Appendix A
Cost Effectiveness Test Results

	2013-2014			
Program Name	**UCT**	**TRC**	**RIM**	**Participant**
Appliance Recycling Program	3.86	5.01	1.38	
Energy Efficiency Education Program for Schools	0.97	1.46	0.66	
Low Income Neighborhood	3.55	4.19	1.34	
Low Income Services	0.88	1.06	0.63	
My Home Energy Report	1.84	1.84	0.93	
Residential Energy Assessments	3.30	3.30	1.65	
Residential Smart $aver®	4.74	7.39	1.32	15.02
Power Manager	4.35	5.75	4.35	
Residential Energy Assessments - Modifications	2.24	2.53	1.13	
Residential Smart $aver® - Modifications	2.71	0.90	1.33	0.76
Smart $aver® Custom	3.72	1.60	1.32	2.05
Smart $aver® Prescriptive - Energy Star Food Service Products	10.19	3.96	1.53	4.24
Smart $aver® Prescriptive - HVAC	2.28	1.00	1.28	0.82
Smart $aver® Prescriptive - Lighting	5.73	2.75	1.62	2.74
Smart $aver® Prescriptive - Motors/Pumps/VFD	6.06	4.27	1.46	5.20
Smart $aver® Prescriptive - Process Equipment	5.37	5.63	1.69	6.02
Smart $aver® Prescriptive - IT	NA	NA	NA	NA
Smart $aver® Prescriptive - Modifications	2.89	2.09	1.37	1.97
Power Share®	4.33	12.84	4.33	

Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

Residential Programs	(1) Projected Program Costs 7/2013 to 6/2014 (A)	(2) Projected Lost Revenues 7/2013 to 6/2014 (A)	(3) Projected Shared Savings 7/2013 to 6/2014 (A)	(4) Program Expenditures 7/2013 to 6/2014 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/2013 to 6/2014 (B)	(8) Shared Savings 7/2013 to 6/2014 (B)	(9) 2013 Reconciliation Gas (D)	(10) 2013 Reconciliation Electric (E)	(11) Rider Collection (F) Gas	(12) Rider Collection (F) Electric	(13) (Over)/Under Collection Gas (G)	(14) (Over)/Under Collection Electric (H)
Appliance Recycling Program	$ 254,905	$ 25,383	$ 51,900	$ 168,563	$ -	$ 168,563	$ 44,179	$ 37,058						
Energy Efficiency Education Program for Schools	$ 160,841	$ 13,197	$ (7,028)	$ 129,104	$ 52,765	$ 76,339	$ 11,050	$ (355)						
Low Income Neighborhood	$ 297,422	$ 40,038	$ 7,460	$ 138,684	$ -	$ 138,684	$ 21,020	$ 31,662						
Low Income Services	$ 669,888	$ 19,932	$ (29,790)	$ 520,653	$ 205,908	$ 314,745	$ 35,227	$ (4,188)						
My Home Energy Report	$ 375,038	$ 402,499	$ 40,863	$ 605,663	$ -	$ 605,663	$ 512,222	$ 46,907						
Residential Energy Assessments	$ 167,774	$ 14,909	$ 12,819	$ 223,409	$ 80,066	$ 143,343	$ 34,080	$ 51,063						
Residential Smart $aver®	$ 1,170,194	$ 1,376,347	$ 319,133	$ 1,511,814	$ 94	$ 1,511,720	$ 1,685,324	$ 511,105						
Power Manager	$ 308,742	$ -	$ 138,807	$ 776,700	$ -	$ 776,700	$ -	$ 85,821						
Personal Energy Report Program (I)		$ -	$ -	$ -	$ -	$ -	$ 144,535	$ -						
Home Energy Assistance Pilot Program (J)	$ 250,556	$ -	$ -	$ 300,152	$ 126,224	$ 173,928	$ -	$ -			$ 106,253	$ 146,409		
Revenues collected except for HEA											$ (2,446,433)	$ 3,250,988		
Total	$ 3,855,362	$ 1,892,305	$ 533,964	$ 4,374,741	$ 465,057	$ 3,909,684	$ 2,487,637	$ 759,073	$ 1,748,956	$ (813,874)	$ (2,340,181)	$ 3,397,397	$ 4,554,194	$ 2,945,123

(A) Amounts identified in report filed in Case No. 2012-00085.
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2013 through June 30, 2014.
(C) Allocation of program expenditures to gas and electric. Uses 63.5% gas based upon saturation of gas space heating.
(D) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085.
(E) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085.
(F) Revenues collected through the DSM Rider between July 1, 2013 and June 30, 2014.
(G) Column (5) + Column (9) - Column(11).
(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).
(I) Personalized Energy Report is a legacy program which continues to collect lost revenues.
(J) Revenues and expenses for the Home Energy Assistance Pilot Program.

Commercial Programs	(1) Projected Program Costs 7/2013 to 6/2014 (A)	(2) Projected Lost Revenues 7/2013 to 6/2014 (A)	(3) Projected Shared Savings 7/2013 to 6/2014 (A)	(4) Program Expenditures 7/2013 to 6/2014 (B)	(5) Lost Revenues 7/2013 to 6/2014 (B)	(6) Shared Savings 7/2013 to 6/2014 (B)	(7) 2013 Reconciliation (C)	(8) Rider Collection (D)	(9) (Over)/Under Collection (E)
Smart $aver® Custom	$ 363,445	$ 91,416	$ 229,707	$ 141,233	$ 35,077	$ 36,875			
Smart $aver® Prescriptive - Energy Star Food Service Proc	$ 14,706	$ 8,866	$ 14,459	$ 69,720	$ 7,854	$ 64,099			
Smart $aver® Prescriptive - HVAC	$ 177,989	$ 66,300	$ 137,729	$ 90,262	$ 3,690	$ 11,467			
Smart $aver® Prescriptive - Lighting	$ 587,516	$ 311,187	$ 390,588	$ 568,419	$ 233,009	$ 267,504			
Smart $aver® Prescriptive - Motors/Pumps/VFD	$ 68,636	$ 59,009	$ 70,546	$ 81,743	$ 19,467	$ 41,259			
Smart $aver® Prescriptive - Process Equipment	$ 56	$ 119	$ 75	$ 21,657	$ 1,876	$ 9,456			
Smart $aver® Prescriptive - IT				$ 95	$ -	$ (9)			
Total	$ 1,212,347	$ 536,898	$ 843,106	$ 973,129	$ 300,973	$ 430,650	$ (1,669,697)	$ 195,330	$ (160,274)
Power Share®	$ 815,415	$ -	$ 261,322	$ 890,645	$ -	$ 294,543	$ 801,314	$ 2,650,831	$ (664,129)
Energy Management and Information Services (F)				$ 1,883					

(A) Amounts identified in report filed in Case No. 2012-00085.
(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2013 through June 30, 2014.
(C) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085
(D) Revenues collected through the DSM Rider between July 1, 2013 and June 30, 2014.
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)
(F) Discontinued pilot program does not receive cost recovery

Kentucky DSM Rider

2015-2016 Projected Program Costs, Lost Revenues, and Shared Savings

Residential Program Summary (A)

	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs (B) Electric	Allocation of Costs (B) Gas	Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas Costs
Appliance Recycling Program	$ 109,613	$ 177,379	$ (204)	$ 286,789	100.0%	0.0%	$ 109,613	$ 286,789	$ -
Energy Efficiency Education Program for Schools	$ 198,961	$ 40,057	$ 6,450	$ 243,468	54.8%	45.2%	$ 107,853	$ 154,360	$ 89,108
Low Income Neighborhood	$ 276,950	$ 101,284	$ 14,464	$ 392,698	100.0%	0.0%	$ 276,950	$ 392,698	$ -
Low Income Services	$ 700,410	$ 54,819	$ (8,455)	$ 746,774	43.5%	56.5%	$ 304,394	$ 350,758	$ 396,016
My Home Energy Report	$ 625,156	$ 542,633	$ 84,254	$ 1,252,044	100.0%	0.0%	$ 625,156	$ 1,252,044	$ -
Residential Energy Assessments	$ 193,881	$ 55,486	$ 66,796	$ 316,164	45.6%	54.4%	$ 88,463	$ 210,746	$ 105,418
Residential Smart $aver®	$ 1,085,886	$ 1,567,646	$ 110,953	$ 2,764,485	96.7%	3.3%	$ 1,050,513	$ 2,729,112	$ 35,373
Power Manager	$ 437,796	$ -	$ 149,597	$ 587,393	100.0%	0.0%	$ 437,796	$ 587,393	$ -
Residential Energy Assessments - Modifications (D), (F)	$ 37,402	$ 5,999	$ (17,981)	$ 25,420	45.6%	54.4%	$ 17,068	$ 5,083	$ 20,337
Residential Smart $aver® - Modifications (C), (F)	$ (189,033)	$ 882	$ (5,943)	$ (194,314)	96.7%	3.3%	$ (182,875)	$ (188,157)	$ (6,158)
Total Costs, Net Lost Revenues, Shared Savings	$ 3,475,023	$ 2,545,965	$ 399,932	$ 6,420,920			$ 2,834,930	$ 5,780,826	$ 640,093
Home Energy Assistance Pilot Program	$ 252,236							$ 146,417	$ 105,820

NonResidential Program Summary (A)

	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs (B) Electric	Allocation of Costs (B) Gas	Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas
Smart $aver® Custom	$ 512,160	$ 97,430	$ 91,979	$ 701,570	100.0%	0.0%	$ 512,160	$ 701,570	NA
Smart $aver® Prescriptive - Energy Star Food Service Products	$ 19,997	$ 21,798	$ 15,832	$ 57,628	100.0%	0.0%	$ 19,997	$ 57,628	NA
Smart $aver® Prescriptive - HVAC	$ 137,089	$ 30,552	$ 79,234	$ 246,876	100.0%	0.0%	$ 137,089	$ 246,876	NA
Smart $aver® Prescriptive - Lighting	$ 889,001	$ 302,730	$ 470,352	$ 1,662,084	100.0%	0.0%	$ 889,001	$ 1,662,084	NA
Smart $aver® Prescriptive - Motors/Pumps/VFD	$ 58,722	$ 23,435	$ 20,324	$ 100,481	100.0%	0.0%	$ 58,722	$ 100,481	NA
Smart $aver® Prescriptive - Process Equipment	$ 2,031	$ 2,201	$ 1,468	$ 5,699	100.0%	0.0%	$ 2,031	$ 5,699	NA
Smart $aver® Prescriptive - IT	$ 16,253	$ 4,056	$ 8,035	$ 28,344	100.0%	0.0%	$ 16,253	$ 28,344	NA
SBES	$ 757,668	$ 27,556	$ 161,764	$ 946,988	100.0%	0.0%	$ 757,668	$ 946,988	NA
Power Share®	$ 924,747	$ -	$ 166,874	$ 1,091,621	100.0%	0.0%	$ 924,747	$ 1,091,621	NA
Smart $aver® Prescriptive - Modifications (E)	$ 419,387	$ 4,361	$ 82,365	$ 506,113	100.0%	0.0%	$ 419,387	$ 506,113	NA
Total Costs, Net Lost Revenues, Shared Savings	$ 3,735,055	$ 514,120	$ 1,096,227	$ 5,345,403			$ 3,735,055	$ 5,345,403	NA
Total Program	$ 7,210,078	$ 3,060,085	$ 1,496,159	$ 11,766,322					

(A) Costs, Lost Revenues (for this period and from prior period DSM measure installations), and Shared Savings for Year 4 of portfolio.
(B) Allocation of costs calculated as ordered in Case No. 2014-0388.
(C) Net effects of revisions to Residential Smart $aver® program described in application.
(D) Net effects of revisions to the Residential Energy Assessments program described in application.
(E) Net effects of revisions to the Smart $aver® Prescriptive program described in application.
(F) Negative shared savings for program modifications is due to net effects of program modifications. Programs as modified are cost effective as demonstrated in Appendix A and will result in positive shared savings.

Kentucky DSM Rider

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations for Programs

July 2015 to June 2016

	Program Costs (A)
Electric Rider DSM	
Residential Rate RS	$ 5,780,826
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	$ 4,253,782
Transmission Level Rates & Distribution Level Rates Part B	$ 1,091,621
Gas Rider DSM	
Residential Rate RS	$ 640,093

(A) See Appendix B, page 2 of 5.

Kentucky DSM Rider

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Billing Determinants

Year	2015
Projected Annual Electric Sales kWH	
Rates RS	1,500,287,137
Rates DS, DP, DT, GS-FL, EH, & SP	2,403,218,077
Rates DS, DP, DT, GS-FL, EH, SP, & TT	2,643,552,077
Projected Annual Gas Sales CCF	
Rate RS	63,667,723

Kentucky DSM Rider

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations

July 2014 to June 2015

Rate Schedule Riders	True-Up Amount (A)	Expected Program Costs (B)	Total DSM Revenue Requirements	Estimated Billing Determinants (C)		DSM Cost Recovery Rider (DSMR)		CURRENT DSM Cost Recovery Rider (DSMR)	
Electric Rider DSM									
Residential Rate RS	$ 2,948,068	$ 5,780,826	$ 8,728,894	1,500,287,137	kWh	$ 0.005818	$/kWh	$ 0.005944	$/kWh
Distribution Level Rates Part A									
DS, DP, DT, GS-FL, EH & SP	$ (160,435)	$ 4,253,782	$ 4,093,347	2,403,218,077	kWh	$ 0.001703	$/kWh	$ 0.001493	$/kWh
Transmission Level Rates & Distribution Level Rates Part B									
TT	$ (664,793)	$ 1,091,621	$ 426,828	2,643,552,077	kWh	$ 0.000161	$/kWh	$ 0.000161	$/kWh
Distribution Level Rates Total									
DS, DP, DT, GS-FL, EH & SP						$ 0.001865	$/kWh	$ 0.001654	$/kWh
Gas Rider DSM									
Residential Rate RS	$ 4,558,748	$ 640,093	$ 5,198,841	63,667,723	CCF	$ 0.081656	$/CCF	$ 0.081352	$/CCF
Total Rider Recovery			$ 18,447,910						

Customer Charge for HEA Program	Annual Revenues	Number of Customers	Monthly Customer Charge
Electric No 4			
Residential Rate RS	$ 146,417	122,014	$ 0.10
Gas No. 5			
Residential Rate RS	$ 105,820	88,183	$ 0.10
Total Customer Charge Revenues	$ 252,236		
Total Recovery	$ 18,700,147		

(A) (Over)/Under of Appendix B page 1 multiplied by the average three-month commercial paper rate for 2013 to include interest on over or under-recovery in accordance with the Commission's order in Case No. 95-312. Value is: 1.001000
(B) Appendix B, page 2.
(C) Appendix B, page 4.

Summary of Load Impacts July 2013 Through June 2014*

Allocation Factors based on July 2013-June 2014

Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales	Elec % of Total Sales	% of Total Gas Sales
Appliance Recycling Program	657,793	0.0433%	-	0.0000%	100%	0%
Energy Efficiency Education Program for Schools	225,486	0.0148%	7,368	0.0103%	59%	41%
Low Income Neighborhood	634,158	0.0417%	-	0.0000%	100%	0%
Low Income Services	251,243	0.0165%	7,771	0.0108%	60%	40%
My Home Energy Report	11,325,468	0.7449%	-	0.0000%	100%	0%
Residential Energy Assessments	411,489	0.0271%	10,866	0.0151%	64%	36%
Residential Smart $aver®	13,428,091	0.8831%	40	0.0001%	100%	0%
Power Manager	-	0.0000%	-	0.0000%	100%	0%
Total Residential	26,933,728	1.7714%	26,044	0.0362%		
Total Residential (Rate RS) Sales For July 2013 Through June 2014	1,520,477,786	100%	71,881,990	100%		

*Load Impacts Net of Free Riders at Meter

Allocation Factors Based on 2015-2016 Projection

Summary of Load Impacts July 2015 Through June 2016*

Allocation Factors Projected - Revised

Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales	Elec % of Total % of Sales	Gas % of Total % of Sales
Appliance Recycling Program	225,426	0.0150%	-	0.0000%	100%	0%
Energy Efficiency Education Program for Schools	325,145	0.0217%	11,400	0.0179%	55%	45%
Low Income Neighborhood	529,200	0.0353%	-	0.0000%	100%	0%
Low Income Services	346,183	0.0231%	19,113	0.0300%	43%	57%
My Home Energy Report**	10,914,000	0.7275%	-	0.0000%	100%	0%
Residential Energy Assessments	442,852	0.0295%	22,395	0.0352%	46%	54%
Residential Smart $aver®	2,040,557	0.1360%	2,916	0.0046%	97%	3%
Power Manager***	-	0.0000%	-	0.0000%	100%	0%
Total Residential	14,823,363	0.9880%	55,824	0.0877%		
Total Residential (Rate RS) Sales Projected	1,500,287,137	100%	63,667,723	100%		

*Load Impacts Net of Free Riders at Meter

Duke Energy Kentucky
4580 Olympic Blvd.
Erlanger, Kentucky 41018

KY.P.S.C. Gas No. 2
Seventeenth Revised Sheet No. 62
Cancels and Supersedes
Sixteenth Revised Sheet No. 62
Page 1 of 1

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 61 of this Tariff.

The DSMR to be applied to residential customer bills is $0.081656 per hundred cubic feet. (I)

A Home Energy Assistance Program (HEA) charge of $0.10 will be applied monthly to residential customer bills through December 2017.

The DSMR to be applied to non-residential service customer bills is $0.00 per hundred cubic feet.

Issued by authority of an Order by the Kentucky Public Service Commission dated _____, 2015 in Case No. _____.

Issued: August 14, 2015
Effective: September 14, 2015
Issued by James P. Henning, President /s/ James P. Henning

Duke Energy Kentucky
4580 Olympic Blvd.
Erlanger, KY 41018

KY.P.S.C. Electric No. 2
Seventeenth Revised Sheet No. 78
Cancels and Supersedes
Sixteenth Revised Sheet No. 78
Page 1 of 1

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 75 of this Tariff.

The DSMR to be applied to residential customer bills is $0.005818 per kilowatt-hour. (I)

A Home Energy Assistance Program (HEA) charge of $0.10 will be applied monthly to residential customer bills through December 2017.

The DSMR to be applied to non-residential distribution service customer bills is $0.001865 per kilowatt-hour. (I)

The DSMR to be applied for transmission service customer bills is $0.000161 per kilowatt-hour.

Issued by authority of an Order by the Kentucky Public Service Commission dated _____, 2015 in Case No. _____.

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Issued by James P. Henning, President /s/ James P. Henning

Smart $aver Energy Efficient Residences Program

A. Description

The Smart $aver Energy Efficient Residences Program ("Program") offers prescriptive incentives to Duke Energy Kentucky, Inc (the "Company") customers for the purchase and installation of energy efficient measures and completion of qualified energy savings improvements. The measures offered through the Program include a smart thermostat, quality installation for eligible equipment, central air conditioners or electric heat pump replacements, central air conditioner tune ups, electric heat pump tune ups, attic insulation / air sealing, duct sealing and duct insulation. These measures increase the efficiency of the customer's HVAC system and building envelope. In addition, replacing existing electric water heaters with heat pump water heaters is an eligible energy efficient measure within the Program.

As a result of increased baselines (SEER ratings) and higher cost for energy efficient equipment, the Company will implement modifications to offer a cost-effective Program. Modifications include adding two new measures, a tier approach of services/measures and a referral component for eligible trade allies. The two new measures include a smart thermostat and quality installation. The smart thermostat is a programmable Wi-Fi enabled thermostat that is programmed at the time of installation. The quality installation encourages proper installation based on manufacture guidelines and utilization of high efficiency air conditioning systems and electric heat pumps. The tier approach allows participants to add on additional services and/or equipment replacement measures.

	Tier1	Tier 2	Tier 3
AC Equipment	14 SEER w/ECM & Quality Installation	15 or 16 SEER w/ECM	17 or higher SEER w/ECM
HP/Geo-Thermal Equipment	14 SEER w/ECM & Quality Installation	15 or 16 SEER w/ECM	17 or higher SEER w/ECM
Optional Quality Installation[1]	Required	√	√
Optional Smart Thermostat[2]	√	√	√

The referral component of the Program is a new delivery channel designed to enhance the effectiveness of the program. Through the provision of a free referral service to customers, the Company believes that the customer's decision-making around energy efficient purchases will be simplified and the guesswork out of finding reliable, qualified contractors with competitive offers will be eliminated. This delivery channel supports the Company's role as an energy efficiency program administrator while building trusted partnerships with customers and HVAC and home performance contractors as well as home builders ("Trade Allies") who interface directly with residential customers. Qualifying Trade Allies may elect to participate in the referral component of the Program. The referral component defines a structured mechanism for the Company to provide leads to eligible Trade Allies.

Trade Allies will market and leverage the Program to assist with selling these products and services to customers. After a customer purchases and installs an approved energy efficient measure, the Trade Ally submits an application for the financial incentive to the Company on behalf of the customer. Upon approval of the application, the Company pays the incentive for approved energy efficiency measure. If the Company referred the customer to the Trade Ally, the Trade Ally pays the Company a referral fee. The referral fee will then be used to offset Program cost therefore reducing the overall cost to operate the

[1] A quality installation is required for Tier 1 but optional for Tier 2 and Tier 3.
[2] A smart thermostat is optional for each tier.

Smart $aver Energy Efficient Residences Program

program. Any eligible customer who would like to participate in the Program without the use of the referrals channel may do so and will receive a financial incentive for eligible measures.

The Company will contract with a third party vendor who is responsible for application processing, incentive payment disbursement, training Trade Allies and processing customer inquiries.

1. **Audience**
   The program is targeted at the Company's residential customers who meet the Program's eligibility requirements.

2. **Rationale**
   Due to the 2015 federal efficiency standard changes for HVAC equipment, increasing building code standards and lower energy efficiency impacts, the existing Program may no longer be cost effective. As a result of these changes, the referral component allows the Company to offer a cost-effective Program. Additionally, customers are looking for trustworthy, unbiased and knowledgeable resources that can simplify complex energy related buying decisions for them and present qualified industry professionals.

B. Projections and Budget

Duke Energy Kentucky	2016	2017	2018
Participation (a)	773	818	865
Energy Impact (kWh) (b)	353,366	725,558	1,118,251
Energy Impact (kW) (c)	107	221	341

(a) Total number of participants in each measure
(b) Cumulative kWh with losses net free riders
(c) Cumulative summer coincident with losses net free riders

Cost-Effectiveness Results	UCT	TRC	RIM	Participant
Kentucky	2.71	0.90	1.33	0.76

C. Potential Issues

The buy-in and participation of the Trade Ally network is vital to the success of the Program. The Program aims to transform the market; shifting market practices away from some of the more commonly utilized practices which rely heavily on decentralized training and varying knowledge levels, as well as imprecise and manual field calculations, towards industry trained and certified trade allies using higher quality diagnostic instruments and processes.

1. Implementation - Vendor selection is being finalized to provide both incentive processing and referral infrastructure. The new information technology platform is required to generate, deliver and manage the lifecycle of the referral, provide referral algorithms based on Trade Ally score cards, and manage customer feedback and expectations.

2. Customer Adoption - The Company will need to market in the appropriate channels to bring high levels of awareness to customers that the Program now offers reputable high quality contractors who are selected and monitored to perform HVAC and home performance based services. Communication with the customer on why and how these services are available to them will encourage adoption.

3. Market Barriers – The Program anticipates there may be initial recruitment barriers registering the required number of Trade Allies who can consistently meet the performance metrics required to

participate in the referrals delivery channel. In addition, the Company's ability to provide quality leads for the Trade Allies to support the viability of the channel will be critical in building sustainability across the Company's service territory.

D. Application Process

All incentive applications must be completed and submitted on behalf of the customer by the Trade Ally within 90 days of the installation of measures. Upon successfully submitting the application, the customer and the Trade Ally will receive notification that the application is being reviewed along with a confirmation code to track the status of the application. If the application is approved, the incentive will be sent to the customer. If an application is not approved, the Trade Alley will be sent a notification detailing the information required to successfully validate and approve the application.

E. Marketing Strategy

Marketing of the Program is primarily targeted to Trade Allies and new home builders. Since Trade Allies interface with the customer during the decision-making event, they are a key component to the success of the Program. Program information including Trade Ally enrollment forms will be available on the Program's re-designed website. This information will assist in educating and building customer awareness about the Program. By increasing the overall awareness of the Program and the participation of Trade Allies, it ensures more customers are discussing the benefits of the Program at time of purchase.

In addition, the Program team plans to launch several broad based marketing campaigns in the first and second quarter of 2016 to bring increase the awareness to the Program. The marketing campaigns may leverage channels such as TV, radio, out of home and print which will be in addition to the traditional channels (email, bill insert, bill messaging) the Program has historically communicated through to reach the customer. A draft version of sample referral collateral is listed in Appendix I.

F. Program Specific Policies

Trade Allies who opt-in to the referral channel will be scored based on a pre-determined set of performance metrics over a set period of time to ensure compliance with the expectations of the Program. The metrics will score a Trade Ally on criteria that may include but are not limited to customer experience, quality assurance, and energy efficiency participation. Once the Trade Ally has met the minimum performance score they will be able to receive the referral when requested by a customer.
Once the Trade Ally is approved for participating in the referral channel, a referral will be generated by an algorithm which determines the top scoring Trade Allies according to the performance metric score card and geographic service territory. All Trade Allies who are receiving referrals will be monitored periodically and must achieve a minimum performance score to continue participating in the channel. If a Trade Ally's performance score decreases at any given time the score card will limit their exposure to receive the referral. In the event the Trade Ally's performance scores increases, the algorithm will increase their exposure for the referral. If the Trade Ally does not continue to meet the minimum score, they will be placed on probation for a period time and will not receive referrals during this timeframe.

G. Incentive Levels

Smart $aver Energy Efficient Residences Program

Measure Name	Max Incentive
Tier 1 HVAC (AC/HP)	$ 250.00
Tier 2 HVAC (AC/HP)	$ 300.00
Tier 3 HVAC (AC/HP)	$ 400.00
Quality Installation	$ 75.00
Smart Thermostat	$ 125.00
HVAC Tune-Up (AC/HP)	$ 50.00
Attic Insulation Air Sealing	$ 250.00
Duct insulation	$ 75.00
Duct Sealing	$ 100.00

H. Measurement and Verification Strategy

Evaluation, measurement and verification actions will provide an independent, third-party report of energy savings attributable to the program including an impact analysis and process evaluation.

The impact analysis will review deemed savings assumptions and verify equipment installations. Selective monitoring and site visits will be performed at a sample of participant homes. Depending on the measure and participation levels, the evaluator will select billing analysis and/or engineering-based estimation of energy and demand savings to determine energy efficiency impacts. A statistically representative sample of participants will be selected for the analysis.

The process evaluation will include participant and non-participant surveys, along with vendor satisfaction surveys or interviews, to estimate net-to-gross and uncover issues that might impact customer satisfaction or program effectiveness. A statistically representative sample of participants will be selected for the analysis.

The Company intends to follow industry-accepted methodologies for all measurement and verification activities. This evaluation plan is consistent with IPMVP Options C (retrofit) and D (new construction).

Smart $aver Energy Efficient Residences Program

I. Appendix

Residential HVAC Energy Efficiency Program Direct Mail – DRAFT VERSION

Smart $aver Energy Efficient Residences Program

Residential HVAC Energy Efficiency Program Billboard Signage – DRAFT VERSION

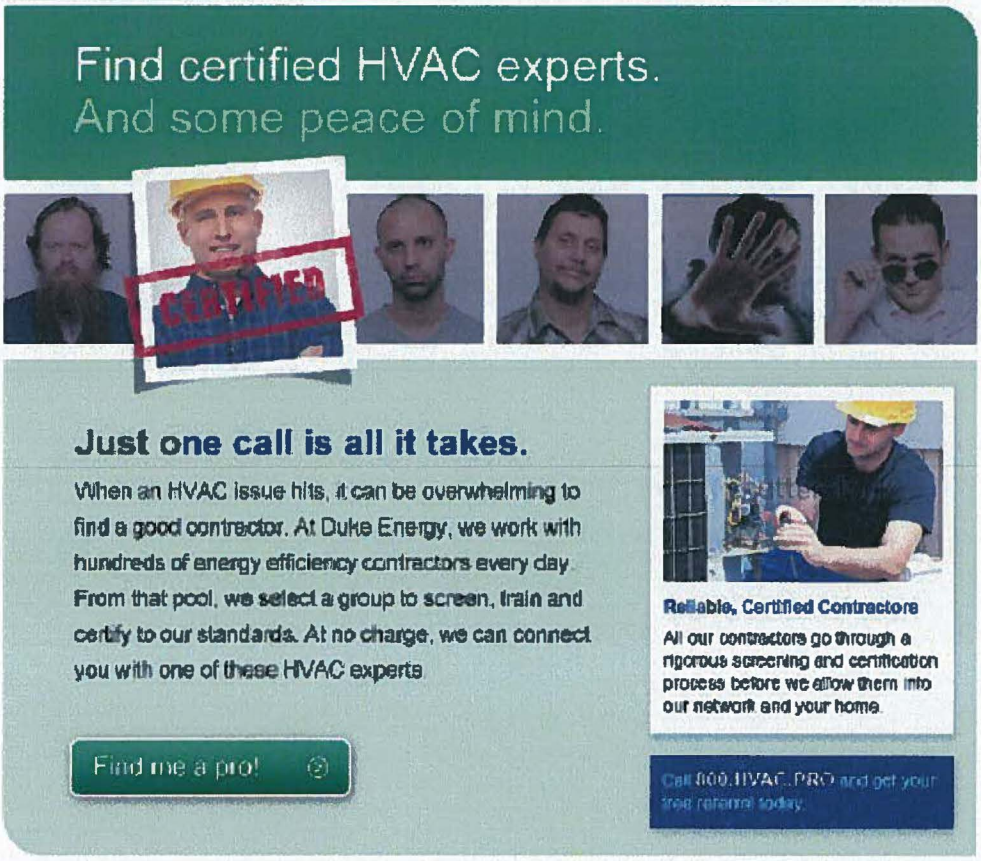
Smart $aver Energy Efficient Residences Program

Residential HVAC Energy Efficiency Customer Email – DRAFT VERSION

Smart $aver Energy Efficient Residences Program

Subject line 1: We'll help you find certified HVAC experts fast
Subject line 2: If your AC blows, be sure your contractor doesn't

DUKE ENERGY.



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Status Update for Duke Energy Kentucky Energy Efficiency and Demand Response Programs - August 2015

Planned[1] Evaluation, Measurement and Verification Activities and Evaluation Reports

Residential Customer Programs	Program/Measure	Past Completed Report(s)	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016
Appliance Recycling	Refrigerator, Freezer	5/16/2014	Requirement Completed					
Energy Education Program for Schools	K12 Curriculum	7/31/2013 & 7/14/2014 & 7/31/2015	Requirement Completed					
	NEED						M&V	Report
Low Income Neighborhood	Neighborhood	2/27/2015	Requirement Completed					
Low Income Services	Refrigerator Replace	1/31/2012					M&V	Report
	Weatherization & Payment Plus	7/31/2013	Requirement Completed					
My Home Energy Report	MyHER	1/12/2014	Requirement Completed					
Residential Energy Assessments	HEHC	7/29/2013	Requirement Completed					
Residential Smart Saver®	HVAC		Report					
	CFL	9/28/2012 & 5/13/2014	Requirement Completed					
	Specialty Bulbs	6/22/2015	Requirement Completed					
	Multi-Family	8/1/2014	Requirement Completed					
Power Manager		6/17/2013 & 5/30/2014	Requirement Completed					

Non-Residential Customer Programs	Program/Measure		Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016
Small Business Energy Saver						M&V	M&V	Report
Smart $aver® Non-Res, Custom			M&V	M&V	Report			
Smart $aver® Non-Res, Prescriptive		11/21/2013	M&V	M&V	Report			
PowerShare		7/25/2013 & 5/24/2014	Report					

[1] Future Evaluation Report dates are projections only. Actual report dates will vary depending on program participation, time to achieve a significant sample and the time needed to collect adequate data.

LEGEND	
M&V	Data collection (surveys, interviews, onsite visits, billing data) and analysis
Report	Evaluation Report

Measure	Technology	Program	Category	Type
Home Energy House Call - Additional LEDs	Lighting	Residential Energy Assessments	Modification	Residential
Home Energy House Call - Energy Efficiency Starter Kit	Lighting	Residential Energy Assessments	Modification	Residential
Quality Installation-NR	HVAC	Residential Smart $aver®	Add	Residential
Quality Installation-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Attic Insulation_ Air Sealing-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 1-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 1-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 2-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 2-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 3-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner- Tier 3-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner Tune-Up-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Duct Insulation-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Duct Sealing-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 1-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 1-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 2-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 2-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 3-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump - Tier 3-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Heat Pump Tune-Up-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Thermostat-NR	HVAC	Residential Smart $aver®	Add	Residential
Smart Thermostat-R	HVAC	Residential Smart $aver®	Add	Residential
Smart Saver - Central Air Conditioner	HVAC	Residential Smart $aver®	Remove	Residential
Smart Saver - Heat Pump	HVAC	Residential Smart $aver®	Remove	Residential
Combination Oven_10 pan	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Combination Oven_20 pan	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Convection Oven Full-Sized	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_No Variable Speed_1975-1985	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_No Variable Speed_1985-1996	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_No Variable Speed_1996-2003	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_No Variable Speed_less than 1975	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_Variable Speed_1975-1985	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_Variable Speed_1985-1996	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_Variable Speed_1996-2003	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHAC_Variable Speed_less than 1975	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_No Variable Speed_1975-1985	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_No Variable Speed_1985-1996	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_No Variable Speed_1996-2003	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_No Variable Speed_less than 1975	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_Variable Speed_1975-1985	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_Variable Speed_1985-1996	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_Variable Speed_1996-2003	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
FHWC_Variable Speed_less than 1975	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Floating Suction_1975-1985	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Floating Suction_1985-1996	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Floating Suction_1996-2003	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Floating Suction_less than 1975	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Fryer (Large Vat)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Fryer (Standard Vat)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential

Measure	Technology	Program	Category	Type
HT ES Multi-Tank - CNV DW New -rplc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Multi-Tank - CNV DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Multi-Tank - CNV DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES PotPanUtl DW (Elec) New -replc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES PotPanUtl DW (Gas) New -replc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES PotPanUtl DW New -replc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - CNV DW New -rplc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - CNV DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - CNV DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - Door DW New -repl on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - Door DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES Sngl Tank - Door DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES UC DW New -replc on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES UC DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HT ES UC DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Icemaker (100 to 500 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Icemaker (501 to 1000 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Icemaker (Greater Than 1001 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Low-Temp ES Multi-Tank - CNV DW New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Low-Temp ES UC DW New -repl on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Zero Energy Doors_High-Temp Cooler	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Zero Energy Doors_Med-Temp Cooler	Food Service Products	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Air Cooled Chiller_Any greater than 150 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Air Cooled Chiller_Any less than 150 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC 10 to 15 Ton Gas Heat	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC greater than 15 Ton Gas Heat	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC HP 10 to 15 Ton	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC HP greater than 15 Ton	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC HP less than 10 Ton	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ARC less than 10 Ton Gas Heat	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +10% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +15% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +25% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +30% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ +5% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ Fixed Orifice_ -20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +10% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +15% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +25% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +30% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ +5% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ AC_ TXV_ -20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +10% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +15% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +25% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +30% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ Fixed Orifice_ +5% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential

Measure	Technology	Program	Category	Type
DX RTU Tune-up_ HP_ Fixed Orifice_ -20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +10% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +15% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +25% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +30% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ +5% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
DX RTU Tune-up_ HP_ TXV_ -20% chg adj	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ECM for HVAC fan_ 1 HP	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ECM for HVAC fan_ 3 qrtr HP	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ECM for HVAC fan_ half HP	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ECM for HVAC fan_ qrtr HP	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
ECM for HVAC fan_ third HP	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 135-240kBtuh 11.7 EER (Tier 0_1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 135-240kBtuh 12.2 EER (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 240-760kBtuh 10.5 EER (Tier 0_1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 240-760kBtuh 10.8 EER (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 65-135kBtuh 11.7 EER (Tier 0_1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC 65-135kBtuh 12.2 EER (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC greater than 760kBtuh 10.4 EER (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC greater than 760kBtuh 9.9 EER (Tier 0_1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC less than 65kBtuh 14 SEER (Tier 0_1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX AC less than 65kBtuh 15 SEER (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP 135-240kBtuh 10.9 EER 3.3 COP (Tier 1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP 65-135kBtuh 11.3 EER 3.4 COP (Tier 1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP greater than 240 kBtuh 10.3 EER 3.3 COP (Tier 1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Packaged less than 65kBtuh 14 SEER 8 HSPF (Tier 1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Packaged less than 65kBtuh 15 SEER 8.5 HSPF - after July 1, 2016 (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Packaged less than 65kBtuh 15 SEER 8.5 HSPF (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Split less than 65kBtuh 14 SEER 8.5 HSPF (Tier 1)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Split less than 65kBtuh 15 SEER 9 HSPF (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX HP Split less than 65kBtuh 15 SEER 9 HSPF EER - after July 1, 2016 (Tier 2)	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split AC 15 SEER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split AC 16 SEER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split AC 18 SEER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split AC 20 SEER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 15 SEER 8.5 HSPF	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 15 SEER 8.5 HSPF - After July 1, 2016	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 16 SEER 8.5 HSPF	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 16 SEER 8.5 HSPF - After July 1, 2016	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 18 SEER 9.6 HSPF	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 18 SEER 9.6 HSPF - After July 1, 2016	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 20 SEER 9.6 HSPF	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX mini split HP 20 SEER 9.6 HSPF - After July 1, 2016	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX PTAC 12000 Btuh 10.7 EER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX PTAC 15000 Btuh 9.8 EER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
HVAC DX PTAC 7600 Btuh 12.2 EER	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Chiller_Centrifugal at least 150 tons and less than 300 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Chiller_Centrifugal at least 300 tons and less than 600 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Chiller_Centrifugal at least 600 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential

Measure	Technology	Program	Category	Type
Water Cooled Chiller_Centrifugal less than 150 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Screw or Scroll at least 150 tons and less than 300 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Screw or Scroll at least 300 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Screw or Scroll at least 75 tons and less than 150 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Water Cooled Screw or Scroll less than 75 tons	HVAC	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 2ft Tube 1-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 2ft Tube 2-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 2ft Tube 3-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 2ft Tube 4-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Case Lights, T8 to LED	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Case Lights, T8 to LED - With Controls	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Tube 1-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Tube 2-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Tube 3-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 4ft Tube 4-LED, replacing or in lieu of T8 fluorescent	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 5ft Case Lights, T8 to LED	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED 5ft Case Lights, T8 to LED - With Controls	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Canopy replacing 176-250W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Canopy replacing 251-400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Canopy replacing up to 175W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Display Case (rplcng or ILO INCD or FL display case Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED FLD rplcng or ILO GRT 100W HAL, INCD, or HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED FLD rplcng or ILO up to 100W HAL, INCD, or HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Highbay replacing 251-400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Highbay replacing greater than 400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Lowbay replacing 176W-250W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Lowbay replacing up to 175W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Panel 1x4 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Panel 2x2 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Panel 2x4 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Portable Task Lights (rplcng or ILO INCD, HAL, or CFL task Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Shelf-mounted Task Lights (rplcng or ILO FL task Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
LED Track Ltng (rplcng or ILO INCD, HAL, CFL, or HID track Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Controlled Plug Strip	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_ 20 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_ 3 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_ 5 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_10 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_15 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_2 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
EC Plug Fan_7.5 HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
PC Power Management from Network	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 10HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 10HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 15HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 15HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 20HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 20HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 25HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 30HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential

Measure	Technology	Program	Category	Type
VFDs on chilled water pumps 40HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 50HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 5HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 7.5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on chilled water pumps 7.5HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 10HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 15HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 20HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 2HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 3HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VFDs on CRAC CRAH AHU fans 7.5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VSD Air COMP replacing load no load COMP	Process Equipment	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
VSD Air COMP replacing variable displacement COMP	Process Equipment	Smart $aver® Non-Residential Prescriptive	Add	Non-Residential
Combination Oven (90 lbs_hr)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Convection Oven	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Fryer	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Multi-Tank - CNV DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Multi-Tank - CNV DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Sngl Tank - CNV DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Sngl Tank - CNV DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Sngl Tank - Door DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES Sngl Tank - Door DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES UC DW w-Boost Htr (Elec) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
HT ES UC DW w-Boost Htr (Gas) New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Icemaker (100 to 500 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Icemaker (500 to 1000 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Icemaker (Greater Than 1000 lbs_day)	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Low-Temp ES Multi-Tank - CNV DW New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Low-Temp ES sngl Tank - CNV DW New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Low-Temp ES sngl Tank - Door DW New -repl on BO	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Low-Temp ES UC DW New -repl on Burnout	Food Service Products	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air Cooled Chiller Tune Up per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 2.86, IPLV = 3.12 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 2.86, IPLV = 3.48 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 2.86, IPLV = 3.97 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 2.86, IPLV = 4.33 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69 per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split AC, College vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split AC, Convenience vs PTAC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split AC, Lodging vs PTAC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split AC, Other vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential

Measure	Technology	Program	Category	Type
Ductless Mini-Split AC, Schools (K-12) vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split Heat Pump, College vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split Heat Pump, Lodging vs PTHP	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split Heat Pump, Lodging vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split Heat Pump, Other vs PTHP	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split Heat Pump, Other vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split HP, Convenience vs PTHP	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split HP, Convenience vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ductless Mini-Split HP, Schools (K-12) vs room AC	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.51 kW_ton with 0.3 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.51 kW_ton with 0.36 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.51 kW_ton with 0.39 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.51 kW_ton with 0.41 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.51 kW_ton with 0.48 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.57 kW_ton with 0.34 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.57 kW_ton with 0.4 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.57 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.57 kW_ton with 0.46 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.57 kW_ton with 0.54 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.63 kW_ton with 0.38 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.63 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.63 kW_ton with 0.48 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled cent Chiller 150 - 300 ton 0.63 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.56 kW_ton with 0.34 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.56 kW_ton with 0.4 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.56 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.56 kW_ton with 0.46 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.56 kW_ton with 0.53 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.63 kW_ton with 0.38 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.63 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.63 kW_ton with 0.48 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.63 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.63 kW_ton with 0.6 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.7 kW_ton with 0.42 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.7 kW_ton with 0.5 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.7 kW_ton with 0.53 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-Cooled Centrifugal Chiller less than 150 ton 0.7 kW_ton with 0.57 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.34 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.37 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.4 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.57 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.39 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.42 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.48 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.65 kW_ton with 0.57 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.72 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential

Measure	Technology	Program	Category	Type
Water-cooled screw chiller 150 - 300 ton 0.72 kW_ton with 0.47 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.72 kW_ton with 0.5 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.72 kW_ton with 0.54 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller 150 - 300 ton 0.72 kW_ton with 0.57 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.31 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.33 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.36 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.38 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.4 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.51 kW_ton with 0.46 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.37 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.4 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.58 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.64 kW_ton with 0.38 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.64 kW_ton with 0.42 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.64 kW_ton with 0.45 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.64 kW_ton with 0.48 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller greater than 300 ton 0.64 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.38 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.41 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.44 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.47 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.5 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.63 kW_ton with 0.56 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.43 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.46 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.5 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.53 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.56 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.71 kW_ton with 0.63 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.79 kW_ton with 0.47 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.79 kW_ton with 0.51 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.79 kW_ton with 0.55 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.79 kW_ton with 0.59 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Water-cooled screw chiller less than 150 ton 0.79 kW_ton with 0.62 kW_ton IPLV per ton	HVAC	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Controlled Plug Strip	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Energy Star 2.0 Server	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Energy Star 6.0 Desktop Computer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Energy Star 6.0 Small Scale Server (Data Storage)	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
PC Power Management from Network	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 10HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 10HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 15HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 15HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 20HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 20HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 25HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential

Measure	Technology	Program	Category	Type
VFDs on chilled water pumps 25HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 30HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 30HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 40HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 40HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 50HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 50HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 5HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 7.5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on chilled water pumps 7.5HP w Economizer	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 10HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 15HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 20HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 2HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 3HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
VFDs on CRAC CRAH AHU fans 7.5HP	Non Res Information Technology	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ceramic Metal Halide 20-100W	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Ceramic Metal Halide Integral Ballast	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
Exterior LED Lighting Motion-Sensor Control	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
High Performance T8 4ft 1 lamp, replacing T12-HPT8	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
High Performance T8 4ft 2 lamp, replacing T12-HPT8	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
High Performance T8 4ft 3 lamp, replacing T12-HPT8	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
High Performance T8 4ft 4 lamp, replacing T12-HPT8	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Auto Traffic Signals	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Bollards (rplcng or ILO INCD, CFL, or HID bollards)	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Canopy replacing 176-250W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Canopy replacing 251-400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Canopy replacing up to 175W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Case lighting	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Case lighting sensor control	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Display Case (rplcng or ILO INCD or FL display case Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED FLD rplcng or ILO GRT 100W HAL, INCD, or HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED FLD rplcng or ILO up to 100W HAL, INCD, or HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Highbay replacing 251-400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Highbay replacing greater than 400W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Lowbay replacing 176W-250W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Lowbay replacing up to 175W HID	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Panel 1x4 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Panel 2x2 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Panel 2x4 replacing or in lieu of T8 FL	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Pedestrian Signals	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Portable Task Lights (rplcng or ILO INCD, HAL, or CFL task Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Shelf-mounted Task Lights (rplcng or ILO FL task Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LED Track Ltng (rplcng or ILO INCD, HAL, CFL, or HID track Ltng)	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LW HPT8 4ft 1 lamp, Replace T12	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LW HPT8 4ft 2 lamp, Replace T12	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LW HPT8 4ft 3 lamp, Replace T12	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential
LW HPT8 4ft 4 lamp, Replace T12	Lighting	Smart $aver® Non-Residential Prescriptive	Remove	Non-Residential

Final Report

Process and Impact Evaluation of Duke Energy's Residential Property Manager CFLs Program in Kentucky

Prepared for
Duke Energy
139 East Fourth Street
Cincinnati, OH 45201

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Submitted by

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TABLE OF CONTENTS

Executive Summary

Key Findings

This section presents the key findings and recommendations identified through the evaluation of the Kentucky Residential Property Managers CFL Program. Table 1 presents the estimated overall impacts from the engineering analysis.

Table 1. Estimated Overall Impacts

	Gross Savings	Net Savings
Annual Savings Per Bulb Distributed		
kWh	39.8	38.7
kW	0.0045	0.0044

The impacts in this table were calculated using engineering algorithms from *Appendix F: Impact Algorithms*. These estimates use self-reported daily hours of use as measured through tenant phone survey. The net-to-gross ratio used to calculate net savings is 97.27%. Freeridership and spillover, the two components of the short-term net-to-gross ratio, are calculated in their respective sections: *Freeridership Levels* and *Spillover Levels*.

Significant Impact Evaluation Findings

- The mean wattage of a replaced bulb is 62 watts and averages 53 watts over the EUL of the CFL due to the phase-in of EISA standards on incandescent lamps.
  - See Table 10 on page 19.
- Self-reported average daily hours of use from the tenant survey is 3.42
  - See Self-Reporting Bias on page 18.
- The net to gross ratio was determined to be 97.27%.
  - See *Net Energy Savings Adjustment Factor* on page 16.
- The in service rate (ISR) was determined to be 88.4%.
  - See *In-Service Rate* on page 16.

Significant Process Evaluation Findings

From the Management Interviews

- Duke Energy and its key vendors work well together with no reported or observed issues in communications or operational effectiveness. Marketing, enrollments, CFL ordering, and shipping are working effectively, as are interactions between participating properties and the vendors.
- Working in concert with its two vendors, Duke Energy ensured that the program exceeded its goals for CFL installs in fiscal year 2013 and that the program had reached more than 80% of its annual goal for fiscal year 2014. Specifically between program inception in July of 2012 and December 31, 2013, Duke Energy reports that 18, 213 CFLs have been installed in 1,787 units at 16 participating properties in Kentucky.
- Overall the program is well managed and well run within the parameters of its current design. The program's primary design limitation arises from the central requirement that

participating properties must install the CFLs themselves. Duke Energy is aware of this and has taken steps to change the program design to one of direct installs by a third party vendor starting in 2014.

- As mentioned in the *Quality Assurance Inspections* section, the program's Kentucky operations experienced some issues with data handling, but these have been resolved and they do not appear have had an effect on quality assurance. Nonetheless, as a result of quality assurance issues identified in Indiana, Duke Energy and Honeywell worked to improve the program's procedures, implementing notable changes to educate properties, and increasing the rigor of inspections.

From the Property Manager Interviews

- Property managers are highly satisfied with the program, giving it with an average satisfaction score of 9.2 on a 10-point scale, and no one rating the program lower than an 8.
- Property managers' average satisfaction rating with Duke Energy was a mean of 6.7 on the same 10-point scale. Those scores were lower primarily due to billing and customer services issues that are unrelated to the program.
- Overall the program appears to be effective in increasing CFL usage at multifamily properties. Eighty percent of property managers said they would not have replaced their existing incandescent lamps with CFLs without the program. All (100%) felt the program was needed primarily due the cost of CFLs; the free bulbs being the biggest motivating factor for their participation.
- The properties ordered an average of 7.6 bulbs for a one bedroom unit, with a mean of 10.8 CFLs for two bedroom units, and 10.7 CFLs for three bedroom units.
- One hundred percent of properties stocked 60 Watt incandescent lamps as their most common replacement bulbs, and 90% indicated the 13 Watt CFL was the most appropriate bulb for the program to be providing. Nonetheless, 60% wanted Hollywood globe bulbs for bathroom vanities and 50% wanted higher watt equivalent bulbs.
- Sixty percent of properties say they will provide CFLs in the future, and another 10% will do so when existing stocks of incandescents are depleted. Bulb costs were a potential determining factor for the 20% of the properties who felt they may revert to incandescents.
- Seventy percent of property managers indicated that they had leftover CFLs when their installs were complete, yet only 30% of properties ended up returning the extra bulbs. The program allowed properties with fewer than 30 leftover bulbs to retain them to replace burned out program bulbs or to add to units where tenants originally refused installation but later moved out of the units.
- One third (30%) of property managers said they threw away the old incandescents, while an additional 30% gave them away for use elsewhere, and 20% stored some of them for future use.
- As intended, the program has also stimulated property manager interest in other energy efficiency products for their units, including door sweeps (70%), weather stripping (60%), water heater blankets (50%), programmable thermostats (30%), water saving measures (20%), and powerstrips (10%). Sixty percent of property managers expressed an interest in Duke Energy's Appliance Recycling Program.

From the Tenant Surveys

- The program is systematically replacing high numbers of incandescent lights with CFLs in multifamily homes that would not have otherwise been likely to make the switch.
- Tenants are highly satisfied with the program, rating their satisfaction at an average of 9.5 on a 10-point scale. Satisfaction with Duke Energy was nearly as high with score a 9.0. Tenants were also well satisfied with the quality of the CFLs (8.8) and with the light quality they provide (8.6).
- Ninety eight (97.6%) percent of tenants surveyed claimed to have at least one CFL installed in a permanent fixture of their homes. Among those who did have CFLs installed, the average was 8.6 CFLs per household.
- The vast majority (93.6%) of survey respondents indicated that the old bulbs removed were some type of incandescent lamp. Just over one third (33.9%) of tenants reported storing the old bulbs for future use. The average number of incandescents in storage was 3.8.
- Tenants estimated their CFL usage at an average 3.4 hours per day, with 91.5% reporting that their hours of bulb usage remained the same after the new CFLs where installed.
- Nearly two thirds (62.2%) of survey respondents indicated that this was their first time using CFLs. Among those who had begun using CFLs prior to joining the program, the average time of prior use was 2.2 years. The average number of previously installed CFLs was 3.8 per home.
- After participating in the program, nearly three quarters (74.4%) of surveyed tenants said they were more likely purchase CFLs, and nearly two thirds (64%) rated their likelihood of buying CFLs in the future at a 9 or 10, on a 10-point scale.

Process Evaluation Recommendations

From the Management Interviews

For a full set of recommendations see section titled "*Recommendations for Program Improvements*" beginning on page 30.

- Reconsider the program limitation regarding only installing CFLs in permanent fixtures in tenant homes. Additional energy savings may be achieved if the program allows additional CFLs to be placed in high use, impermanent sockets in tenant homes.
- Consider expanding program eligibility rules to cover business areas of the properties, as well.
- Establish clear standards and practices for quality assurance inspections.
- Consider hiring a separate firm to provide quality assurance for the program.
- Consider incorporating periodic ride-alongs with staff members from the new program implementer as they visit properties for sales visits and quality assurance inspections.
- Using handheld devices such as iPads during installations and quality assurance inspections will help speed record-keeping and reduce the possibility of errors.

From the Property Manager Interviews

For a full set of recommendations see section titled "*Recommendations for Program Improvements*" beginning on page 58.

- Survey responses and explanatory comments made throughout the property manager interviews indicate that property managers desire greater clarity and more assistance during the bulb ordering phase of the program. For this reason, we encourage Duke Energy to clarify socket eligibility rules with properties prior to obtaining bulb count estimates.
- Providing an option for ordering higher-watt equivalent and Hollywood-style globe CFLs could help to increase socket penetration numbers for the program.
- Consider expanding the program to include additional energy saving measures such as building envelope improvements, water-saving devices, and HVAC enhancements as interest and program budgeting dictates.
- Property managers revealed a lack of awareness regarding the program's two-year CFL warranty. While this is not surprising given divisions of labor and employee turnover, we suggest that Duke Energy provide additional means of reminding people about the warranty to ensure that long-term energy savings continue to accrue even when original CFLs fail.

From the Tenant Surveys

Recommendations can also be found in the section titled "*Recommendations for Program Improvements*" beginning on page 94.

- Providing an option for higher watt equivalent (100 Watt) bulbs may address participant desires for brighter bulbs.
- Overall tenants and their landlords appear interested in finding additional ways to save energy. Therefore TecMarket Works encourages Duke Energy to look for further energy saving measures that may be introduced to multi-family properties, such as building envelope improvements and water conservation measures. Additional energy savings opportunities may also be realized if the program increases its behavior change messaging.
- Future marketing strategies may want to emphasize 1) the energy savings associated with CFLs, 2) cost savings on utility bills, and 3) long bulb life associated with CFLs, as tenant surveys indicate these messages are most influential.

Introduction and Purpose of Study

Summary Overview

This document presents findings from impact and process evaluations of Duke Energy's Property Manager CFLs program as it was administered in Kentucky. The evaluation was conducted by TecMarket Works, BuildingMetrics, and Matthew Joyce, subcontractors to TecMarket Works.

Summary of the Evaluation

TecMarket Works conducted a process evaluation consisting of interviews with program administrators and implementers, property manager interviews, and a survey of tenants. These efforts were designed to review program activities, identify issues, and assess satisfaction levels.

Table 2. Evaluation Date Ranges

Evaluation Component	Dates of Data Collection
Tenant Surveys	Surveys conducted from 12/6/13 to 12/1713
Property Manager Interviews	Interviews conducted from 1/7/14 to 1/15/14
Program Management Interviews	Interviews conducted from 5/29/13 to 1/22/14
Engineering Estimates	January and February 2014

From December 6 to 17, 2013 TecMarket Works fielded a telephone survey with randomly selected tenants who received CFLs through this program. Surveyed tenants were asked how many CFLs they had currently installed in light fixtures in their homes. Detailed information was collected for a maximum of three bulbs including: the location of the installed CFL, the type and wattage of the bulb that it replaced, and the average hours per day that it is in use. The information gathered regarding the three CFLs is sufficient to provide statistically significant data.

An impact analysis was performed for CFLs by room type and can be seen in Table 11 and Table 12. However, it should be noted that individual room type samples for hours of use are of insignificant size to achieve statistical relevance and are presented as anecdotal evidence. The impacts are based on an engineering analysis of the impacts associated with the results of the tenant surveys.

Evaluation Objectives

The objective this evaluation is to assess the energy impacts, operational effectiveness, and satisfaction associated with Duke Energy's Residential Energy Efficiency CFLs: Property Manager channel as administered in Kentucky.

Program Description

Through the auspices of this energy efficiency program, Duke Energy works with the property managers of multi-family housing communities to provide and install 13-watt CFLs in high use permanent fixtures of rented residential units located within the Duke Energy service territory.

In addition to the energy savings resulting from replacing incandescent bulbs with more efficient 13-watt CFL bulbs, the program is also intended to stimulate long-term behavior changes by promoting familiarity with CFLs among property managers and residents of multi-family communities through the distribution of educational materials that discuss similarities and differences between incandescent bulbs and energy-efficient bulbs, and how to properly dispose of broken bulbs.

Duke Energy outsources program execution to Honeywell, a third-party vendor that identifies and enrolls qualifying properties, manages their CFL orders (up to 12 eligible light sockets per apartment), handles questions from property managers, and provides quality assurance inspections to ensure that the CFLs have been appropriately installed. Actual CFL installations are the responsibility of each property management company, which is given up to 90 days to install the CFLs and complete the requisite paperwork to document the installs.

CFLs are provided by AM Conservation, a separate third party vendor that sources and ships CFLs and other energy efficiency items for a number of Duke Energy's energy efficiency programs. The program is offered free of charge to participating tenants and property management companies. The cost of the CFLs is covered by Duke Energy, while shipping costs are covered by Honeywell.

Program Goals and Participation

The program began with an initial goal of 6,760 CFLs to be installed in Kentucky between program inception on July 24, 2012 and June 30, 2013. Actual installs totaled 7,688 bulbs (114% of goal) in 899 individual units on 13 participating properties. This represents an average of 8.6 bulbs per unit. The program set a more ambitious goal of 10,432 CFLs for its second year, which runs from July 1, 2013 to June 30, 2014. During the six month period between July 1 and Dec 31, 2013 for which results were available for reporting, the program installed 8,484 CFLs in 888 units, which represents 81% of goal and average of 9.6 CFLs per unit.

When the results of both years are combined the program has installed 16,172 CFLs in 1,787 units at 16 participating properties. (This reflects the program's total property count, since some properties received multiple CFL shipments across calendar years and would otherwise be counted twice.) While these are the official final numbers reported by Honeywell and Duke Energy, these numbers do not reflect bulb count adjustments noted during quality assurance inspections. Those findings are discussed in more detail in the *Tracking, Reporting, and Quality Assurance* section below.

Table 3 below summarizes the program's official performance to date. Upon viewing the table it is important to note the program design is such that when a property ends up with extra CFLs after the installs have been completed, those bulbs are not returned to AM Conservation. Instead

they are transferred to Honeywell's program inventory to be distributed to other properties that need them. As a result, the bulb order numbers and install quantities do not necessarily align.

Table 3. Reported Program Performance through December 31, 2013

Time Period	Annual Goal # of Installed CFLs	Property Count*	Sum CFL Order Qty	Unit Count	Sum of CFLs Installed/ Uploaded to EE Database	% of Annual Goal	Avg. Bulbs Per Unit
July 24, 2012 – June 30, 2013	6,760	13	9,094	899	7,688	114%	8.6
July 1, 2013 – Dec 31, 2013	10,432	8	9,119	888	8,484	81%	9.6
Total to Date	17,192	21	18,213	1,787	16,172	94%	9.0

**Note that the property count shows instances that a property received shipments of bulbs to install. In some cases, the same property may have received shipments in separate fiscal years (i.e. 1 property, 2 shipments, 1 in FY 2013 and 1 in FY 2014). Overall, 16 unique properties participated in KY over this time span. Five of these properties received a second shipment. Of the 16 total properties, 15 had completed their installs by the time of our survey and were thus eligible for phone interviews.*

Methodology

Overview of the Evaluation Approach

The process evaluation consisted of three primary components: management interviews, property manager interview surveys, and tenant surveys. The impact evaluation studies the responses of a series of questions posed to tenants residing in participating properties. These questions include the location of the CFL, and the type and wattage of the bulb that it replaced. The compilation of these data is presented in Table 8 in its unadjusted form; that is, before the self-reporting bias is applied to the hours of use. The adjusted values appear in Table 9.

Study Methodology

Management Interviews

TecMarket Works conducted interviews with the Duke Energy program manager who oversees the program, as well as three representatives from Honeywell, including the program's senior project manager, its overall project coordinator, and the field representative responsible for the Kentucky Service territory. We also spoke with the client manager at AM Conservation, the program's fulfillment contractor. The interviews ranged from 30 to 120 minutes and considered program design, execution, operations, interactions, data transfer methods, and personal experiences in order to assess program operations, identify any implementation issues, and discuss opportunities for improvement. The interview instrument can be found in *Appendix A: Management Interview Instrument.*

Property Manager Interview Surveys

TecMarket Works conducted phone interviews with participating property managers, maintenance supervisors, and regional managers to discuss their experiences with implementation, determine their satisfaction levels, and to assess overall program design.

Tenant Surveys

TecMarket Works conducted a phone survey with 82 randomly selected tenants who received CFLs in their residential units as part of this program. The phone survey was conducted in order to obtain CFL installation data, to determine customer satisfaction, and to identify potential areas for program improvement.

Engineering Estimates

Engineering algorithms can be seen in *Appendix F: Impact Algorithms*. These algorithms were taken from the Draft Ohio Technical Resource Manual (TRM). These unit energy savings algorithms were applied to customers in the engineering analysis sample.

Data collection methods, sample sizes, and sampling methodology

Management Interviews

Management interviews and follow-up phone conversations were made with program administrators from Duke Energy, Honeywell, and AM Conservation. The interview instrument can be found in *Appendix A: Management Interview Instrument.*

Property Manager Interview Surveys

Phone interviews were completed with 10 participating property managers and maintenance supervisors. Property managers were contacted a maximum of four times or until the contact resulted in a completed interview or a refusal to participate. The interview instrument can be found in *Appendix B: Property Manager Survey Instrument.*

Tenant Surveys

TecMarket Works conducted a phone survey with a random sample of participating tenants from December 6 to 17, 2013 with 82 completed surveys. The phone survey instrument can be found in *Appendix C: Tenant Survey Instrument.*

Engineering Estimates

Engineering estimates rely on tenant survey responses from the above mentioned tenant surveys.

Number of completes and sample disposition for each data collection effort

Management Evaluation

Between May 2013 and January 2014, TecMarket Works interviewed five program managers and vendors for this evaluation. This represents a completion rate of 100%.

Property Manager Evaluation

From January 7 to 15, 2014, TecMarket Works completed 10 Kentucky property manager phone interviews out of a population of 15 qualified properties, under the management of a total of 12 property managers, since some individuals were responsible for more than one property. This represents an 83.3% completion rate. Of the two property managers not represented in the survey, one declined to participate, while the other was the result of a change in management since the time of the installs. Such changes are to be expected given that in some cases the CFL installs were completed up to a year prior to the time of the survey.

Tenant Evaluation

Phone surveys with participating tenants were conducted from December 6 to 17, 2013, with 643 tenants contacted from a pool of 739 valid program participants in the Kentucky service territory. This resulted in 82 completed phone surveys and a 12.8% completion rate. Tenants were contacted a maximum of four times or until the contact resulted in a completed survey or refusal to complete the survey.

Table 4. Summary of Data Collection Efforts

Data Collection Effort	Size of Population	# of Completed Conversations	Completion Rate
Management Interviews	5	5	100%
Property Manager Interviews	12	10	83%
Tenant Phone Survey	643	82	13%

Engineering Estimates

Engineering estimates rely on tenant survey responses from the above mentioned tenant surveys.

Description of baseline assumptions, methods and data sources

Baseline assumptions were determined through phone surveys with tenants providing self-reported value for hours of use, baseline lamp watts, and room-type distribution. Robust data concerning HVAC system fuel and type was available from Duke Energy's Home Profile Database (appliance saturation survey data) in Kentucky. Interaction factors derived from this data were used in favor of deemed values from secondary sources as they recognize only Duke Energy customers and, therefore, more accurately represent the participant population. A breakdown of these factors by system and fuel type can be seen in *Appendix F: Impact Algorithms.*

Description of measures and selection of methods by measure(s) or market(s)

The program distributed CFLs exclusively. The Ohio TRM's impact algorithms were fed with primary data, collected through a phone survey of the tenants and used to calculate energy savings. All customers are in the residential market.

Expected and achieved precision

Tenant Surveys

Sampling procedures for the tenant survey had an expected precision of 90% ± 6.4% and an achieved precision of 90% ± 5.4%.

Engineering Estimates

Engineering estimates rely on tenant survey responses. Sampling procedures for the tenant survey had an expected precision of 90% ± 6.4% and an achieved precision of 90% ± 5.4%.

Threats to validity, sources of bias and how those were addressed

CFL installations were tracked through the use of the Property Manager CFL Campaign Tracker. There is a potential for bias in the engineering algorithms' parameters, such as replaced wattages and hours of use, which are self-reported by the surveyed participants.

The baseline wattage data that feeds the engineering analysis was obtained from the tenants through the tenant phone surveys. Since the property managers, not the tenants, were the ones that physically removed the old incandescent bulbs from their fixtures in order to install the CFLs, the tenants' recollection of replaced wattage is potentially distorted. TecMarket Works nonetheless believes that this is a valid estimate of baseline wattage. As seen in Table 8, the average baseline wattage reported by the tenants is 62 watts. This compares favorably to information collected from the property managers themselves, 100% of whom claim that the most common bulb wattage replaced was 60 watts.

Net to Gross Analysis

Freeridership Levels

The property managers receiving the Duke Energy bulbs were instructed to install the CFLs in tenant's units so that each installation removed an incandescent bulb from a fixture that was being used by the occupants of that unit. This approach was taken because Duke Energy wanted to design a program with a low freerider rate reducing the risk that the bulbs would be used by people who were already using CFLs in those fixtures. Duke Energy theorized that if the fixture contained an incandescent bulb and was in use, then the conversion of that fixture to a CFL would acquire higher net savings than a typical CFL rebate program in which the customer installed the bulb where they wanted or placed some of the bulbs into storage.

The evaluation results support Duke Energy's theory. According to surveyed occupants, approximately 96 percent of the property-manager-installed CFLs went into fixtures in which the tenant reported having an incandescent light bulb prior to the conversion. Only about 4 percent of the property-manager-installed CFLs were reported to have had a CFL in that fixture prior to the installation of the new bulb. From this perspective, 96 percent of the CFLs installed by the property managers provided net new energy savings.

Table 5. Net to Gross Analysis

CFL replaced:	Total	
An Incandescent	182	95.79%
A CFL	8	4.21%
Empty Socket	0	0.00%
Don't know	7	-

However, even though the property manager-installed-CFLs went into incandescent fixtures, this does not mean that all fixtures in the apartments, including the program-targeted fixtures, had incandescent light bulbs.

When we asked if the tenants had already used CFLs in their units prior to the program-installed CFLs, 32 percent of the tenants reported having at least one CFL in their units prior to the program installed units. One percent of the tenants indicated that the CFLs in their units were installed prior to their taking possession of their units and an additional 31 percent of tenants indicated that they had installed one or more CFLs in their units. Sixty-eight percent of the tenants indicated that there were no CFLs installed in their units prior to the program-installed CFLs.

Of the 26 tenants who reported having already used CFLs in their units and could also estimate the number of CFLs that were already in use, the typical unit had 3.8 CFLs prior to the program-installed CFLs. Without the program, there is a possibility that some of the tenants who had incandescent bulbs in the fixtures that were replaced by CFLs via the program may have replaced that incandescent with a CFL when the incandescent burnt out.

With most tenants having not already used CFLs in the past, and the average tenant having only 3.8 CFLs in their units, there is not a strong indication that these tenants are committed CFL

users. In addition, because 96% of the program installed CFLs went into incandescent fixtures, these tenants had not yet made the switch to energy efficient lighting in all of their primary fixtures. The program is reaching its intended market and getting CFLs placed in fixtures that used standard bulbs prior to the replacement.

Because the program is a direct install program in which the program installs CFLs in fixtures that are lit with incandescents, the level of freeridership is set at the level at which the tenants report having the property owners change their fixture from an incandescent to a CFL. As a result, the level of freeridership for this program is assessed to be 4.21%. We are not crediting Duke Energy with a net CFL installation if the tenant indicated that they had already been using a CFL in the fixture before the Duke Energy CFLs were installed. These tenants report that they had already converted their fixtures to CFLs. It is unlikely that a property manager would take out a CFL only to install another CFL. However, we take the tenant's response seriously and discount net savings by the level at which the tenant reports already using a CFL in the fixture targeted by the property owner.

Spillover Levels

The experience tenants gained with the Duke Energy program-installed CFLs did not produce a large amount of spillover of additional CFL bulb purchases, but it did induce some tenants to buy and use more CFLs and attribute the cause of their purchase to the experience they obtained via the program-installed CFLs. In 74 percent of cases, the surveyed tenants reported that their program experience made it more likely that they would have purchased additional CFLs. Of the remaining 26 percent, 17 percent were neither more nor less likely and eight percent were less likely. Tenants purchased an additional 18 bulbs and they installed 14 of those bulbs in fixtures they are using.

When tenants were asked to score the level at which the program installed bulbs caused them to buy and use more CFLs, a 1 to 10 scale was used to score that effect. To allocate program-induced spillover causal effect, a score of 1 was counted as zero spillover allocation. The rest of the scores were directly converted to a percent allocation score (5=.5, 7=.7, 9=.9, 10=1.0). These allocation scores were then multiplied by the number of additional bulbs that the participants indicated that they had both purchased and installed. Thus, for this set of respondents, we are adding an additional 12.5 bulbs to the 810 distributed by the program to survey respondents. This provides a level of spillover of 1.54% (12.5/810 =.0154). The 1.54% percent spillover is conservative, as it only counts the Duke Energy motivated purchases that were installed and which occurred between the period of time of the installation and the survey.

We also note that this is short-term spillover. Additional bulbs may have been purchased after the evaluation effort was completed, however these are excluded from this assessment.

Table 6. Spillover Numbers

How many did you buy	How many are being used	Attribution score (1-10 scale)	Spillover Contribution
4	4	10	4
4	4	10	4
3	3	5	1.5
1	1	10	1
1	1	10	1
1	1	10	1
4	0	7	0

Net Energy Savings Adjustment Factor

The combination of the reduction in energy savings attributed to freeriders plus the adjustment attributed to spillover provides a net adjustment factor of 97.27% [(1 – 4.21% freerider) * (1 + 1.54% spillover) = .9727]. Accounting for freeriders, those that already indicated that they had installed a CFL, and for spillover, those indicated that the Duke Energy program caused them to buy and install more CFLs provides a net energy savings of 97.27% of the gross savings.

In-Service Rate (ISR) Calculation

A total of 802 CFLs were reported as installed in participating tenant households. At the time of the phone survey, tenants were asked how many CFLs are currently installed. Out of the 82 tenants surveyed, 76 provided responses. The ISR is calculated using only the CFLs installed in the homes of participants with valid responses. The 76 responding tenants received a total of 768 CFLs. Of these, 679 were reported as installed at the time of the survey, a first year ISR of 88.4%. As the tenants are not personally installing the bulbs, and every bulb that is handed out is installed, no further adjustment is made for bulbs in storage. The final ISR is therefore equal to the first year ISR of 88.4%.

Impact Analysis

Table 7 shows the estimated energy savings per bulb distributed adjusted downward for the ISR of 88.4% and incorporating the freeridership and spillover percentages computed from participants' survey responses. The program distributed 13-watt CFLs exclusively. The average wattage of a replaced bulb was 62 watts. The baseline wattage, as seen in Table 10, decreases over the EUL of the CFL as per *Appendix G: EISA Schedule and CFL Baseline.*

Table 7. Adjusted Impact: Average kWh and Coincident kW per Bulb Distributed

Metric	Result
In Service Rate	88.4%
Gross kW per bulb	0.0045
Gross kWh per bulb	39.8
Freeridership rate	4.21%
Spillover rate	1.54%
Total Discounting to be applied to Gross values	2.73%
Net kW per bulb	0.0044
Net kWh per bulb	38.7
Measure Life[1]	5 years
Effective useful life net kWh per bulb	193.5

Methodology

Primary data collected from surveyed tenants was used to determine the room-type distribution of CFL installations, average daily hours of use, and mean wattage of bulb removed seen in Table 8. The self-reported average daily hours of use is adjusted downward to account for the self-reporting bias described in the *Self-Reporting Bias* section. The mean wattage of bulbs removed is adjusted downward for the years after the year of the installation to account for the effects of EISA on bulb availability. This is described in *Appendix G: EISA Schedule and CFL Baseline.* These values are then combined with as per *Appendix F: Impact Algorithms* to calculate savings.

Survey Data

Specific information about the CFLs distributed through the program was collected through a phone survey of tenants. Data was collected for a maximum of three bulbs and included the location of the CFL, the type and wattage of the bulb that it replaced, and the average hours per day that it is in use. The phone survey, conducted by TecMarket Works between December 6 and December 17, 2013, included a random sample of 82 participating tenants. The compilation of this data is presented in Table 8 in its unadjusted form; that is before the self-reporting bias is applied to the hours of use. The adjusted values appear in Table 9.

[1] Consistent with prior evaluations of CFL programs for Duke Energy, a measure life of five years was used for installed CFLs. No derate was performed for post-EISA years.

Table 8. Unadjusted CFL Survey Data

Room Type	Number of Installations	Average Wattage of Bulb Removed	Average Daily Hours of Use (Old)	Average Daily Hours of Use (New)
Living or family room	41	59	5.26	5.45
Dining room	35	65	5.21	5.10
Kitchen	50	65	7.24	7.24
Master bedroom	22	62	3.30	3.32
Other bedroom	3	68	7.83	7.83
Bathroom	64	59	3.41	3.23
Hall	20	64	1.89	1.95
Closet	1	75	0.50	0.50
AVERAGE/TOTAL	**236**	**62**[2]	**4.72**	**4.69**

Figure 1 graphically shows the prevalence of CFL installations in each room type in ascending order.

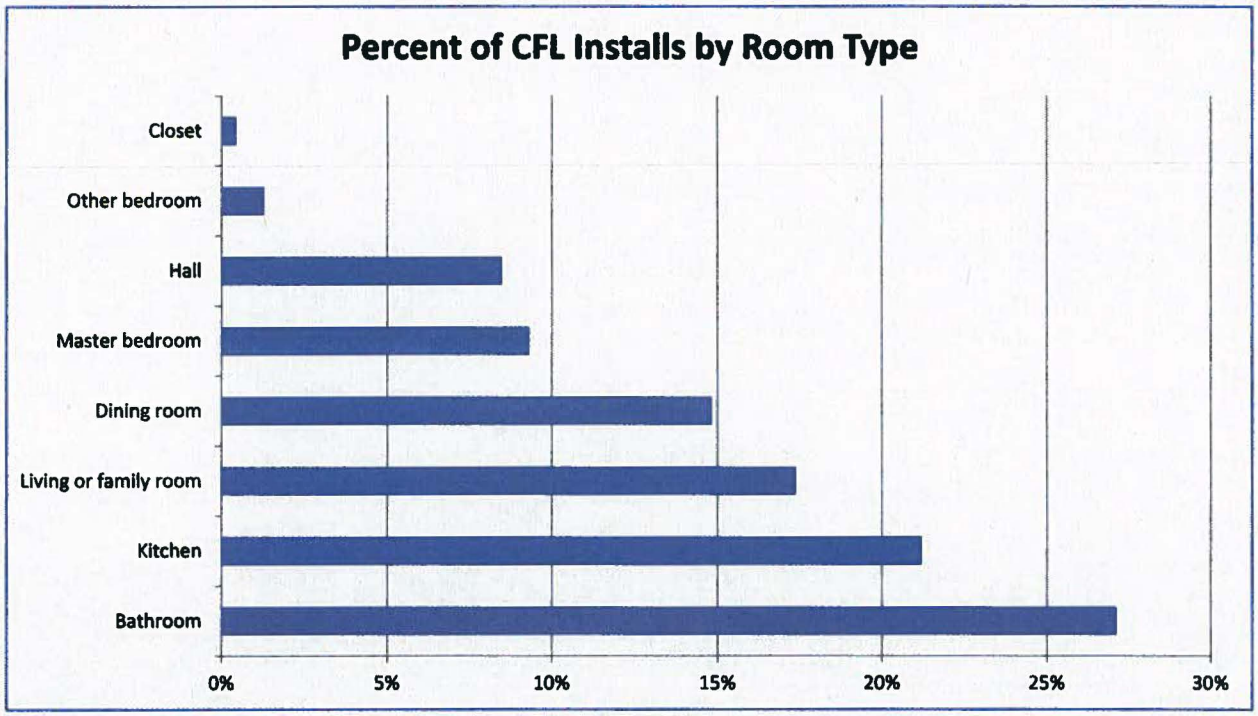

Figure 1. Percent of CFL Installations by Room Type

Self-Reporting Bias

Previous studies that have included both customer surveys and lighting loggers have shown that, comparing customers' self-reported hours of operation to the actual hours of operation,

[2] The overall average wattage of the bulb removed is a weighted average that uses CFL installation distribution data from the entire survey population to assign weights. As this data was collected from the tenants, and not the property managers that did the installations, there is the potential for distorted results. However, TecMarket Works believes this to be a valid estimate of baseline wattage. This compares very favorably with the Draft Ohio TRM, where, by means of the deemed calculation for delta watts (CFL watts * 3.25), we can determine that the average wattage of an incandescent bulb that is replaced by a 13-watt CFL is 55.25 watts (13 * 3.25 + 13).

customers responding to the survey overestimated their lighting usage by about 27%[3]. Consequently, the self-reported hours of use obtained from the survey were reduced by the 27% established through the collection of data from previous programs.

Customers were asked if they had increased or decreased their lighting usage since installing the CFLs they received through the program. The weighted average of self-reported hours of use before and after participating in the program were very close.

Table 9 shows the weighted average of the unadjusted hours of use values along with the updated weighted average values after the self-reporting bias is applied. The final value for average daily hours of use is 3.44 and 3.42 before and after the program respectively.

Table 9. Adjusted Average Daily Hours of Use

Adjustment	Magnitude of Adjustment	Average Daily Hours of Use (Old)	Average Daily Hours of Use (New)
Unadjusted	N/A	4.72	4.69
Self-Reporting Bias	27%	3.44	3.42

Impact Estimates

As described in *Appendix G: EISA Schedule and CFL Baseline*, the baseline against which a CFL is evaluated against decreases throughout its EUL. The baseline wattage by room type and by year is shown in Table 10 with the average in the final column and the overall weighted average in the highlighted cell in the bottom right, the numbers used for the savings calculations. Savings estimates at the room type level are unreliable and should not be used in any calculations. Gross savings for the program are presented in the same manner in Table 11 and Table 12.

Table 10. Baseline Wattage by Room Type and Year

Room Type	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Living or family room	59	56	49	45	43	51
Dining room	65	59	52	49	47	55
Kitchen	65	60	53	49	46	54
Master bedroom	62	57	50	47	45	52
Other bedroom	68	62	55	50	48	57
Bathroom	59	57	49	46	43	51
Hall	64	59	52	48	46	54
Closet	75	64	59	53	53	61
Total/Average	**62**	**58**	**51**	**47**	**45**	**53**

[3] TecMarket Works and Building Metrics. "Duke Energy Residential Smart $aver® CFL Program in North Carolina and South Carolina". February 15, 2011. Pg. 35.

Table 11. Gross kWh Savings by Room Type and Year

Room Type	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Living or family room	51.3	47.7	40.0	35.8	32.6	41.5
Dining room	58.4	51.9	44.1	40.6	38.0	46.6
Kitchen	79.4	72.5	61.4	55.1	51.0	63.9
Master bedroom	34.6	30.5	25.9	23.9	22.4	27.5
Other bedroom	90.9	81.8	70.1	61.9	58.4	72.6
Bathroom	34.2	32.2	27.0	24.2	22.1	27.9
Hall	20.3	18.4	15.6	14.0	13.0	16.3
Closet	6.6	5.4	4.8	4.3	4.3	5.1
Total/Average	**49.4**	**45.2**	**38.2**	**34.5**	**31.8**	**39.8**

Table 12. Gross kW Savings by Room Type and Year

Room Type	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Living or family room	0.0053	0.0049	0.0041	0.0037	0.0034	0.0043
Dining room	0.0059	0.0053	0.0045	0.0041	0.0038	0.0047
Kitchen	0.0058	0.0053	0.0045	0.0041	0.0038	0.0047
Master bedroom	0.0056	0.0049	0.0042	0.0039	0.0036	0.0044
Other bedroom	0.0062	0.0056	0.0048	0.0042	0.0040	0.0049
Bathroom	0.0053	0.0049	0.0041	0.0037	0.0034	0.0043
Hall	0.0058	0.0052	0.0044	0.0040	0.0037	0.0046
Closet	0.0070	0.0058	0.0052	0.0045	0.0045	0.0054
Total/Average	**0.0056**	**0.0051**	**0.0043**	**0.0039**	**0.0036**	**0.0045**

Management Interviews

Program Operations and Oversight

Duke Energy's Kentucky Property Manager CFL Program supplies free 13-watt CFLs to multi-family communities in its Kentucky service territory. The program provides the properties with up to 12 CFLs per apartment. The CFLs are installed by employees of the property management company. CFL fulfillment and daily program operations are handled by third party vendors.

Duke Energy provides administrative oversight for the program, including vendor management, confirmation of eligible properties, and the creation of marketing materials that are used in print, online, and in digital format by the utility and by Honeywell, the third party vendor. Duke Energy also handles website administration, inventory reconciliation, and final quality assurance.

Honeywell handles day-to-day program activities including marketing, property enrollment, CFL ordering and warranty issues, oversight of installations and timelines, quality assurance inspections, property manager relations, property contracts, data collection and database management, reporting, forecasting, and inventory control.

The CFLs distributed by the program are sourced, bundled, and shipped directly to participating properties by AM Conservation, a third party vendor that provides fulfillment services for a number of Duke Energy's energy efficiency programs.

Program History and Timeline

Duke Energy's Property Manager CFLs Program was conceived when Duke Energy recognized the potential for energy savings programs targeted to non-homeowners in the residential rental markets of its service territories. The program initially began operations in Duke Energy's Ohio, North Carolina and South Carolina service territories in January of 2011. Since then program elements such as bulb types, maximum number of bulbs per unit, timeframes, necessary marketing materials, and other attributes of the program have been fine-tuned through ongoing field operations. The Kentucky version of this residential lighting program shares the same program design and operates similarly to Duke Energy's other service territories. The program was approved for operations in Kentucky on July 24, 2012. CFLs were first shipped to Kentucky properties in November of 2012.

Eligibility

This residential lighting program is available to multi-family properties with single meters and individual residential accounts. Properties may install up to 12 CFLs in each unit, with no limit on the number of units on a given property. Eligible light sockets must be permanent, indoor, screw-in fixtures within the units. Lighting for common rooms, property management offices, work and storage areas, hallways, breezeways and other outdoor situations is not covered by this program.

While these eligibility rules are clearly defined and explained, property manager interviews reveal a frequently cited desire for the program to provide CFLs for these non-qualifying locations as well. Expanding the program to incorporate these business-related locations would enable Duke Energy to capture increased energy savings at a minimum of additional marketing

expense, since the property managers could agree to the business-related CFL installs at the same time. Enabling such an arrangement could help overcome one of the property managers' objections to participation: Under the program's current design, the energy/cost savings only accrue to the tenants and not the business itself.

Marketing to and Recruiting of Property Managers

Although Duke Energy maintains the program's online presence and retains creative control of the program's marketing materials, the actual marketing execution for the program is handled by Honeywell. The vendor uses two simultaneous strategies to recruit new properties to join the program: top down and bottom up.

The top-down approach focuses on the vice presidents, directors, and regional managers at large property management firms who have decision making authority for a number of properties. "By gaining approval of just one person at that level, we can often get half a dozen properties signed on all at once," said the Honeywell project coordinator we spoke with. This approach often requires a bit of detective work to identify the right individuals to speak with. To accomplish this, Honeywell frequently uses a combination of membership lists obtained from apartment associations, local rental property magazines, and internet searches. The targeted individuals are then approached by phone, email, fax or mail, depending upon the contact information available. Successful contacts generally lead to an explanatory phone call or in-person meeting in order to discuss the program's benefits and requirements. Once the corporate decision maker is on board, their internal communication directives alert the individual properties about the program and prepare the way for direct conversations with Honeywell representatives at the local level.

The second strategy is the bottom-up approach. This method bypasses the corporate structure and initiates contact directly with local property managers. The same outbound marketing channels of phone, email, fax, and mail are used with this strategy, but with this approach Honeywell also adds in direct in-person visits to the property. "I maintain my own lists of potential properties. So if I am in the area for another reason, such as a quality assurance inspection or to pick up extra CFLs, I like to take the opportunity to personally visit potential properties," said Honeywell's Kentucky field representative. "I try to schedule my visits but I'll also just drop by if the chance arises. It can be hit or miss since property managers are busy people, but I find that in-person conversations are helpful for assuring people the program is for real. Sometimes people tell me that when they read about the Duke program by fax or email it sounds too good to be true so they can be skeptical. But if I explain it to them directly I sometimes can get them to sign up on the spot." Other times, even though the local property manager is convinced, the decision to participate in the program must be approved by someone in a corporate office. Either way, this often starts word of mouth referrals that bring in additional properties from the original property manager's social network.

Both the top down and bottom up marketing approaches are supported with periodic trade show booths, reverse trade shows, and print advertising in appropriate trade publications. Overall, program marketing is reported to be functioning well. One minor marketing challenge mentioned is the high job turnover rate in the property management field. This sometimes makes contact names, email addresses, and even follow up conversations difficult since people may not be in the same positions within months after the original contact is made. Honeywell understandably