Entergy New Orleans, Inc.
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Gary E. Huntley
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January 28, 2012

Via US Mail

Ms. Peggy Lewis
Clerk of Council
Council of the City of New Orleans
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

Re: Filing of Quarterly Energy Smart Report In Compliance with Resolution R-11-52

Dear Ms. Lewis:

On February 3, 2011, the Council of the City of New Orleans adopted Resolution R-11-52 that approved Entergy New Orleans, Inc.'s ("ENO") selection of CLEAResult as the Third Party Administrator for the Council-approved Energy Smart Programs. Council Resolution R-11-52 requires CLEAResult to file bi-monthly reports with the Council.

On behalf of CLEAResult, ENO submits the enclosed Energy Smart report for the period of October 2012 through December 2012. Should you have any questions regarding this filing, please contact my office at (504) 670-3680.

Sincerely,

Gary E. Huntley

cc: All Councilmembers
Council Utilities Regulatory Office
Clinton A. Vince, Esq
Presley Reed, Esq
Walter J. Wilkerson, Esq
Joseph A. Vumbaco, PE
Erroll Smith, CPA
Ken Paliet, CPA

EnergySmart
A New Orleans Program

Quarterly Report

October 2012-December 2012

(Program Year 2 – April 2012 thru March 2013)

Entergy
THE POWER OF PEOPLE

Overview

The third quarter of the Energy Smart Program Year concluded on December 31, 2012, saving 13,398,240 kWh and reaching 80.6% of its overall goal for the year. The most notable change from quarter 2 to quarter 3 was the Income Qualified Program exceeding its target goal. The Small and Large Commercial Solutions programs each saw considerable gains in their energy savings, with the Large Commercial Program exceeding its goal.

After the launch of the Algiers expansion program in October, Energy Smart began focusing attention on how to effectively let Algiers residents know they could now take part in the Program. The CFL Direct Install Program has had great success thus far having attained 15% of its goal just 3 months into this 18 month program. Marketing material (featured at the end of this report) began circulation in Algiers in early January and is being followed up with outreach to the Algiers Neighborhood Association. Door Hangers are being distributed in the 70114 and 70131 zip codes of Algiers to advertise the Energy Smart Program.

The Energy Smart Information Center Kiosk was moved from the Rosa F Keller Library to the Algiers Regional Library where it will remain until the end of February.

Program Results- New Orleans

Preliminary results of Energy Smart by program are shown below for work completed and invoiced by December 31, 2012.

December 2012 - Monthly Participation/Savings Report

(Program Year - April 2012 thru March 2013)

		2012 Saving Goals		YTD					% Completed YTD	
Program Name	Market Focus	kW	kWh	kW	kWh	CO^2 reduction (lbs)	# of Participants	# of Measures	kW	kWh
Home Performance with Energy Star	Residential	293	868,874	484.3	2,201,874	12,330,494	1,258	19,418	165.3%	253.4%
Energy Star Air Conditioning	Residential	347	1,178,169	69.2	186,068	1,041,981	385	474	20.0%	15.8%
A/C Tune-up	Residential	648	1,176,985	167.9	369,335	2,068,276	810	887	25.9%	31.4%
Energy Smart New Homes	Residential	492	2,308,671	130.7	545,045	3,052,251	197	526	26.6%	23.6%
CFL Direct Install	Residential	660	4,565,349	257.4	1,582,068	8,859,581	2,187	40,582	39.0%	34.7%
Income Qualified	Residential	30	122,250	79.3	663,928	3,717,997	656	11,748	264.3%	543.1%
Solar Water Heater Pilot	Residential	NA	NA			0			0.0%	0.0%
Small Commercial Solutions	Commercial	322	2,230,328	340.5	1,775,580	9,943,248	68	68	105.8%	79.6%
Large Commercial Solutions	Commercial	636	4,130,464	847.4	6,074,342	34,016,315	17	17	133.2%	147.1%
Totals		**3,428**	**16,581,090**	**2,376.60**	**13,398,240**	**75,030,143**	**5,578**	**73,720**	**69.3%**	**80.8%**

Program Results- Algiers

Preliminary results of Energy Smart by program are shown below for work completed and invoiced by December 31, 2012. The Algiers portion of Energy Smart began in October 2012 and will end on March 31, 2014. The goals stated in the following table are for the entire duration of the program.

		Goal	YTD			
Program Name	**Market Focus**	**kWh**	**kWh**	**Participants**	**Measures**	**kWh**
Home Performance w/ Energy Star	Residential	593,539	12,971	9	14	2.0%
Energy Star Air Conditioning	Residential	105,302				
A/C Tune-Up	Residential	120,441	1,845	14	5	1.5%
Energy Smart New Homes	Residential	26,653				
CFL Direct Install	Residential	1,102,303	163,121	176	4134	14.8%
Income Qualified	Residential	94,273				
Solar Water Heater Pilot	Residential	14,712				
Small Commercial Solutions	Commercial	409,158				
Large Commercial Solutions	Commercial	646,897				
Totals		**3,113,278**	**177,937**	**199**	**4,153**	**5.70%**

Home Performance with ENERGY STAR

Month	Participating Contractors	Rebates							QA Inspections	DI Participants	Energy Consultants	Silver Assessment	Gold/Platinum Assessment	kWh Savings	Incentive Paid
		Ceiling Insulation	Wall Insulation	Floor Insulation	Air Sealing	Duct Sealing	Solar Screen	Total Rebates							
April	23	13	5	4	3	2	0	27	10	-	20	34	28	99,344	$ 38,279
May	23	24	14	13	16	1	2	70	26	-	20	53	18	213,750	$ 26,990
June	25	14	15	9	6	0	1	45	31	-	21	29	35	115,915	$ 27,813
July	25	25	23	10	7	1	0	66	18	-	21	28	25	184,322	$ 26,315
August	27	18	14	15	12	4	0	63	33	-	22	34	22	193,781	$ 30,706
September	28	12	9	8	15	13	0	57	47	-	23	29	14	160,349	$ 26,088
October	28	6	7	4	18	15	0	50	31	-	23	29	27	97,662	$ 22,112
November	28	4	3	8	4	4	0	23	7	1015	22	20	14	1,081,713	$ 80,139
December	28	4	4	4	8	3	0	23	6	-	22	32	12	55,038	$ 12,312
YTD Totals	**28**	**120**	**94**	**75**	**89**	**43**	**3**	**424**	**209**	**1015**	**22**	**288**	**195**	**2,201,874**	**$ 290,754**

The Home Performance with Energy Star (HPwES) continues to perform exceedingly well and has more than doubled its kWh savings goal over just the first 9 months of program year 2. This is due in part to the success of the Direct Install Program and completion of several multi-family projects despite delays due to Hurricane Isaac. Due to the high level of participation, the original allotment of HPwES incentive funds was depleted by late November. To capitalize on the momentum and success of the program, $80,000 of incentive funding was shifted from the Energy Smart New Homes program to the HPwES program. Going forward, the HPwES program will be working closely with Home Energy Assessors and contractors to streamline the processes and program requirements for each aspect of the program.

Direct Install CFL Program

Month	Participants	14W	18W	23W	Total	kWh savings	Incentive Paid
April	327	5940	321	294	6555	252,665	$38,141
May	341	6098	260	314	6672	256,041	$14,678
June	480	7868	295	292	8455	321,230	$18,601
July	285	4585	229	263	5077	196,036	$11,169
August	135	2063	156	126	2345	91,390	$5,159
September	203	3008	419	269	3696	149,554	$8,131
October	45	2282	315	314	2911	119,964	$6,404
November	139	678	86	114	878	36,407	$4,030
December	232	3395	367	231	3993	158,781	$8,785
Total	**2,187**	**35,917**	**2,448**	**2,217**	**40,582**	**1,582,068**	**$ 115,098**

The first six months of program year 2 of the direct install CFL program saw results that were on pace with the first year of the program. However, impacts from lack of volunteers to install bulbs due to Hurricane Sandy led to a slowing in installation activity over the last few months. In order to maximize volunteer activity over from January- March of this year, Greenlight New Orleans has launched the "March on Climate Change" campaign and partnered with local businesses to help recruit volunteers. In addition, Energy Smart and Entergy New Orleans are exploring ideas to increase volunteerism over the next few months.

A/C Tune Up Program

Month	Participating Contractors	Tune-Ups performed	kWh savings	Incentives paid	QA Inspections
April	20	128	57,264	$8,865	-
May	23	114	50,962	$8,123	-
June	23	32	14,658	$2,112	17
July	23	38	21,525	$3,148	9
August	23	20	13530	$2,210	3
September	24	14	7,380	$912	-
October	30	94	57,810	$5,835	57
November	30	151	49,933	$9,098	76
December	30	303	96,273	$18,143	252
Total	**30**	**894**	**369,335**	**$58,446**	**414**

This was the best performing period of time for the A/C tune-up program in the history of the Energy Smart program. Program savings more than doubled from 165,319 kWh at the end of September to 369,335 kWh at the end of December. This surge in activity was primarily due to performing A/C tune ups for renters in multi-family complexes. As a result, the A/C Tune Up program is on pace to surpass program year 1's results.

Income Qualified

Month	RAC Installed	CAC Repaired/ Tuned up	Assessments performed	Weatherization Projects	Direct Install	kWh savings	Incentives paid
April	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-
August	0	4	0	0	-	2,460	$ 1,027
September	0	3	0	0	-	1,845	$ 1,218
October	4	5	1	1	-	6,264	$ 6,081
November	3	14	5	4	618	648,916	$ 58,208
December	2	1	1	1	-	4,442	$ 3,160
Total	**9**	**27**	**7**	**6**	**618**	**663,928**	**$ 69,694**

Exceeding its yearly target goal by more than 5 times, the Income Qualified Program realized substantial savings while serving renters in the multi-family Direct Install Program. In addition, Energy Smart contractors working in Income Qualified single family homes performed work necessary to prepare homes for weatherization work, including repairing sheetrock, installing new doors and replacing exterior siding on homes. The Energy Smart Program is working to identify new opportunities to ensure that the high participation rate of income qualified homes will continue.

Energy Efficient New Homes

Month	Rebates Received			kWh savings	Incentives paid	QA Inspections
	HERS 70 or less	HERS 85-71	Prescriptive			
April	-	-	-	-	-	-
May	2	1	106	256,717	$ 41,496	11
June	-	1	-	1,044	$ 200	-
July	20	0	0	112,339	$ 7,514	-
August	10	0	2	25,600	$ 4,875	10
September	1	0	-	2,087	$ 375	20
October	8	3	-	19,828	$ 3,600	11
November	4	1	-	9,392	$ 1,700	15
December	-	-	38	118,038	$ 22,950	-
Total	**45**	**6**	**146**	**545,045**	**$ 82,710**	**67**

The Energy Smart New Homes Program has continued to be one of the most challenging of Energy Smart programs to show results. Energy savings in year 2 has already surpassed energy savings posted in the entirety of year 1, but the low volume of New Home construction has had impact on program performance. The Energy Smart program has seen some success in the combining the addition of prescriptive measures to the program with strategic outreach to key partners. The Energy Smart program remains in close contact with the New Orleans Home Builders Association and will continue to pursue partnerships and opportunities.

Energy Star Air Conditioning

Month	Participating Contractors	CAC	RAC	Rebates received	kWh savings	Incentives paid	QA Inspections
April	28	4	14	18	10,884	$ 1,945	0
May	29	8	32	40	22,042	$ 4,515	15
June	30	7	127	134	46,062	$ 8,280	37
July	30	2	44	46	14,541	$ 2,425	30
August	28	7	153	160	50,917	$ 11,620	31
September	30	7	41	48	24,288	$ 4,965	12
October	30	4	17	21	12,135	$ 2,575	16
November	30	-	2	2	696	$ 85	2
December	30	1	4	5	4,503	$ 995	5
Total	**30**	**40**	**434**	**474**	**186,068**	**$ 37,405**	**125**

As expected, the Energy Star A/C program saw a slowing in activity during the move into winter months. Program Year 2 results have already surpassed the final Year 1 results, but having reached only 15.8% of goal has caused Energy Smart program administrators to examine new tactics for engaging customers and contractors in this program. Plans are now underway to reach out to a larger number of contractors &retailers with a goal of getting more uptake for the program.

Solar Hot Water Heater Program

Month	Participating Contractors	Rebates Received	kWh savings	Incentives Paid
April	5	-	-	-
May	5	-	-	-
June	5	-	-	-
July	5	-	-	-
August	5	-	-	-
September	5	-	-	-
October	6	-	-	-
November	6	-	-	-
December	6	-	-	-
Total	**6**	**-**	**-**	**-**

The Energy Smart Solar Hot Water Heater Program has yet to process any rebates in year 2 and only saw 2 rebates processed in year 1. While Energy Smart has been working to market the program since the issue regarding the backflow valve has been resolved, there has been no uptake for rebates. Energy Smart will continue to reach out to solar PV installers to let them know that rebates are available for solar hot water heater installations.

Small Commercial Solutions

Month	Assessments Performed	Projects completed	kWh savings	Incentives paid	QA Inspections
April	5	-	-	-	-
May	16	3	32,858	$4,081	3
June	5	4	65,066	$8,055	4
July	2	5	46,907	$5,863	5
August	28	4	41,573	$22,635	4
September	23	11	306,881	$18,686	11
October	1	16	368,519	$43,879	16
November	0	14	414,364	$50,761	14
December	0	11	499,412	$62,337	11
Total	**80**	**68**	**1,775,580**	**$216,297**	**68**

Completed Project Type	
Lighting	67
A/C	1
Total	**68**

The Small Commercial Solutions Program more than tripled its kWh savings since the last report, going from 493,285 kWh saved at the end of September to 1,775,580 kWh saved at the end of December. While the funding for this program has been allocated for some time, many of the projects are just closing. Energy Smart is in the process of rolling out a new marketing initiative which will focus on non-lighting opportunities. Examples of marketing flyers targeting restaurants and hotels with the goal of reducing energy consumption in dishwashing, vending and refrigeration are attached in the appendix.

Large Commercial Solutions

Month	Assessments Performed	Projects completed	kWh savings	Incentives paid	QA Inspections
April	2	-	-	-	-
May	10	2	30,089	$2,832	2
June	20	7	2,744,383	$220,650	7
July	17	-	-	-	-
August	0	1	78,928	$7,893	1
September	0	1	512,602	$50,000	1
October	1	3	2,459,625	$76,040	3
November	1	3	248,715	$24,872	3
December	-	-	-	-	-
Total	**51**	**17**	**6,074,342**	**$382,287**	**17**

Completed Project Type	
Lighting	16
HVAC	1
Chiller	-
Solar Window Film	-
Total	**17**

The Large Commercial Solutions Program more than doubled its output in this quarter due in large part to the completion of a compressed air project in an industrial facility. Though the Large Commercial program has preset payout levels and a $50,000 per project limit, savings results can exceed the goal if projects produce savings beyond the equivalent of the $50,000 threshold. Having well exceeded its savings target for the year at 147.1% of goal, the Energy Smart program is in the process of planning marketing initiatives for Year 3 of the program.

The One Stop Shop Energy Smart Information Center (ESIC)

Month	Phone calls received	Website hits
April	201	553
May	256	1,553
June	107	1,664
July	115	1,116
August	138	1,092
September	144	761
October	127	1177
November	199	1034
December	90	645
Total	**1377**	**9,595**

Marketing and Outreach Activity

Marketing update for June 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 1,664 (vs. 1,553 in May)
  - Peak day: Tuesday, June 26 (820)
- Top referring websites / bounce rate (lower number is better):
  - Direct (557 vs. 451 last month) / 42%
  - Google (290 vs. 243 last month) / 46%
  - Entergy New Orleans (198 vs. 138) / 21%
  - Dsire.org (81 vs 59) 18%
  - T.co (Twitter) / 19%
  - M.facebook.com (32) / 75%

Energy Smart Information Center:

- Moved to the Richard E. Smith branch in Lakeview, for July and August.

Advertising and Media:

- Outreach on Lowes WAC event
  - 2000 Flyers to churches weekend of June 2/3:
    - Greater St. Stephens (East location)
    - Household of Faith (East location)
    - Beacon of Light (East location)
    - New Hope Baptist Church (Uptown)
    - Marie Goretti (East Location)
    - Franklin Ave (Gentilly)
    - Greater Antioch or City of Love (Carrollton)
  - 4,000 Robocalls on event week of 6/18
  - Emails to public and City Council channels
  - Radio: WTUL interview June 6
- ¼ page Times Picayune ad - A/C tune-up
- ¼ page Gambit ad – A/C tune-up
- *Times Picayune Article* Energy savings reaped in New Orleans 6/24/12
- Press Release First Year of Energy Smart Helps to Create Greener New Orleans 6/25/12
- ENO news release, email and predictive dialer message about higher summer bills and encouraging customers to become more energy efficient, including Energy Smart 6/26/12
- *Charles Rice on The 411 7/1/12*

Presentations and Events:

- Lowes WAC Recycling and Rebate events:
  - Elysian Fields on Saturdays, June 9 & 23
  - Jefferson Highway on Sundays, June 10 & 24
- Energy Smart staff at the Lower Light Baptist Church Neighborhood Event, 4422 Raye Avenue, New Orleans, Saturday, June 16
- Hand delivered updated Energy Smart A/C program materials to all HVAC contractors in the program

Marketing update for July 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 1,116
  - Peak day: Tuesday, July 2 (76)

Energy Smart Information Center:

- Richard E. Smith branch in Lakeview for July and August

Advertising and Media:

- Radio ads WWL – 3 weeks in July – Central HVAC program
- WWL-TV website advertising
- Gambit: AC tune-up ad

Presentations and Events:

- WTUL radio show Robert Refrigeration to promote/educate on AC tune-up program: July 4
- Hollygrove Neighborhood Association: July 14
- United Way Southeast Louisiana Office: July 16
- Pontchartrain Park Community Center: July 21
- Lakeview Library: July 21
- Delgado Housing Fair: July 28
- East New Orleans Library: July 28

Marketing update for August 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 1,092
  - Peak day: Friday, August 17 (202)

Internet:

- Launched first Energy Smart Newsletter! Friday, August 17 to list of 8,000 emails managed by Bright Moments: Content: Overview, Central HVAC, Lowe's event highlights
- Central HVAC program on front page of website

Energy Smart Information Center:

- Richard E. Smith branch in Lakeview for July and August

Advertising and Media:

- Final Times Picayune ad, August 4: Central HVAC
- B97 radio ads throughout 8/6-8/19 on HVAC programs

Presentations and Events:

Energy Smart staff and table at the following Mayor's budget events. Between 400-600 people were in attendance at each event:

- District A: Aug. 22, at Lakeview Christian Center, 5885 Fleur de Lis Drive.
- District B: August 13, at the Jewish Community Center, 5342 St. Charles Ave.
- District D: Aug. 27, at Dillard University's Professional Schools Building, Georges Auditorium, 2601 Gentilly Blvd.
- District E: Aug. 15, at Greater St. Stephen Full Gospel Baptist Church, 5600 Read Blvd.

Marketing update for September 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 761
  - Peak day: Thursday, September 6 (47)
- Central HVAC program on front page of website

Algiers Roll-Out:

- Developed and finalized marketing plan for Energy Smart Algiers expansion

Energy Smart Information Center:

- East New Orleans Branch library for September and October

Advertising and Media:

- None in September
- HPwES marketing materials in development; presentation to ENO on 9/25/12
- NOA-TV interview organization
- Phantom load campaign coordiation

Presentations and Events:

- September 15: PRC Sellabration; presentation to Lakeview Civic Association
- September 24: Mayor's Budget Meeting.

October 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 1,177 (vs. 761 in September)

Algiers Roll-Out:

- Programs started October 22.
- E-blast sent to the BM database targeting Neighborhood Association on the Westbank announcing Energy Smart now available to all Algiers residents.
- Mailer to Algiers Neighborhood Associations introducing Energy Smart now available to all Algiers residents.

Home Performance with ENERGY STAR

- Training on October 25 by outside HPwES trainer of approximately 30 contractors and staff.
- Program changes and new forms sent to all contractors.
- Energy Smart video filmed during the meeting and release forms gathered from participating contractors.

Media

- ENO press releases on:
    - Algiers expansion
    - Phantom Power

Presentations and Events:

- October 6: Hollygrove Market
- October 10: Harrison Marketplace
- October 20: Broadmoor Festival

November 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 1,034 (vs. 1,177 in October)
    - Peak Day: November 15 (Entergy Solutions article out)

Algiers Roll-Out:

- Entergy Solutions Plus E-blast with Algiers article 11/15/12

Energy Smart Information Center:

- Keller library in Broadmoor for November and December

December 2012

Website hits:

- Total www.EnergySmartNOLA.info Visits: 645 (vs. 1,034 in November)
    - Peak Days:
        - 12/12/12 (E. Smart newsletter out) and 12/6/12

Algiers Roll-Out:

- E. Smart newsletter out 12/12/12
- Algiers Point Neighborhood Association highlighted Energy Smart 12/21/12

Resolution Recommendations

On October 18, 2012, the New Orleans City Council passed Resolution R-12-393 requiring the inclusion of additional details in reporting on the Energy Smart Program. Per this requirement, the following section and the accompanying appendix include:

- Responses to the enumerated requirements in the aforementioned resolution;
- Picture examples of marketing materials have been included to demonstrate outreach to both residential and commercial customers;
- Detailed narratives for each program include specific strategies for addressing how programs that have not reached their goals will be modified with the aim of increasing participation;
- Detailed explanations of deemed savings changes and incorporation of the Independent Examiner's recommendations; and
- A 2013 marketing and advertising plan.

Recommendation #1

The Resolution recommended that the program strive to attain more non-lighting projects in the commercial sector. Energy Smart will increase its marketing efforts and focus to more proactively market non-lighting measures to commercial customers. Energy Smart will begin targeted marketing initiatives to specific customer types including, but not limited to hotels, restaurants and churches. Marketing pieces directed toward these customer segments have been developed to assist measure diversity in the programs. Attached in the appendix are examples of Energy Smart Commercial Program flyers that have been created to assist with this effort. Itemized lists of measures and rebates are included in the flyers to make customer more aware of the incentives levels available to them. Additionally, Entergy New Orleans customer service managers have performed walk-downs of several main commercial corridors within the city in an effort to promote the Energy Smart program.

Many of the commercial projects utilizing Energy Smart incentives have been lighting projects due to the high level of savings and rapid payback of 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. In fact, in Entergy New Orleans's recently filed Integrated Resource Plan, the Achievable Demand Side Management Potential Study shows that 44% of long term savings opportunities for commercial customers come from lighting measures versus 25% for space heating and cooling[1].

[1] Entergy New Orleans, Inc.
Achievable Demand Side Management Potential Study, October 30, 2012, Prepared by ICF International, Page 36 and 37.

Recommendation #2

The Resolution recommended that documentation verifying that the recommendations of the Independent Examiner have been incorporated including capturing all projects in a single database and confirmation of changes and additions to deemed savings. For a discussion on deemed savings modifications, please see the Memorandum, Attachment A and Attachment B included in the Appendix. Included in these documents are screenshots verifying that these changes in deemed savings have been incorporated into the savings calculations. In addition, please see pages 33-41 of the Energy Smart Year 1 Annual Report for additional discussion of how the Independent Examiner's recommendations were incorporated.

Recommendation #3

The Resolution recommends updating the supporting documentation for the second year goal. However, with only approximately two months remaining in program year two, the best support for the goal are the program results themselves. At this time, neither a new baseline study nor an updated appliance saturation survey has been performed. It was not anticipated that these studies would be performed during the term of the program.

Recommendation #4

The Resolutions recommends that Energy Smart provide detailed strategies to increase participation in programs that are underperforming. Energy Smart assesses the performance of the programs on a regular basis. As a result, they continually look to improve the results of programs that are underperforming as well as those that are on pace to reach and/or exceed the goal. Detailed plans for marketing and outreach have been attached in this report. It is worth noting that though several of the programs in Year 2 appear to be underperforming against the yearly goal, some of these programs (Energy Star Air Conditioning and Energy Smart New Homes) are outpacing their Year 1 results.

Recommendation #5

Recommendation #5 applies to the year-end Annual Report. The recommendations will be addressed in the Year 2 Annual Report.

Recommendation #6

The Resolution recommends the Energy Smart provide projections showing the use of Energy Smart funds through the end of program year 3. An updated forecast for program Year 3 is currently being created. Energy Smart requests additional time to provide this data in a supplemental filing which will be made on, or before, February 8, 2013.

Recommendation #7

The Resolution recommends that Energy Smart provide documentation of specific activities and resources of the third party administrator and ENO that will be used to coordinate the ENO-administered Energy Smart programs and ELL- Algiers administered Energy Smart programs and the Smartview AMI Low Income pilot program. With the exception of reporting and some additional marketing efforts specific to Algiers, the Energy Smart program on both sides of the river is being executed as one program. At this time, there are no plans to coordinate Energy Smart and the Smartview AMI pilot.

APPENDIX

Marketing and Outreach Sample Material

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 Unit Package Unit	
Food Service Equipment	ENERGY STAR Electric Steam Cooker	Up to $1,250 per Unit
Refrigeration	ECM Evaporate Motors	$80 per Unit
Dishwashing	Pre-Rinse Spray Valve (Electric Water Heater Customer Only)	$140 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, call the Entergy New Orleans Energy Solutions Center at 1-866-721-0249, or visit www.energysmartnola.com .

EnergySmart
A New Orleans Program

Figure 1- Draft Sample Commercial Flyer

EnergySmart
A New Orleans Program

Save Energy and Money with Energy Smart!

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

EnergySmart
A New Orleans Program

Incentives of up to $5000 per home available to New Orleans residents for energy efficiency measures, including:

- FREE energy efficient light bulbs
- $75 off A/C tune-ups
- Attic & Floor Insulation
- Air and Duct Sealing

Contact Energy Smart at 1-866-721-0249
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www.EnergySmartNOLA.info

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

Figure 2- Sample of Neighborhood Outreach Door Hanger

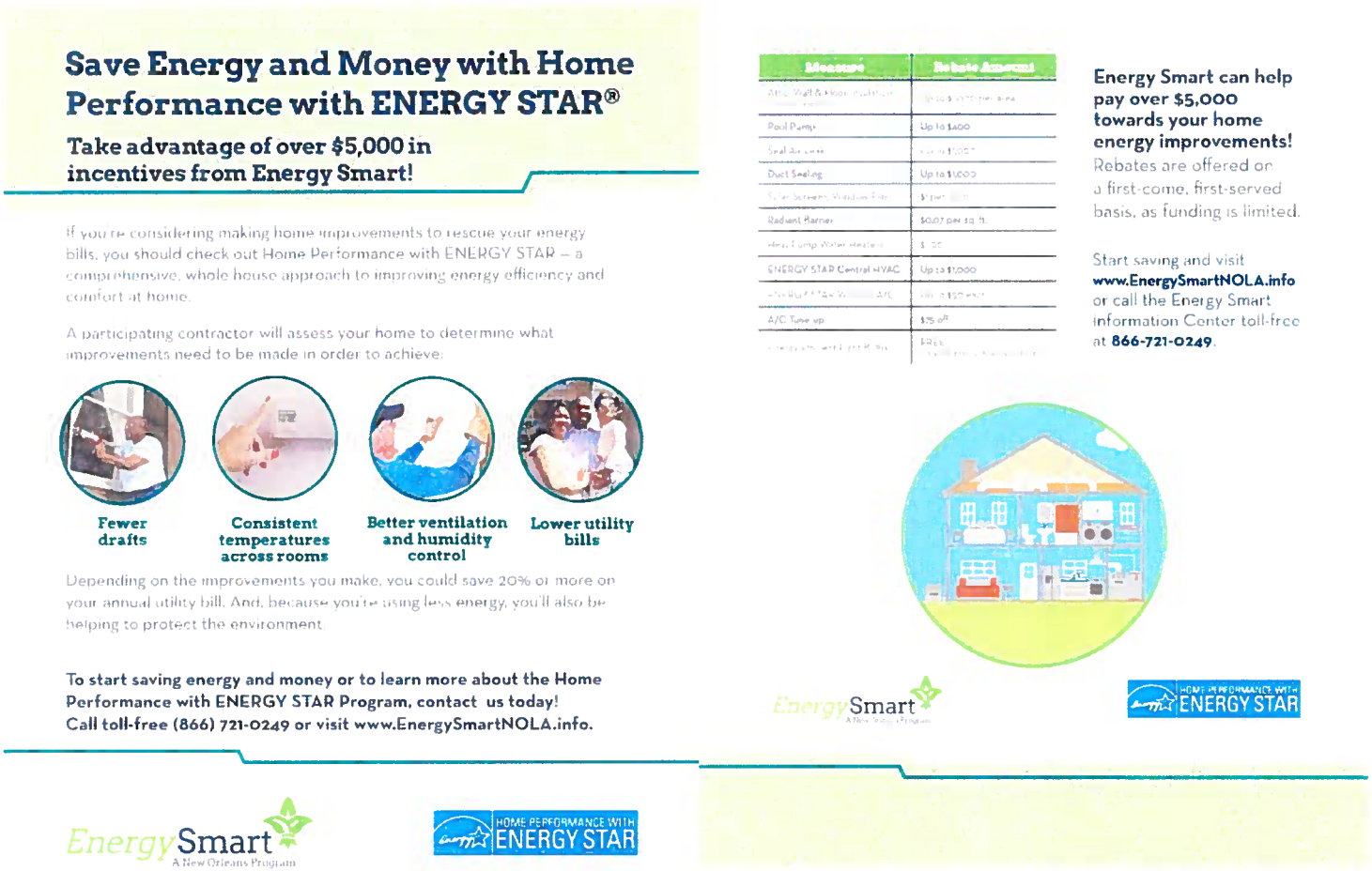

Figure 3- Sample of Times Picayune and Gambit Newspaper Inserts

ENERGY SMART

2013 Marketing/Advertising Plan

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
Print	Doorhanging - (72,000 pieces & distribution) Gambit - (60,000 pieces) *Flyers - (15,000 pieces)	HPwES, Whole house approach.		AC tune-up season, Tips on why do tune-ups, On-line sign up		Lowes WAC events	Central HVAC, WAC, Tune-ups	AC - Keeping cool		AC tune-ups			
Gambit Insert 20K quantity each insertion	(Placement, Printing)	**Week 2 January 6th -12th (Eastbank & Algiers 70114)**				**Week 2 (May 13th)**				**Week 2 (September 16th thru September 23rd)**			
Doorhangers 12K quantity each canvas – printing not included	(Disribution & Placement cost included in print column)	**Week 3 & 4 January 14th thru 22nd (Algiers only) distribution & printing**		**Weeks 2 and 3 (March 9th; March 16th) New Orleans Eastbank & Algiers distribution & printing**		**Weeks 3 and 4 (May 18th; May 25th) distribution & printing**				**Weeks 2 and 3 (September 14th; September 21st) distribution & printing**	**Weeks 2 October 14th thru 21st) Algiers distribution & printing**		
Robocalls @30K quantity each citywide call (6K/City Council District)				**Week 4 (March 17th-March 23rd) Eastbank (30,000) & Algiers (12,000)**						**Week 3 (September 15th-September 21st)**	**Weeks 2 October (14th thru 21st) Algiers (12,000)**		
Radio ads	(Placement only)			**Week 2 (March 3rd –March 9th)**		**Weeks 3 and 4 (May 13th -May 25th)**							
Newspaper - (Times Picayune, etc.)	(Placement only) (inserts) (Printing)	**Week 2 January 6th - 12th (East & Algiers)**				**Week 3 (May 19th) (placment only)**							
Flyer 15K quantity each canvas to churches and businesses - printing not included	(Distribution only) (Printing)					**Week 4 (May 11th & 12th-May 18th & 19th) (distribution only)**							
Media Relations		**WBOK, Kelder & LBJ, Sunday Morning Journal, NPR, WWLTV**		**WBOK, Kelder & LBJ, Sunday Morning Journal, NPR, WWLTV**		**WBOK, Kelder & LBJ, Sunday Morning Journal, NPR, WWLTV**				**WBOK, Kelder & LBJ, Sunday Morning Journal, NPR, WWLTV**			
Television							**Week 2**						
Entergy Bill insert								**Week 2**					

Outreach - Events and Presentations - Ongoing throughout year

Energy Smart Commercial Solutions Program

FOR HOTELS

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

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
Chillers	Replace Existing with High Efficiency	Based on New Equipment Efficiency Call for Details
Variable Frequency Drives (VFDs)	Installed on Air Handler Unit (AHU)	Up to $1,000 per Unit
Air Conditioning	DX Units	Based on New Equipment Efficiency Call for Details
	Package Units	Based on New Equipment Efficiency Call for Details
Guest Room Thermostats	ENERGY STAR Electric Steam Cooker	Up to $35 per Thermostat
Vending Machine Controllers	Cold Drink Machines	$190 per Unit
	Refrigerated Reach-In Coolers	$130 per Unit
	Snack Machines	$46 per Unit

Schedule your walk-through energy assessment today!

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

EnergySmart
A New Orleans Program

CLEAResult
UNLEASHING THE VALUE OF ENERGY

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	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. 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. See Attachment B for a more detailed explanation of this approach from the Texas filing.	All Commercial Lighting Measures

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) (Total)	Energy Saved (kWh) (Total)
1	1	Office 1	Office	Refrigerated Case (33 to 41°F)	f44svs	F48T12/VHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	f44ll	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	f44svs	F48T12/VHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	f44irlu	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	f44svs	F48T12/VHO Fluorescent, (4) 48", STD VHO lamps (484 Watt/Unit)	10	0	None	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 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
f44irlu	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
Add a systematic approach for dealing with early retirement retrofits	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. 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. For early retirement (ER) projects the measure's 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 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. 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. Weighted ER Measure Savings (kWh) = $(kWh_{ER} \times RUL + kWh_{ROB} \times (EUL-RUL)) / EUL$ Where: kWh_{ER} = Early Retirement (ER) Energy Savings kWh_{ROB} = Replace on Burnout (ROB) Energy Savings Remaining Useful Life (RUL) Estimated Useful Life (EUL)	All Commercial HVAC measures

	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
	Project Type
Application Type	Early Retirement
Building Type	Large Office
	Existing Equipment Type
Equipment Type 1	DX Air Cooled
Equipment Type 2	Unitary Air Conditioner
Equipment Type 3	Split System Under 5.42 tons
	Existing Equipment
Existing Equip Manuf. Year	2005
Cooling Capacity (tons)	5 tons
	New Equipment Nameplate
New Full-Load Efficiency	13.00 EER
New Part-Load Efficiency	16.00 IEER
	Efficiency Requirements
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

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

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

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

Early Retirement Energy Savings (kWh) Calculations

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

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

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

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 BTUh

	Manuf. Year[a]	Split System <65,000 Btu/h EER[a]	SEER	SEERadj[b]	Applicable Standard	
BASELINE EFFICIENCIES	2005	9.0	10	10	ASHRAE 90.1--2004	← ER Old EER & ER Old SEER
	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]	← ROB Old EER & ROB Old SEER
	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]	← 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
Solar Screen: Update baseline SHGC assumption	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)	Solar Screens

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)	▪ All installed measures will be verified by CLEAResult staff to ensure they meet the Best Practice Standards ▪ If 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 present ▪ Energy 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	▪ 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	▪ Major Violation Examples (not all inclusive)
	  ▪ 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)

DUCT EFFICIENCY IMPROVEMENTS

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.

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.

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.

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.

Installation Standards

1. 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.
2. Foil tapes, including UL 181 A-P 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.
3. Ducts shall be mechanically attached as per manufacturer's specifications.
4. 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.

Duct Efficiency Measure Air Flow Requirements

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

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

Optimal Energy's Deemed Savings Recommendations	CLEAResult Action	Affected Measures
Document sources for all assumptions in deemed savings document. If based on modeling, include a description of all modeling inputs in an appendix.	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". CLEAResult believes the existing documentation to be sufficient, given the savings values are "in-line" with industry accepted values 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.	Ceiling Insulation, Wall Insulation, Floor Insulation, ENERGY STAR Windows, Air Infiltration, Solar Screens, Duct Efficiency Improvement
Include O&M and gas savings in deemed savings document	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.	All Measures
Add information necessary to calculate TRC	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.	All Measures

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.	For residential HVAC measures, the EFLH are based on ENERGY STAR's AC & Heat Pump energy savings calculator. 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.	All Commercial and Residential HVAC measures

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 petition[2].

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.

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[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 years[1], 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.

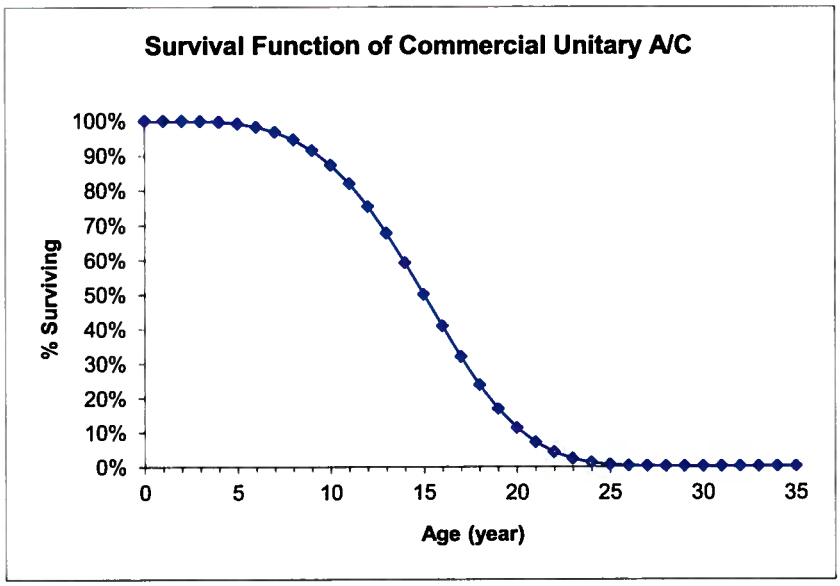


Figure 1 - Survival Function of Commercial Unitary Equipment[3]

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.

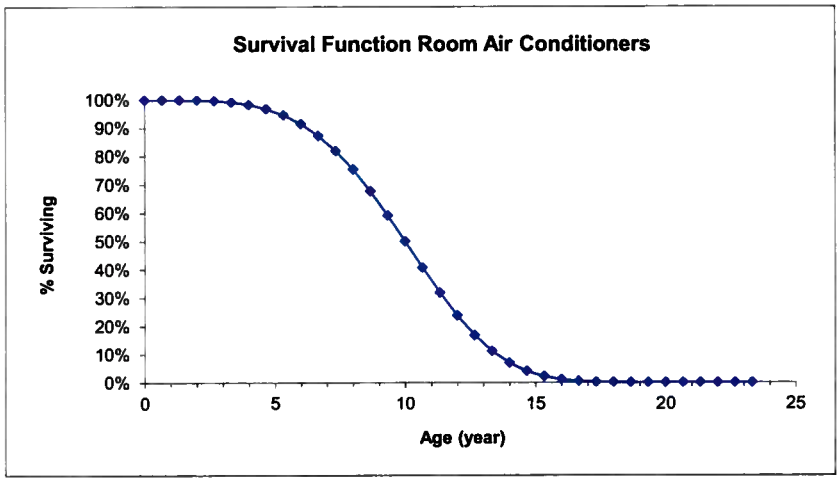


Figure 2 - Survival Function of Room Air Conditioners

Figure 3 - Survival Function of Packaged Chillers was based on data obtained from ASHRAE[4]. 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.

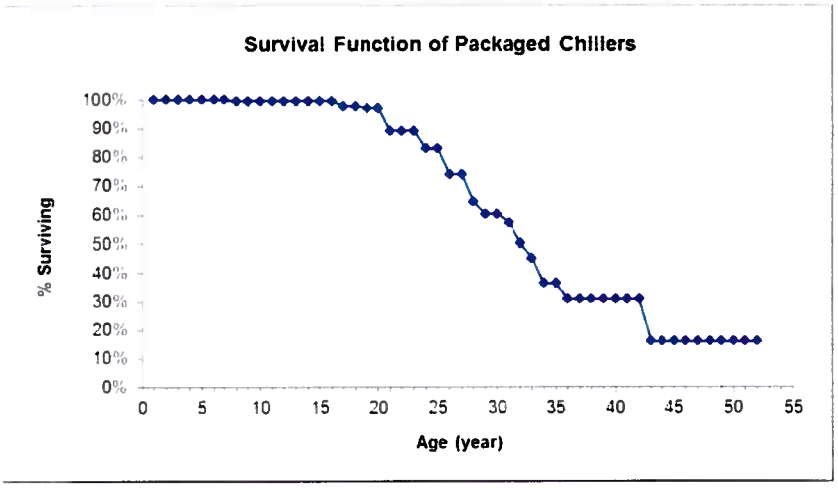


Figure 3 - Survival Function of Packaged Chillers[4]

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

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

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

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

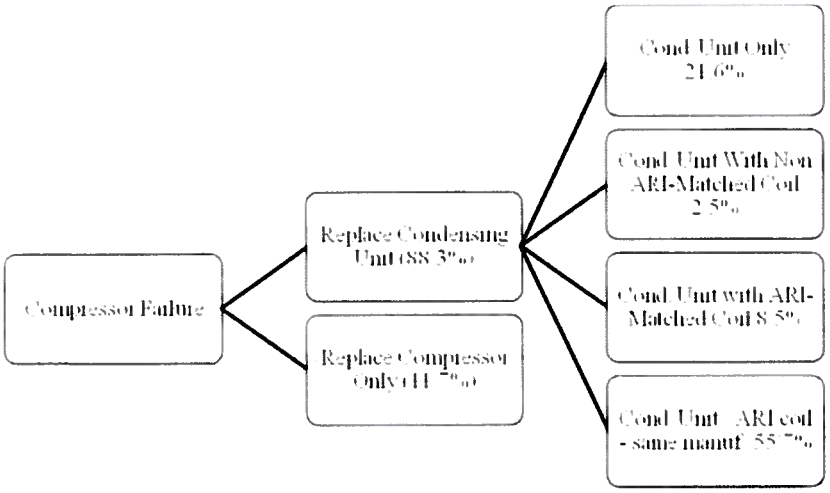
Equation 2

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

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:

$SEER_{Base}$ = ($SEER_{CompressorRepl}$) x (Actual%CompressorRepl) +

($SEER_{CondenserRepl}$) x (Actual%CondenserRepl) +

($SEER_{SystemRepl}$) x (Actual%SystemRepl)

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

SEERBase = 9.5 x 11.7% + 11.05 x 24.1% + 13.5 x 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

IEERadj = EER + 0.2 (Cooling capacity ≥ 65k and < 240k Btu/h)

IEERadj = EER + 0.1 (Cooling capacity ≥ 240k Btu/h)

Unitary Heat Pump Equipment

IEERadj = EER + 0.2 (Cooling capacity ≥ 65k and < 135k Btu/h)

IEERadj = EER + 0.1 (Cooling capacity ≥ 135k 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 ELFHs, Nexant Texas and Arkansas ELFHs, 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 calculated 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

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

Equation 4

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

Equation 5

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

Cooling Capacity (≥ 65k Btu/h)

Equation 6

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

Equation 7

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

Equation 8

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

Where (reference Table 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.

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 x 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.

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

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

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

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

Table 4 - Efficiency Levels for Unitary Air Conditioning Equipment

	Manuf. Year[g]	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 and < 760k Btu/h[c]			All Systems > 760k Btu/h[c]			Applicable Standard
		EER[a]	SEER	SEERadj[b]	EER[a]	SEER	SEERadj[b]	EER	IEER or IPLV	IEERadj[d]	EER	IEER or IPLV	IEERadj[d]	EER	IEER or IPLV	IEERadj[e]	EER	IEER or IPLV	IEERadj[e]	
BASELINE EFFICIENCIES	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	8.1	7.8	7.0 IPLV	7.9	ASHRAE 90.1--1989
	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	8.1	7.8	7.0 IPLV	7.9	ASHRAE 90.1--1989
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1989 (as of Jan. 1, 1992)
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1999
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1999
	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	8.4	8.0	7.3 IPLV	8.1	ASHRAE 90.1--1999
	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	9.4	9.0	9.2 IPLV	9.1	ASHRAE 90.1--1999 (as of 10/29/2001)
	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	9.4	9.0	9.2 IPLV	9.1	ASHRAE 90.1--1999 (as of 10/29/2001)
	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	9.4	9.0	9.2 IPLV	9.1	ASHRAE 90.1--2004
	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	9.4	9.0	9.2 IPLV	9.1	ASHRAE 90.1--2004
	2006[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	9.4	9.0	9.2 IPLV	9.1	Federal Standard/ASHRAE 90.1--2004 (as of 1/23/2006)[b]
	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	9.4	9.0	9.2 IPLV	9.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006)[b]
	2008[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	9.4	9.0	9.2 IPLV	9.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006)[b]
	2009[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	9.4	9.0	9.2 IPLV	9.1	Federal Standard/ASHRAE 90.1-2007 (as of 1/23/2006)[b]
	2010[b]	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	9.9	9.5	9.6 IEER	9.6	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)[b]
	2011[b]	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	9.9	9.5	9.6 IEER	9.6	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)[b]
	2012[b]	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	9.9	9.5	9.6 IEER	9.6	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)[b]
	ROB[b]	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	9.9	9.5	9.6 IEER	9.6	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)[b]
	NC	11.1	13	13	11.1	13	13	11.0	11.2 IEER	11.2	10.8	11.0 IEER	11.0	9.8	9.9 IEER	9.9	9.5	9.6 IEER	9.6	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)
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	12.1	10.2	11.4 IEER	11.4	CEE Tier 2[f]

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.

Table 5 - Efficiency Levels for Unitary Heat Pump Equipment

	Manuf. Year[h]	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[a]	SEER	SEERadj[b]	HSPF	EER[a]	SEER	SEERadj[b]	HSPF	EER	IEER or IPLV	IEERadj[d]	COP[f]	EER	IEER or IPLV	IEERadj[e]	COP[f]	EER	IEER or IPLV	IEERadj[e]	COP[f]	
BASELINE EFFICIENCIES	1990	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	8.3 IPLV	9.1	3	8	7.0 IPLV	8.1	2.8	8	7.0 IPLV	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 IPLV	9.1	3	8	7.0 IPLV	8.1	2.8	8	7.0 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	9.1	3	8.3	7.3 IPLV	8.4	2.9	8.3	7.3 IPLV	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 IPLV	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 IPLV	8.4	2.9	ASHRAE 90.1--1999
	2001	9.0	10	10	6.8	8.8	9.7	9.7	6.6	8.9	n/a	9.1	3.2	8.3	n/a	8.4	3.1	8.3	7.3 IPLV	8.4	3.1	ASHRAE 90.1--1999
	2002	9.0	10	10	6.8	8.8	9.7	9.7	6.6	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 IPLV	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	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 IPLV	8.9	3.1	ASHRAE 90.1--1999 (as of 10/29/2001)
	2004	9.0	10	10	6.8	8.8	9.7	9.7	6.6	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 IPLV	8.9	3.1	ASHRAE 90.1--2004
	2005	9.0	10	10	6.8	8.8	9.7	9.7	6.6	9.9	n/a	10.1	3.2	9.1	n/a	9.2	3.1	8.8	9.0 IPLV	8.9	3.1	ASHRAE 90.1--2004
	2006[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 IPLV	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 IPLV	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 IPLV	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 IPLV	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 IEER	11.0	3.3	10.4	10.5 IEER	10.5	3.2	9.3	9.4 IEER	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 IEER	11	3.3	10.4	10.5 IEER	10.5	3.2	9.3	9.4 IEER	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 IEER	11	3.3	10.4	10.5 IEER	10.5	3.2	9.3	9.4 IEER	9.4	3.2	Federal Standard/ASHRAE 90.1-2007 (as of 1/1/2010)[b]
	ROB[b]	10.7	13	12.44	7.7	10.7	13	12.44	7.7	10.8	11.0 IEER	11	3.3	10.4	10.5 IEER	10.5	3.2	9.3	9.4 IEER	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 IEER	11	3.3	10.4	10.5 IEER	10.5	3.2	9.3	9.4 IEER	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 IEER	12.1	3.4	10.7	11.7 IEER	11.7	3.2	10.1	10.7 IEER	10.7	3.2	CEE Tier 2[g]

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 < 135k Btu/h an adjusted IEER (IEERadj = EER + 0.2).

e. Equipment manufactured prior to 2010 and with capacities ≥ 135k Btu/h an adjusted IEER (IEERadj = 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	
BASELINE EFFICIENCIES	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 than15,000, 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	9.0	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1-2007
	2008	9.0	8.9	8.6	9.0	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1-2007
	2009	9.0	8.9	8.6	9.0	8.9	8.6	3.0	3.0	2.9	Federal Standard/ASHRAE 90.1-2007
	2010	9.0	8.9	8.6	9.0	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	9.0	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	9.0	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	9.0	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	9.0	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	
BASELINE EFFICIENCIES	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	8.0	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
	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)
inimum Efficien		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	
BASELINE EFFICIENCIES	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

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	
BASELINE EFFICIENCIES	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	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	
BASELINE EFFICIENCIES	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--1999 (as of 10/29/2001)
	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

- **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.

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/com-lt/com-lt-main.php3. Accessed December 29, 2010.

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.[3] 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" spreadsheet[5] 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.

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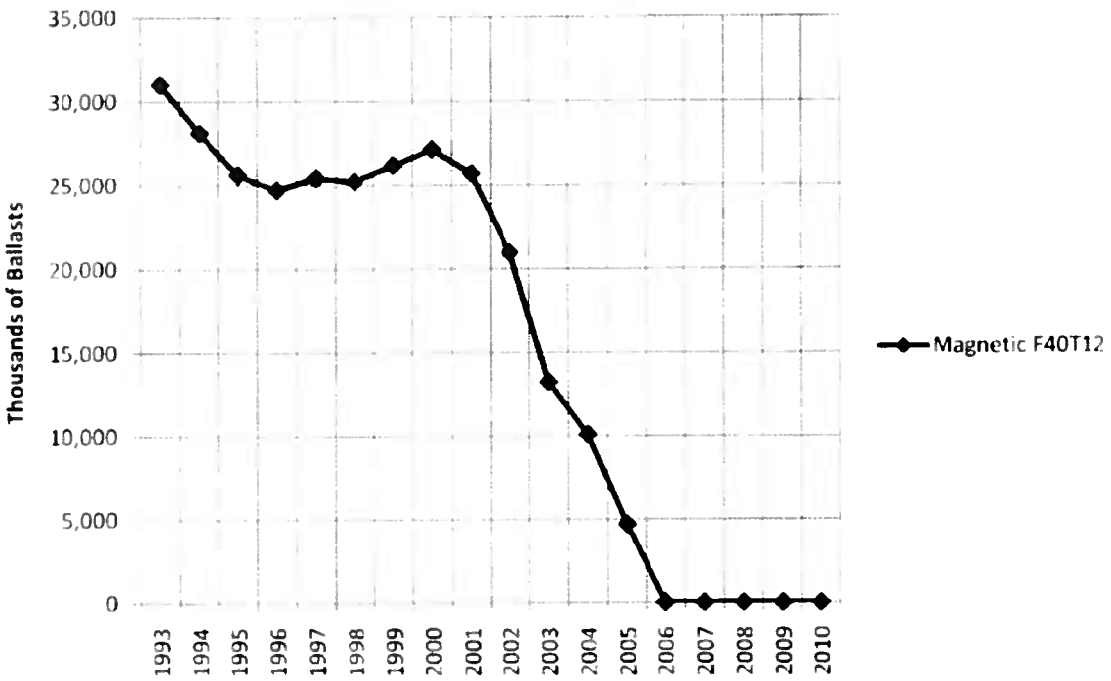
[5] DOE 2010b. "Fluorescent Lamp Ballasts Preliminary Analytical Tools: National Impact Analysis." Excel Spreadsheet. U.S. Department of Energy; 2010.

[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