two strata. The first stratum represents households which had one AC tuned, and the second strata represents households that had two ACs tuned. Table 3 below shows the reported kWh, kW, and number of projects in each sampling stratum.

Table 3: AC Tune-Up Program Strata Description

Sampling Strata	Reported kWh	Reported kW	Projects	Coefficient of Variation
1	207,635	92	655	0
2	148,830	85	242	0
3	84,891	47	61	0.46
TOTAL	441,446	224	830	

Next, a sample of projects from each stratum was selected. The number of projects selected from each stratum is dependent on the coefficient of variance of the reported savings within that stratum. Table 4 gives the sample information.

Table 4: AC Tune-up Reviewed Project Information

Sampling Strata	Projects	Reported kWh	Number of sampled projects	kWh of sampled projects	% of Total Sampled
1	655	207,635	1	317	0.2%
2	242	148,830	1	615	0.4%
3	61	84,981	14	18,486	22%

TOTAL	958	441,446	16	19,418	4%
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Table 5 shows the results of the quantitative project file review.

Table 5: AC Tune-up Impact Results

	Reported	Realization Rate	Verified	Relative Precision at 90% confidence level
kWh	441,446	1.002	442,136	0.3%
kW	224	1.0	224	n/a

Some general observations from the database and project file review:

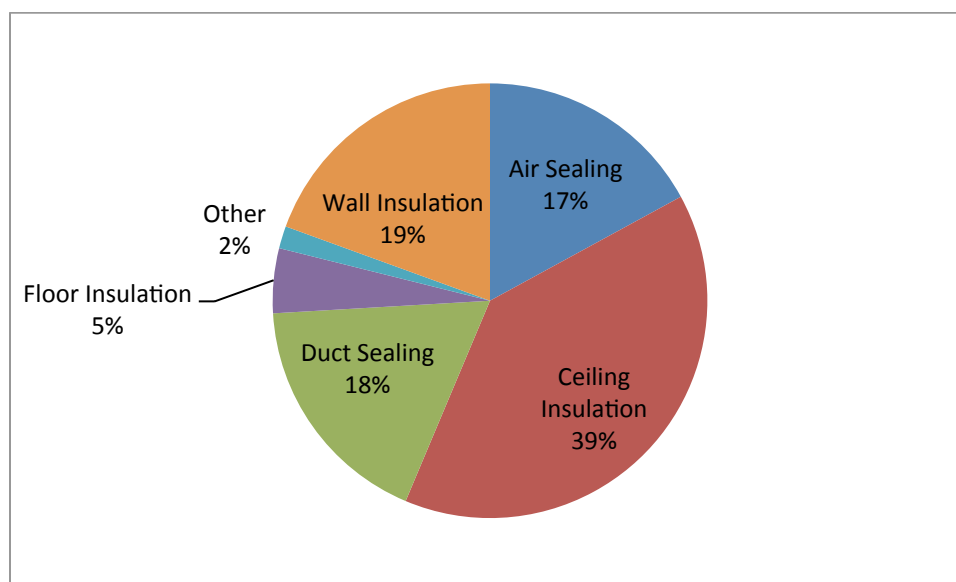
- Realization rate is close to one, showing that savings were captured accurately and consistently.
- For kWh, realization rate is slightly over one due to a tune-up on an electric heat pump that was counted as a tune-up for a standard AC with gas heat.
- No errors were found in the kW savings in the database, resulting in a realization rate of exactly 1.0.
- Deemed savings estimates are not capacity dependent for this program, while the applications include equipment with capacities varying from 1.5 to 4 tons. **We recommend modifying deemed savings values to be dependent on the capacity of the air conditioner. At a minimum, capacity should be tracked in the database, to enable a comparison between the actual average capacity and the assumptions used in the deemed savings database.**
- Rev 3.1 of the rebate form made it clear that the contractor was to fill out the FIXED or TXV section, but this clarity is lost in Rev 3.2. We recommend modifying the form to bring back this clarity.
- There were a couple instances where the minimum outside air temperature requirement for the day of the tune-up was not met. However, the air temperatures were only very slightly below the requirements, so savings were not quantitatively modified in the evaluation.
- The database was often confusing, especially when multiple AC units in the same home were addressed. For example, the total rebate amount would sometimes be listed as double the standard incentive, but the savings only implied one unit was serviced. Then there would be an additional line in the database with no rebate but with the savings associated with the rebate listed above. Note that the database had all the savings and cost information correct, but the format was confusing, and made the evaluation somewhat more time consuming. **We recommend modifying the database so that the incentives and the savings are clearly aligned.**

RESIDENTIAL SOLUTIONS

Energy Assessments

There were 471 households that participated in the Residential Solutions Program for program year 2. Program reported savings are 1,776 MWh. The chart below shows total savings by end use

Figure 1: Residential Solutions Savings by End Use



In order to minimize the number of project files requiring review, stratified random sampling was used. Before final sample selection, the database was reviewed to check for outliers and missing values. Project records were sorted from smallest to largest kWh claim, and placed into three strata, each with approximately one-third of the total program savings. Table 6 below shows the reported kWh, kW, and number of projects in each sampling stratum.

Table 6: Residential Solutions Program Strata Description

Sampling Strata	Reported kWh	Reported kW	Projects	Coefficient of Variation
1	589,850	305	317	0.59
2	602,792	186	105	0.17
3	583,657	148	49	0.34
TOTAL	1,776,299	639	471	

Next, a sample of projects from each stratum was selected. The number of projects selected from each stratum is dependent on the coefficient of variance of the reported savings within that stratum. Table 7 gives the sample information.

Table 7: Residential Solutions Reviewed Project Information

Sampling Strata	Projects	Reported kWh	Number of sampled projects	kWh of sampled projects	% of Total Sampled
1	317	589,850	12	28,270	5%
2	105	602,792	2	15,260	3%

3	49	583,657	8	105,681	18%
TOTAL	471	1,776,299	22	149,211	8%

Table 8 shows the results of the quantitative project file review.

Table 8: Energy Assessment Impact Results

	Reported	Realization Rate	Verified	Relative Precision at 90% confidence level
kWh	1,776,299	0.999	1,774,228	3.5%
kW	639	1.008	644	1.9%

Some general observations from the database and project file review:

- As was the case in Program Year 1, the savings in the database were not updated to reflect the results of the post-installation inspection. While in this case the changes in the evaluated selection mostly averaged out, **we recommend implementing a process for updating the tracking savings after the inspection.**
- None of the homes that participated in the program had CFLs, aerators, or showerheads installed during the assessment. A pilot started very late in program year 2 that would encourage more installations of these types of measures. **We recommend continuing the pilot into program year 3, and continuing to emphasize direct installations during the initial assessment.**
- As program procedure, the vendor is asked to go back and fix any projects that fail inspection. However, there was no hard-copy documentation available showing this procedure, and so the savings were not included in the verified numbers shown above.
- Ceiling insulation measure savings differ if the existing R-value is "0" or "1 to 4", but the rebate form has a single category for existing R-value of "0 to 4." **We recommend revising the rebate form to split this into two categories for consistency with the deemed savings methodology.**
- House type is not provided on the rebate application form. Since deemed savings are dependent on whether a unit is site-built or manufactured, **we recommend collecting this information on the application forms.**
- As in program year one, it was often difficult to tell how the savings in the database were derived from the information in the application. We recommend including any savings calculations with the project documentation and/or the tracking database.
- There were a few cases where the numbers in the post-installation inspection did not match the numbers used to derive the tracking savings. These instances are reflected in the realization rate. However, they do not significantly affect the gross kWh.
- Many projects did not include invoices or inspection forms. **We recommend ensuring that, for all projects that undergo inspection, the inspection form is included in the project documentation, and that all invoices are included.**

- It was often difficult based on the information provided to tell which of the recommend measures ended up being implemented. **We recommend clearly including a single document showing each measure that was implemented, and the associated savings, along with the application, invoice, and post-inspection form.**
- Many project files did not contain the customer information sheet that included the heating system type. For these homes, we were able to infer the heating system by backing out of the tracking savings, but could not independently verify these savings. **The initial assessment form including customer information should be included in the project documentation.**

Multi-Family Direct Install

Multi-Family Direct Install was performed as an initiative within the Residential Solutions Program. This initiative performed the direct installation of CFLs, faucet aerators, and low-flow showerheads in each unit of large multi-family complexes. Because some of the units visited were for low-income families, this initiative also produced some savings for the low-income program. In total, there were six multi-family complexes visited, for total reported savings of 621 MWh.

There were no problems with the project file review; the project documents were internally consistent and matched the number of bulbs used for the savings calculations, and the stipulated hours of operation by room type conformed to industry standards. However, deemed savings were not calculated using the same wattage CFLs as were installed in the program. We did not modify savings as the result, due to uncertainty as to what the actual wattages were of the installed lamps. **However, in the future, the deemed savings methodology should be revised to reflect the actual wattages of CFLs being installed.**

Since we did not adjust kWh or kW savings for the multifamily direct install program, the realization rate is 1.0. Tables 9 and 10 show the kWh and kW savings for the Multi-Family DI program.

Table 9: Multi-Family DI kWh Impact Results

	Reported Savings	Realization Rate	Verified Savings
LI	717,694	1.0	717,694
Non-LI	1,551,974	1.0	1,551,974
Total	2,269,669	1.0	2,269,669

Table 10: Multi-Family DI kW Impact Results

	Reported Savings	Realization Rate	Verified Savings
LI	70	1.0	70
Non-LI	144	1.0	144
Total	213	1.0	213

Finally, it is likely that the savings shown here are still an underestimate, because they do not count for interactive HVAC effects. **We recommend that, going forward, the contractors or volunteers track whether or not lamps are installed in a conditioned space and include a multiplier to account for HVAC interactive effects.**

Total Residential Solutions Savings

Finally, Tables 11 and 12 shows the total savings for the energy assessment measures and component of the Multi-Family Direct Install Initiative that is attributable to the Residential Solutions Component. The rest of the savings from the initiative will be counted under the Low-Income program.

Table 11: Total Residential Solutions kWh Savings

	Reported Savings	Realization Rate	Verified Savings
Assessments	1,776,299	0.999	1,774,228
Multi-Family	1,551,974	1.0	1,551,974
Total	3,328,273	0.999	3,326,202

Table 12: Total Residential Solutions kW Savings

	Reported Savings	Realization Rate	Verified Savings
Assessments	639	1.008	644
Multi-Family	144	1.000	144
Total	783	1.01	788

ENERGY STAR AIR CONDITIONER

There were 402 homes that participated in the Energy Star Air Conditioner Program in 2012. Each household achieved an average savings of 536 kWh, for a total reported savings of 215 MWh.

In order to minimize the number of project files requiring review, stratified random sampling was used. Before final sample selection, the database was reviewed to check for outliers and missing values. Project records were sorted from smallest to largest kWh claim, and placed into three strata, each with approximately one-third of the total program savings. Table 13 below shows the reported kWh, kW, and number of projects in each sampling stratum.

Table 13: Energy Star AC Program Strata Information

Sampling Strata	Reported Gross kWh	Reported Gross kW	Projects	Coefficient of Variation
-----------------	--------------------	-------------------	----------	--------------------------

1	72,233	30	279	0.32
2	71,165	26	95	0.53
3	72,114.00	22	28	0.28
TOTAL	215,512	78	402	

Next, a sample of projects from each stratum was selected. The number of projects selected from each stratum is dependent on the coefficient of variance of the reported savings within that stratum. Table 14 gives the sample information.

Table 14: Energy Star AC Reviewed Project Information

Sampling Strata	Projects	Reported kWh	Number of sampled projects	kWh of sampled projects	% of Total Sampled
1	279	72,233	4	1,128	2%
2	95	71,165	12	7,281	10%
3	28	72,114	4	12,458	17%
TOTAL	402	215,512	20	20,867	10%

Table 15 shows the results of the quantitative project file review.

Table 15: Energy Star AC Impact Results

	Reported	Realization Rate	Verified	Relative Precision at 90% confidence level
kWh	215,512	1.03	221,332	7%
kW	78	1.09	85	16%

Some general observations from the database and project file review:

- The higher than one realization rate is largely due to one instance where a geothermal heat pump was installed, but the tracking database savings reflected a typical window AC unit.

NEW HOMES

There were 215 homes that participated in the New Homes program. The average savings were 2,710 kWh per home, for a total of 583 MWh saved. Out of the 215 participating homes, 68 used the performance path. Of these, 58 received a HERS rating of 70 or less for 2,087 kWh savings per home, with the remaining 10 homes receiving a HERS rating of 70-85, for 1,044 kWh of savings per home. The 153 homes that followed the prescriptive path achieved between 1,811 kWh and 4,839 kWh savings per home.

Since the savings variance between projects for the program is so small, we used simple random sampling to save time and effort over using stratified sampling methods. We chose a sample of nine projects. Table 16 shows the results of the evaluation.

Table 16: New Homes Impact Results

	Reported Savings	Realization Rate	Verified Savings
kWh	582,688	1.008	587,251
kW	141	1.024	144

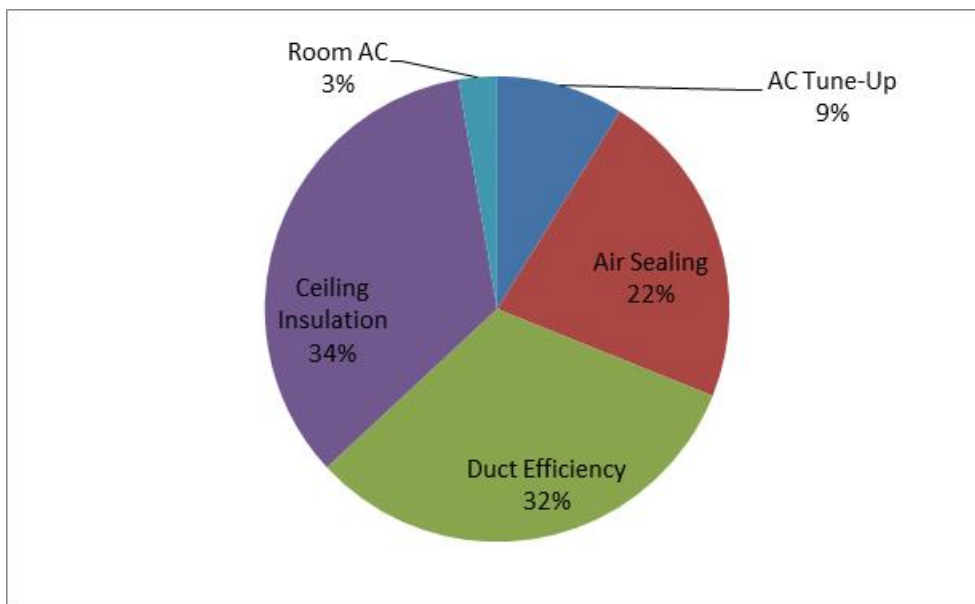
Some general observations from the database and project file review:

- Realization rates for both kWh and kW are above one mostly because HVAC savings in the tracking database reflect capacity numbers that have been rounded down to match the closest capacity in the deemed savings document. However, the post-installation inspection uses actual capacity values and uses savings that have been interpolated between the two closest values in the deemed savings document. The evaluators used the interpolated savings numbers, as these best reflect the actual conditions at the home. **However, going forward we recommend developing protocol for how to calculate deemed savings for HVAC measures where the capacity falls between two values in the deemed savings document.**
- The deemed savings values for the advanced lighting package assumes gas furnace heat, while many of the new homes projects have heat pumps. This means that heat pump savings may be overstated due to lighting interactive effects.
- In most cases, the glazing area calculations and/or number of windows purchased and window area were not provided in the documentation. The savings numbers were checked to ensure they fell into a reasonable range; however, the precise savings values for these measures could not be independently verified. **Going forward, these calculations should be a standard part of the project verification for homes on the prescriptive path.**
- **We recommend that effort should be made to ensure all application material and invoices should be included in the project documentation.**

LOW-INCOME

In the 2011 program year, there were a total of 76 homes that participated in the Low-Income program. Each household achieved an average savings of 2,469 kWh, for total program savings of 188 MWh. Figure 3 shows the distribution of savings by end use.

Figure 2: Low-Income Savings Distribution



For sampling, we split up the projects into two tiers, as shown in Table 17.

Table 17: Low-Income Program Sampling Description

Tier	Reported kWh	Reported kW	Projects
1	94,831	48	63
2	92,706	36	13
TOTAL	187,664	83	76

Next, a sample of projects was selected from each category. The number of projects selected from each category is dependent on the coefficient of variance of the reported savings. Table 18 gives the sample information.

Table 18: Low-Income Reviewed Project Information

Projects	Reported kWh	Number of sampled	kWh of sampled projects	% of Total Sampled
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projects					
Tier 1	63	94,831	8	23,602	25%
Tier 2	13	92,833	5	27,588	30%
TOTAL	76	187,664	13	51,189	27%

Tables 19 and 20 shows the results of the quantitative project file review. It also includes the component of the Multi-Family Direct Install savings that were counted towards low-income.

Table 19: Low-Income Impact kWh Results

	Reported Savings	Realization Rate	Verified Savings
Low-Income	187,664	0.97	182,535
Multi-Family	717,694	1.0	717,694
Total	905,358	0.99	900,229

Table 20: Low-Income Impact kW Results

	Reported Savings	Realization Rate	Verified Savings
Low-Income	83	0.98	82
Multi-Family	70	1.0	70
Total	153	0.99	152

Realization rates for both kWh and kW are very close to one, demonstrating CLEAResult's good data verification procedures.

Some general observations from the database and project file review:

- The below one realization rate is largely due to instances where tracking savings were not revised as a result of inspections, including one instance where savings were claimed for an insulation measure that failed inspection.
- In cases where the post-installation inspection revises the savings claimed in the applications, these revisions were not typically reflected in the tracking database. We recommend developing a protocol to update database savings after the post-installation inspection.
- On projects where CFLs were installed in the initial audit, these savings were not recorded in the database. We recommend pushing harder to install CFLs, shower heads, and aerators, and to ensure that the resulting savings are properly recorded in the tracking database.
- We recommend including the project invoice in the project file, or some other form of documentation showing which of the recommended measures were actually installed

COMMERCIAL AND INDUSTRIAL

In order to both increase the total available sample of Commercial and Industrial projects and to streamline evaluation efforts, the small and large C&I programs were combined into one population. The small and large Commercial and Industrial programs saved 11,967 MWh from 105 projects. Of the projects, 97% were lighting projects representing 53% of the savings, with the remainder coming from HVAC projects. Nearly 30% of program savings come from one large chiller project, and another 18% come from an air compressor project.

For sampling, due to the large difference in average savings between lighting and non-lighting projects, and because we wanted to be sure to review some non-lighting projects, we split up the projects into three strata of lighting projects plus one stratum for non-lighting projects. Table 21 below shows the distribution.

Table 21: C&I Program Strata Description

Strata	Reported Gross kWh	Reported Gross kW	Projects
1	1,940,521	379	86
2	2,370,024	443	13
3	1,987,677	243	3
non-lighting	5,669,099	646	3
Total	11,967,321	1,712	105

Next, a sample of projects was selected from each category. The number of projects selected from each category is dependent on the coefficient of variance of the reported savings. Table 22 gives the sample information.

Table 22: C&I Program Reviewed Project Information

Sampling Strata	Projects	Reported kWh	Number of sampled projects	kWh of sampled projects	% of Total Sampled
1	86	1,940,521	5	48,622	3%
2	13	2,370,024	4	806,895	34%
3	3	1,987,677	3	1,987,677	100%
Non- Lighting	3	5,669,099	3	5,669,099	100%
TOTAL	105	11,967,321	15	8,512,293	71%

Table 23 shows the results of the quantitative project file review.

Table 23: C&I Impact Results

	Reported	Realization Rate	Verified	Relative Precision at 90% confidence level
kWh	11,967,321	0.9998	11,964,553	0.3%
kW	1,712	0.9915	1,697	0.9%

Some general observations from the database and project file review:

- The kW realization rate was below one mainly due to savings claimed in the tracking database from exterior lighting fixtures. Going forwards, we recommend creating a new area type in the lighting calculator for exterior lighting, with a coincidence factor of 0.
- The kWh realization is slightly below one because some cooling bonuses were given for unconditioned spaces, and because a couple projects did not adjust tracking savings based on the final numbers.
- For completeness, the lighting survey worksheet should be included in the project files. This will aid future evaluations and make it easier to update savings based on the results of any post-installation verification.
- Some contractors have been using outdated versions of the lighting tool. We recommend ensuring that all contractors are using the current version of the lighting tool, and that care be taken to make sure contractors switch to new versions as updates are released.
- The chiller project included a report with details on the savings calculations and M&V activities. However, the other two projects we reviewed had very little information on how the savings estimates were derived and/or measured, making the savings very hard to independently verify. We recommend that any non-lighting projects have a memo in the project documentation that clearly delineates how the savings were calculated, and provides references to sources to support any necessary assumptions.

CFL GIVEAWAY

Since this program does not have the invoices, applications, and inspection reports associated with the other programs, we did not do a traditional impact evaluation. Savings for this program are partly based on a survey indicating that 91.7% of respondents had installed the CFLs and 84% had installed the smart strip. Table 24 shows the reported savings for the CFL Giveaway program.

Table 24: C&I Impact Results

	Reported
kWh	475,968
kW	44

CONCLUSION

TOTAL RESULTS

Tables 25 and 26 show that realization rates for all programs were very close to one, with a total realization rate of just barely above one for kWh and just below one for kW. This indicates that CLEAResult did a good job calculating and reporting deemed savings, and that, while there were some errors, they were not systemic and were instead evenly distributed around the mean savings.

Table 25: Total kWh Results

Program	Reported kWh Savings	Verified kWh Savings	kWh Realization rate
CFL Direct Install	2,647,012	2,654,751	1.00
AC Tune-Up	441,446	442,136	1.00
Residential Solutions	3,328,273	3,326,202	1.00
Energy Star Air Conditioner	215,512	221,332	1.03
New Homes	582,688	587,251	1.01
Low Income	905,358	900,229	0.99
Commercial and Industrial	11,967,321	11,964,553	1.00
CFL Giveaway	475,968	475,968	1.00
Total	20,563,578	20,572,422	1.00

Table 26: Total kW Results

Program	Reported kWh Savings	Verified kWh Savings	kWh Realization rate
CFL Direct Install	248	232	0.94
AC Tune-Up	224	224	1.00
Residential Solutions	783	788	1.01
Energy Star Air Conditioner	78	85	1.09
New Homes	141	144	1.02
Low Income	153	152	0.99
Commercial and Industrial	1,712	1,697	0.99
CFL Giveaway	44	44	1.00
Total	3,383	3,366	0.99

CONCLUSIONS AND NEXT STEPS

The realization rate of close to one for kWh shows that, in general, CLEAResult's quality control and verification procedures are rigorous and ensure high quality tracking data.

However, there are a few key recommendations that would further improve the accuracy of the tracking data.

- Ensure that the project savings information is updated based on post-inspection verification information.
- Ensure that the instructions for CFLs replacement wattage are consistent between the Residential Solutions program, the CFL DI program, and the deemed savings documentation. These instructions should be based on the requirement of maintaining the same lumens pre- and post- installation. Any reduction in light output after the direct install will make it more likely for the customer to switch back to incandescent, thus negating the energy savings.
- Ensure that project documentation is consistent and complete for every project. Incomplete project documentation made it very difficult to perform a thorough third-party verification in certain cases. This is especially true for the C&I program, where each lighting project file should include a copy of any calculation worksheets and each non-lighting project should include a memo explaining the savings assumptions and calculations.
- Include the lighting calculator with the commercial lighting project files. This will make it far easier to verify savings, and update savings after any post-installation verifications.
- Consider adding a factor representing HVAC interactive effects for residential savings calculations.

Despite the above caveats, it is clear that after two program years, CLEAResult is accurately using the deemed savings for its projects and is keeping a good and up-to-date database. We believe that Energy Smart stakeholders should be confident that CLEAResult's ongoing quality control and data verification procedures are ensuring that reported savings correctly reflect the actual implemented project specifications and correctly apply the deemed savings documents, especially after the above recommendations have been implemented. It may be therefore appropriate to conduct a less thorough review of the project files in the future and instead focus evaluation resources on specific program areas that represent large fractions of overall savings and/or are highly uncertain. These evaluation areas may include:

- Evaluation of net savings as opposed to gross savings.
- On-site verification to ensure that projects are being installed to the correct specifications.
- Evaluate specific savings assumptions in the deemed savings algorithms that have a high degree of uncertainty or that impact a large portion of portfolio savings.
- A process evaluation looking at how to improve program processes and procedures, as opposed to impacts.
- Review of install rates and savings for the CFL Giveaway program.

MEMORANDUM

To: Entergy New Orleans
cc: CLEAResult, Inc.
From: Optimal Energy
Date: May 28, 2013
Subject: Net-To-Gross Comparison

Introduction

In this memo, we survey impact evaluations performed in other jurisdictions in order to get a qualitative sense of the magnitude of net-to-gross (NTG) ratios that could be expected in the EnergySmart New Orleans programs. It is important to note that NTG ratios are typically program specific and depend on many factors, including but not limited to:

- History of efficiency in the jurisdiction
- Marketing and outreach activities
- Program delivery model
- Economic conditions
- Climate of jurisdiction
- Type and size of incentives
- Measures offered as part of program
- Electric rates in jurisdiction
- Deemed savings methodology and assumptions
- Methodology used for NTG evaluation

Due to this complicated mixture of factors, it is very difficult to compare the NTG found for one program to another program in another jurisdiction. As a result, the conclusions of this section should not be quantitatively applied to the savings of this year's programs, but only used to get a general qualitative sense of the type of NTG ratios that may be found were these studies to be performed in New Orleans. This section gives brief conclusions for each program in the EnergySmart portfolio. For a more detailed summary of the evaluations reviewed, see the accompanying excel file.

CFL Direct Install

There are few published studies that have evaluated this type of program. However, there are some examples of evaluations that look at the NTG for the CFL component of a residential solutions style program. Two evaluations that match this description were performed for Ameren Illinois' programs. Ameren's Residential All-Electric program provides direct installation of CFLs, showerheads, and other low cost measures as well as recommendations for further energy-saving retrofits. Ameren's Residential Retrofit program provides similar services to gas heated homes. The all-electric and retrofit programs were found to have a NTG for CFLs of 0.89 and 0.68, respectively. A third evaluation done for a similar program in Massachusetts

finds a NTG of 0.83. We would thus expect that the NTG for this program would fall in the **0.7-0.9 range**.

AC Tune-Up

We reviewed a variety of programs, both with AC tune-ups as their sole focus and with tune-ups as a component in a broader program. We find a likely NTG range to be from **0.85 to 0.95**.

Residential Solutions

Residential Solutions is a fairly standard and well understood program in the residential sector. Nevertheless, there is a very wide range of NTG ratios reported for this program, from 0.66 to 1.74. This range reflects the varying conditions of different jurisdictions as well as different methodologies of the evaluations (such as whether spillover was included in the evaluation and how it was calculated). There were two evaluations which found NTG ratios above one: a NYSERDA program at 1.74 and a Massachusetts program with 1.29 for air sealing and 1.23 for insulation. These numbers reflect fairly large spillover effects; the NYSERDA value includes 66% non-participant spillover. If Energy Smart New Orleans net-to-gross evaluation were to focus mainly on free ridership, it could expect a NTG ratio of 0.65 – 0.92; including an estimate of free ridership may boost that range to around **0.8-1.3**.

Energy Star AC

Energy Star ACs are most typically a fairly minor part of a broader residential prescriptive program. Because of this, we did not find as many comparable evaluations as for the other programs. However, our findings suggest free ridership of between 0.59 and 0.81. However, there is indication that the NTG ratio for heat pumps is likely to be significantly higher than for central ACs and room ACs. An evaluation for First Energy's Residential Energy Efficient HVAC Equipment, for example, finds an NTG ratio of 0.811 for central ACs and 1.35 for heat pumps. However, since heat pumps are currently a fairly minor part of Energy Smart's savings, we would expect a lower free ridership, in the range of **0.7-0.8**.

New Homes

Residential new construction programs tend to have extremely varied NTG ratios, even for similar programs and jurisdictions, making it very difficult to give a likely range. For example, a single evaluation of California's program found a NTG of **0.45 to 1.06**, depending on the region. This is due to the wide variation in the quality of a baseline home from city to city. We would expect the NTG for New Orleans would fall within in this range, most likely at the upper end, as energy efficiency less established in the New Orleans' marketplace than it is in California.

Low-Income

Because low-income program participants by definition have very little disposable income, it typically assumed that these customers would make very few efficiency investments without the existence of the program. Therefore, the NTG for the Low-Income program should be expected to be **around 1.0**.

Commercial and Industrial

The evaluations examined for this program range from 0.6 to 0.83. Our review indicates that programs most similar to those in New Orleans have an NTG ratio of around 0.7. Non-lighting measures may be expected to have a slightly higher NTG ratio of **0.8 to 0.9**.

CFL Giveaway

Because the CFL giveaway gives multiple free CFLs to participants with no follow up to ensure installation, we would expect the NTG ratio to be lower than for other programs. Factors that could impact savings from the giveaway include:

- Percent of CFLs that are installed
- Percent of participants that live in the New Orleans service area
- Percent of CFLs that are installed in low-use areas

These factors are going to be significantly influenced by the specifics of the program. For example, one would expect the percent of CFLs to be installed to lower for New Orleans, which gives 8 CFLs per participant than for a program that gives 4 CFLs per participant. Further, the Program Implementer did in fact conduct a survey to estimate how many of the lamps were installed in the New Orleans service territory. This survey determined that 100% of participants live in the New Orleans service territory and that 91.7% of participants installed CFLs. However, the survey had a low response rate, just 6.5%. Also, respondents were not asked how many of the CFLs were installed. Combined with the results of evaluations in other jurisdictions, we suspect that the actual NTG ratio, including the in service rate may be in the range of **0.5 – 0.8**.





Algiers Quarterly Report For Period of October 2012 through May 2013

Executive Summary

Energy Smart New Orleans was developed by the New Orleans City Council, is administered by Entergy New Orleans & Entergy Louisiana and is implemented by CLEAResult. Since Energy Smart's launch in 2011, it has helped more than 17,000 New Orleans households and businesses become more energy efficient while saving money and increasing comfort.

In October of 2012, the Energy Smart program crossed the Mississippi River to start offering services to Entergy Louisiana customers located in Algiers. With this expansion, the Energy Smart program brought energy efficiency services to every resident and business owner in Orleans Parish. Now entering the 9th month of an 18 month program (from October 2012 to March 2014) Energy Smart has already reached 55% of its target goal and is on track to reach all of its goals by the completion of the program.

Crucial to the successful deployment of Energy Smart in Algiers has been building on the momentum and success generated since Energy Smart first started in 2011. As Energy Smart had already developed a network of contractors, some of whom live in Algiers, the program focused its efforts on working with that network to expand services. This expansion was bolstered by targeted outreach and marketing to Algiers leaders, residents and businesses.

This report contains a summary of program activity, kWh savings to date and highlights of how Energy Smart has worked on expanding into Algiers. This report is being filed at the same time as the Energy Smart year two annual report. For a complete listing of all program material including contractor lists, deemed savings documents and marketing material please refer to the year two annual report.

Participation & Savings Report

(Program- October 2012 thru March 2014)

Program	Goal	October 2012 thru May 2013			
	kWh	kWh	Participants	Measures	kWh
Home Performance w/ Energy Star	593,539	276,973	140	1995	46.7%
Energy Star Air Conditioning	105,302	7,710	5	6	7.3%
A/C Tune-Up	120,441	12,458	19	22	10.3%
Energy Smart New Homes	26,653				
CFL Direct Install	1,102,303	546,976	597	14771	49.6%
Income Qualified	94,273	209,306	190	2894	222.0%
Solar Water Heater Pilot	14,712				
Small Commercial Solutions	409,158	440,175	7	7	107.6%
Large Commercial Solutions	646,897	218,945	1	1	33.8%
Totals	3,113,278	1,712,543	959	19,696	55.01%

Marketing and Outreach Activity

Algiers has been the recipient of both specific West Bank outreach for Energy Smart, as well as city-wide advertising and promotion for major campaigns. These have been: Home Performance with ENERGY STAR, AC Tune-Ups, and Window AC Recycling and Rebate events at Lowes. Direct measures, such as door hangers, presentations and direct communications via neighborhood associations have been combined with general outreach via radio and city wide communications. In addition, the Energy Smart Information Center was at the Algiers Regional Library for two months in the Spring of 2013.

Below is a list of marketing and outreach Energy Smart has done in Algiers:

- ✦ October 2012:
 - Programs available October 22, 2012.
 - E-blast sent to the Bright Moments database targeting Neighborhood Associations on the Westbank announcing Energy Smart now available to all Algiers residents.
 - Mailer to Algiers Neighborhood Associations introducing Energy Smart to Algiers residents and businesses.
 - Discussed Algiers expansion at all Energy Smart contractor bi-monthly meetings.
- ✦ November-December 2012:
 - Entergy Solutions Plus E-blast with Algiers article 11/15/12
 - Energy Smart E-newsletter announcing move to Algiers out 12/12/12
 - Algiers Point Neighborhood Association highlighted Energy Smart in newsletter 12/21/12
- ✦ January-February 2013:
 - Home Performance with ENERGY STAR promotion
 - 1/9/13: Times-Picayune Insert- 27,000 pieces targeting Algiers and New Orleans East.
 - 1/18/13: Door Hangers - 12,000 pieces targeting Algiers neighborhoods in 70114 & 70131 zip codes.
 - 1/22/13: ES presentation at the Algiers Neighborhood Association President's Council meeting at the Algiers Regional Library.
 - Energy Smart Information Center moved to Algiers Regional Library for January and February. Moved in March (now at City Hall)
 - Door to door outreach by Energy Smart to businesses to drive Small Commercial program participation
- ✦ March – April 2013:
 - 4/9/13: 5000 door hangers on AC tune-up program distributed in Algiers (70114)
 - Energy Smart CFL bulbs and Advanced Power Strip giveaway, reaching 181 Algiers residents and saving 57,888 kWh
- ✦ May – June 2013:
 - 5/21/13: Presentation at Algiers Economic Development Foundation meeting
 - Lowes AC event E-blasts and radio ads promoted June 1 and 8 AC recycling and rebate events across city.
 - Energy Star Window A/C rebates ads placed in Wal-Mart and Sears

Summary of Program Activity

Below is a short synopsis of how each program has performed during the first nine months of the Algiers program:

- ✦ **Home Performance with Energy Star (HPwES)**- The HPwES program has completed 35 energy assessments and 17 retrofits in single family homes in Algiers. The Energy Smart program identified and performed multi-family direct installation on 124 units at a large multi-family complex in Algiers. During regularly scheduled HPwES meetings with contractors, Energy Smart continues to underscore the importance of contractors expanding their services to Algiers residents.
- ✦ **Energy Star Air Conditioning**- Energy Smart has completed 6 air conditioning replacements to date, with many more expected in the coming months. The combination of Energy Smart advertising this program in Algiers, in store Window A/C trade in events at Lowes and a spike in A/C activity during the hot summer months will bring the largest amount of activity through summer of 2013.
- ✦ **A/C Tune-Up**- This program has completed 22 A/C tune ups to date in 19 Algiers single family homes. Like the Energy Star A/C program, this program will see the majority of its activity in summer months. Energy Smart has also identified several multi-family apartment complexes upon which it will perform tune ups in the coming months.
- ✦ **New Homes**- There has been no activity in the New Homes program to date. With relatively little new homes activity occurring in Algiers, this program will likely see little participation. Energy Smart communicates regularly with new homes contractors and developers, also maintaining a strong relationship with the Home Builders Association of New Orleans.
- ✦ **CFL Direct Install**- The CFL direct install program has performed very well to date and is on target to reach its goal of 1.1 million kWh. To date, non-profit Green Light New Orleans has installed almost 15,000 energy saving light bulbs in 600 single family homes in Algiers.
- ✦ **Income Qualified**- The Income Qualified program has already doubled its target goal, largely through a multi-family direct install job that was performed on 182 rental units in Algiers. HPwES contractors are at work identifying good candidates for the Assisted HPwES program, which will continue to drive savings to a broad range of income qualified residents in Algiers.
- ✦ **Solar Water Heater Pilot**- The entire Energy Smart program has seen little activity in this program, with zero activity over the last 12 months. Energy Smart is waiting to see how the solar market reacts to the changes to Louisiana state tax incentives, which may drive more interest in this program.
- ✦ **Small Commercial Solutions**- Those businesses interested in taking part in the Small Commercial Solutions program sign a “letter of intent” after having received an initial assessment of their energy savings potential. To date, letters of intent have been signed which account for all Small Commercial funds and the program has already exceeded its kWh savings goal.
- ✦ **Large Commercial Solutions**- With one job completed, the Large Commercial program has achieved one-third of its kWh savings goal. Energy Smart has also established contact with a property management company which manages several large commercial properties in Algiers. It is expected that this program will meet or exceed its goal by the end of the calendar year.

959	participants
19,696	measures
1,712,543	kWh saved
55%	of kWh savings goal achieved

Looking forward to the coming months

Energy Smart anticipates that activity in Algiers will continue to grow in the coming months. This growth will come through a combination of summer months driving participation in the A/C programs, a greater presence of Energy Smart contractors in Algiers, and planned outreach and marketing activities. Energy Smart is on track to achieve its goals for the suite of residential and business services which it provides. Energy Smart will provide another report on the Algiers portion of the Energy Smart program in early fall.