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FLORIDA'S LAW FIRM FOR BUSINESS

Writer's E-Mail Address: bkeating@gunster.com

April 21, 2015

E-PORTAL

Ms. Carlotta Stauffer, Clerk
Office of the Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: **Docket No. 150089-EG - Petition for approval of demand-side management plan by Florida Public Utilities Company.**

Dear Ms. Stauffer:

Attached for filing, please find a revised and corrected edition of Florida Public Utilities Company's ("Company") 2015 Demand-Side Management ("DSM") Plan. The Company's Plan was originally submitted to the Commission on March 16, 2015.

The need to file a revised, corrected Plan has arisen as a result of errors identified in recent days as a result of preparing the Company's responses to Staff's First Data Request. While preparing these Data Responses, the Company found that the FIRE model run for the Commercial Reflective Roof Program in the Company's DSM Plan was incorrect. The Company further determined that the cost-effectiveness test results in the table in Section A.4 in the Company's DSM plan for the Rate Impact Test and the Total Resource Cost Test were transposed.

FPUC has prepared the attached revised copy of the DSM plan with the corrected FIRE model included, as well as the appropriate corrections to three identified pages which were necessitated by the corrections to the FIRE model and the edit to the table providing the test results. Each revised page has been marked as "Revised." The specific revisions are as follows.

- Cover page marked to reflect the Plan has been "Revised."
- Page 5 revised table entitled "1200 kWh Projected Bill Costs"
- Page 22
    - Section 3.3.1, First Paragraph, Line 3. Changed "half" to "25 %"
    - Section 3.3.1, First Paragraph, Line 4. Changed "$0.15" to "$0.075"
    - Section 3.3.1, First Paragraph, Line 5. Changed "$0.65" to "$0.325"
    - Section 3.3.3, Line 7. Changed "$0.15" to "$0.075"

  - Section 3.3.3, Line 7. Changed "$0.65" to $"0.325"
- Page A-5 revised table entitled Summary of Cost-Effectiveness Results
- Appendix A-9 revised FIRE model output

We sincerely apologize for any inconvenience these errors may have caused. As always, please don't hesitate to let me know if you have any questions whatsoever.

Sincerely,

Beth Keating
Gunster, Yoakley & Stewart, P.A.
215 South Monroe St., Suite 601
Tallahassee, FL 32301
(850) 521-1706

Revised April 20, 2015 inserted

2015 Demand-Side Management Plan

March 16, 2015

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1.0 Overview and Summary

1.1 Background

Sections 366.80 through 366.85, and 403.519, Florida Statutes (F.S.), are known collectively as the Florida Energy Efficiency and Conservation Act (FEECA). Section 366.82(2), F.S., requires the Florida Public Service Commission (PSC) to adopt appropriate goals designed to increase the conservation of expensive resources, such as petroleum fuels, and to reduce and control the growth rates of electric consumption and weather-sensitive peak demand. Pursuant to Section 366.82(6), F.S., the PSC must review the conservation goals of each utility subject to FEECA at least every five years. The seven utilities subject to FEECA are Florida Power & Light Company (FPL), Duke Energy Florida, Inc. (DEF), Tampa Electric Company (TECO), Gulf Power Company (Gulf), Florida Public Utilities Company (FPUC), Orlando Utilities Commission (OUC), and JEA (referred to collectively as the FEECA utilities). Goals were previously established for the FEECA utilities in Order No. PSC-09-0855-FOF-EG issued December 30, 2009. Therefore, new goals were required to be established by the end of 2014.

In 2008, the Legislature amended Section 366.82, F.S., such that when goals are established, the PSC is required to: (1) evaluate the full technical potential of all available demand-side and supply-side conservation and efficiency measures, including demand-side renewable energy systems, (2) establish goals to encourage the development of demand-side renewable energy systems, and (3) allow efficiency investments across generation, transmission, and distribution as well as efficiencies within the user base. These requirements were fully addressed during the 2009 goals proceedings. The Legislature also authorized the PSC to allow an investor-owned electric utility (IOU) an additional return on equity of up to 50 basis points for exceeding 20 percent of their annual load-growth through energy efficiency and conservation measures and may authorize financial penalties for those utilities that fail to meet their goals. The additional return on equity shall be established by the PSC through a limited proceeding. Finally, the amendments to Section 366.82, F.S., provided funds for the PSC to obtain professional consulting services if needed. These statutes are implemented by Rules 25-17.001 through 25-17.0015, Florida Administrative Code (F.A.C.).

In preparation for the new goals proceeding, an informal meeting was held on June 17, 2013, with the FEECA utilities and interested parties to discuss the new goals proceeding. In an effort to streamline the proceeding and minimize costs, the PSC staff recommended and the parties agreed that the Technical Potential Study used in the previous numerical goals proceeding, Docket Nos. 080407-EG through 080413-EG, should be updated, instead of performing a completely new study. Further, parties discussed minimum testimony requirements and what level of analysis could be reasonably conducted by the parties within the timeframe of

the dockets. Consistent with Order No. PSC-09-0855-FOF-EG in the previous goals proceeding, the parties agreed that supply-side efficiencies would not be addressed in this proceeding. On July 26, 2013, seven dockets were established to set numeric conservation goals for each of the FEECA utilities, marking the fifth such proceeding. On August 19, 2013 the Order Establishing Procedure (OEP), Order No. PSC-13-0386-PCO-EU, was issued.

On August 23, 2013, FPUC filed a petition requesting to establish its numeric goals by use of a proxy methodology and to waive the filing requirements of Order No. PSC-13-0386-PCO-EU. On December 4, 2013, Order No. PSC-13-0645-PAA-EU was issued approving the use of a proxy methodology to establish FPUC's numeric goals. By using the proxy methodology, FPUC was able to avoid costs associated with performing the analyses required by the minimum testimony requirements which would have represented a hardship to FPUC's customers. FPUC was excused from the filing and participation requirements of the July 2014 hearing. FPUC was responsible for filing numeric conservation goals based on the proxy utility, Gulf, within ten days of the Final Order establishing goals for Gulf. The PSC granted the staff administrative authority to validate the calculations of the numeric conservation goals submitted by FPUC. FPUC is required to file this demand side management plan within 90 days of the Final Order establishing the goals for Gulf. On December 16, 2014, the Final Order No. PSC-14-0696-FOF-EU was issued establishing Gulf's goals.

On December 29, 2014, the PSC staff provided administrative approval of FPUC's numeric conservation goals which are presented in Section 1.2. With respect to non-numeric goals, Order No. PSC-14-0696-FOF-EU requires that the existing solar pilot programs presented in FPUC's 2010 Demand-Side Management Plan continue until December 31, 2015. Since the existing solar pilot programs are part of FPUC's 2010 Demand-Side Management Plan, they are not addressed in this 2015 Demand-Side Management Plan.

The remainder of this report summarizes Florida Public Utilities Company's DSM Plan and compares projected annual DSM peak demand and energy reductions (consistent with the programs outlined in the DSM Plan) to the annual DSM goals established by the PSC.

1.2 Commission Approved Numeric Conservation Goals

FPUC's residential and commercial/industrial numeric conservation goals for the 2015 through 2024 period were established by the proxy method approved in Order No. PSC-13-0645-PAA-EU and through PSC staff administrative approval in the December 29, 2014 letter from Tom Ballinger. These PSC-established annual goals, along with FPUC's projected annual DSM peak demand and energy reductions (corresponding to the programs discussed in subsequent sections of this document) are presented below.

Total Annual Savings Across All Programs and Classes						
	Summer Peak MW Demand Reduction		Winter Peak MW Demand Reduction		Annual Energy Reduction (gWh)	
Year	Goals	Program	Goals	Program	Goals	Program
2015	0.057	0.280	0.022	0.168	0.078	0.538
2016	0.073	0.285	0.023	0.168	0.108	0.550
2017	0.087	0.290	0.027	0.168	0.132	0.563
2018	0.106	0.295	0.040	0.168	0.160	0.576
2019	0.123	0.300	0.043	0.168	0.201	0.588
2020	0.141	0.352	0.046	0.202	0.228	0.685
2021	0.157	0.352	0.049	0.202	0.249	0.685
2022	0.165	0.352	0.061	0.202	0.275	0.685
2023	0.182	0.352	0.063	0.202	0.293	0.685
2024	0.194	0.352	0.066	0.202	0.313	0.685
Note: Totals may not add due to rounding						

Annual Savings Across Residential Class Programs						
	Summer Peak MW Demand Reduction		Winter Peak MW Demand Reduction		Annual Energy Reduction (gWh)	
Year	Goals	Program	Goals	Program	Goals	Program
2015	0.036	0.213	0.012	0.122	0.023	0.416
2016	0.046	0.213	0.015	0.122	0.030	0.416
2017	0.056	0.213	0.018	0.122	0.038	0.416
2018	0.067	0.213	0.022	0.122	0.045	0.416
2019	0.078	0.213	0.025	0.122	0.053	0.416
2020	0.089	0.213	0.028	0.122	0.060	0.416
2021	0.099	0.213	0.031	0.122	0.067	0.416
2022	0.107	0.213	0.034	0.122	0.073	0.416
2023	0.117	0.213	0.036	0.122	0.078	0.416
2024	0.123	0.213	0.039	0.122	0.084	0.416

Annual Savings Across Commercial & Industrial Class Programs						
	Summer Peak MW Demand Reduction		Winter Peak MW Demand Reduction		Annual Energy Reduction (gWh)	
Year	Goals	Program	Goals	Program	Goals	Program
2015	0.012	0.067	0.010	0.046	0.055	0.122
2016	0.027	0.072	0.008	0.046	0.078	0.135
2017	0.031	0.077	0.009	0.046	0.094	0.147
2018	0.039	0.082	0.018	0.046	0.115	0.160
2019	0.045	0.087	0.018	0.046	0.148	0.173
2020	0.052	0.138	0.018	0.080	0.168	0.270
2021	0.058	0.138	0.018	0.080	0.182	0.270
2022	0.058	0.138	0.027	0.080	0.202	0.270
2023	0.065	0.138	0.027	0.080	0.215	0.270
2024	0.071	0.138	0.027	0.080	0.229	0.270

1.3 Discussion of Rate Impacts from Conservation Programs

FPUC's proposed conservation programs are cost effective with respect to the Rate Impact (RIM) test except for the Residential Energy Survey as presented in Appendix A. The following table presents the projected cost and benefits associated with the DSM plan. As shown in the table, the conservation costs recovered in the Energy Conservation Cost Recovery Clause do not consider the reduced system costs resulting from the conservation programs. It should also be noted that the costs shown in the table for the quantifiable programs include the cost for the Residential Energy Survey Program which does not pass the RIM test. The projected conservation cost and benefits compare to the current Energy Conservation Cost Recovery Clause of $1.28 for a 1200 kWh bill reflecting the reduced conservation costs associated with the lower goals.

Florida Public Utilities Company 1200 kWh Projected Bill Costs					
Year	Quantifiable Programs	Education, Common, and Non-quantifiable	Total Conservation Costs	System Savings	Net Conservation Costs
2015	$0.30	$0.65	$0.95	$0.08	$0.87
2016	$0.42	$0.67	$1.09	$0.23	$0.86
2017	$0.56	$0.68	$1.25	$0.39	$0.85
2018	$0.71	$0.69	$1.40	$0.56	$0.84
2019	$0.85	$0.71	$1.56	$0.72	$0.84
2020	$1.03	$0.72	$1.75	$1.11	$0.64
2021	$1.21	$0.73	$1.94	$1.43	$0.51
2022	$1.39	$0.74	$2.13	$1.70	$0.43
2023	$1.58	$0.76	$2.33	$1.94	$0.39
2024	$1.77	$0.77	$2.54	$2.22	$0.32

1.4 Overview of DSM Programs

FPUC is by far the smallest of the FEECA utilities. As such FPUC is unable to afford a lot of independent program development and as such FPUC utilizes work developed by the other FEECA utilities to the extent possible. FPUC has developed this DSM Plan within the context of the uncertainty that FPUC faces. Some of this uncertainty is unique to FPUC among the FEECA utilities. An example of this unique uncertainty is that FPUC purchases all of its power. The structure of those purchase power agreements can readily change with their renewal and can impact the effectiveness of existing conservation measures installed. Furthermore, the small size of FPUC limits the resources it has available for the administration and execution of its conservation programs. FPUC also faces the same uncertainties facing the other FEECA utilities such as the Proposed Clean Power Plan. All these factors have been considered in the development of FPUC's DSM Plan.

The conservation programs that FPUC has included in this DSM Plan are divided into residential and commercial/industrial programs. FPUC's DSM Plan contains a mix of existing and new programs. In addition, FPUC is discontinuing some of the existing conservation programs as discussed below. Existing conservation programs included in this DSM Plan have been revised and updated to reflect current market conditions as well as the experience that FPUC has gained with the programs.

The existing programs that FPUC has discontinued include the following.

- Commercial Energy Survey Program
- Commercial Indoor Efficient Lighting Rebate Program

- Commercial Window Film Installation Program

The Commercial Energy Survey Program while a good program was found not to be cost effective. The educational aspects of the program will be included in FPUC's Energy Education Programs under the new Commercial Energy Consultation Program, but savings will not be quantified. The Commercial Indoor Efficient Lighting Rebate Program was discontinued because revisions to codes and standards have resulted in it becoming functionally obsolete in its current form. While there may remain some opportunities for lighting upgrades, the new codes and standards will provide these upgrades. FPUC instituted the Commercial Window Film Installation Program in 2011, but only had four participants in the four years that the program was in place and none in 2014. Thus FPUC is deleting program due to lack of participants.

The residential and commercial programs included in this plan center around heating and cooling improvements which represent the greatest energy use in FPUC's service area. FPUC proposes two residential programs and three commercial/industrial programs as quantifiable programs. The programs are designed to provide opportunities for all customers to participate. FPUC's quantifiable conservation programs are listed below.

1.4.1 Residential Programs

- Residential Energy Survey Program
- Residential Heating & Cooling Efficiency Upgrade Program

1.4.2 Commercial Programs

- Commercial Heating & Cooling Efficiency Upgrade Program
- Commercial Chiller Upgrade Program
- Commercial Reflective Roof Program

1.5 Renewable Energy Programs

As discussed above, the goals process found that renewable energy programs were not cost effective. Order No. PSC-14-0696-FOF-EU requires that the existing solar pilot programs be continued until December 31, 2015. This DSM Plan does not include these programs since they are part of the existing DSM Plan approved by Order PSC-10-0678-PAA-EG.

1.6 Organization of Plan

Section 2.0 presents details of the residential programs. Section 3.0 presents details of the commercial/industrial programs. Section 4.0 presents the Energy Education Program. Appendix A contains the cost effectiveness evaluations.

2.0 Residential Programs

2.1 Residential Energy Survey Program

2.1.1 Program Description

The objective of the Residential Energy Survey is to provide FPUC's residential customers with energy conservation advice that encourages the implementation of efficiency measures resulting in energy savings for the customer. These measures, once implemented, also lower FPUC's energy requirements and improve operating efficiencies. FPUC views this program as a way of promoting the installation of cost-effective conservation features. During the survey process, the customer is provided with specific whole-house recommendations.

The survey process also checks for possible duct leakage. If a problem is identified, recommendations are made for further analysis and repairs. Blower-door testing is required to identify and quantify the duct leakage. FPUC provides the customer a list of contractors that provide blower-door testing. After the blower-door test contractor identifies the leakage sites and quantities, the customer is given a written summary of the test findings and the potential for savings, along with a list of approved repair contractors.

During the survey, FPUC will provide the customer with a conservation kit as appropriate. The kit includes two LED bulbs, weather stripping, chalk, insulators for wall sockets and light switches, and a water temperature thermometer. While the contents of the conservation kit will result in demand and energy savings, its purpose is to provide the customer with actual samples of low and no cost measures the customer can take to reduce their energy costs.

Through follow-up survey work, FPUC monitors and tracks the installation of cost-effective conservation features and/or duct leakage repairs. As a result, the increase in operating efficiencies provides for a reduction in weather-sensitive peak demand, as well as a reduction in energy consumption.

The Residential Energy Survey is a revision of the existing FPUC Residential Energy Survey. Changes since the 2010 DSM plan include deletion of the 10 CFL's that were provided previously since new lighting standards essentially require CFL's as a minimum. The on-line survey discussed as a future option in the 2010 DSM plan has now been fully implemented. While FPUC was generally on track in meeting the 2010 DSM plan projected participation rates, the 2015 DSM plan reduces projected participation rates due to the lower cost effectiveness of

the proposed Residential Energy Survey resulting from the deletion of the 10 CFL's and the expected lower customer response without the CFL's.

The Residential Energy Survey Program started with Order No. PSC-10-0678-PAA-EG issued on November 12, 2010 approving FPUC 2010 DSM Plan and Consummating Order No. PSC-10-0713-CO-EG issued on December 7, 2010. Prior to the Residential Energy Survey Program, the energy survey program was entitled GoodCents Residential Energy Survey and GoodCents Energy Survey and was in existence in 2001.

2.1.2 Participation Standards

The Residential Energy Survey Program is available to all residential customers served by FPUC. The program provides participating customers with information they need to determine which energy saving measures are better suited to their individual needs and requirements. The Residential Energy Survey Program will provide audits in accordance with Rule 25-17.003 of the Florida Administrative Code and customers will be notified of this cost-free service at least every six months as required in Rule 25-17.003.

2.1.3 Benefits and Costs

Estimates for benefits were adopted from DEF's Home Energy Check program. In addition to the estimated savings of DEF's Home Energy Check program, the savings include the savings resulting from the installation of the two LED bulbs included in the conservation kit. This program estimates a reduction in demand of 0.143 kW per customer with a 522 kWh annual energy reduction.

The estimated 2015 cost per customer for the Residential Energy Survey Program is $522 which is based on FPUC's actual 2014 Residential Energy Survey Program cost adjusted for eliminating the 10 CFL's and adding two LED bulbs.

2.1.4 Monitoring and Evaluation

The availability of the audit program is communicated to residential customers using bill inserts and other media. Each participating customer is presented with an assessment of his or her current energy situation and recommendations for improvement. FPUC can assist customers in locating qualified contractors to properly install the recommended changes.

FPUC conducts follow-up surveys after customers have implemented the specific recommendations. Data concerning these changes are accumulated so the impact of the energy surveys can be more accurately measured.

The reporting requirements for this program will follow Rule 25-17.0021 (5), Florida Administrative Code. Additionally, program expenses will be identified in the ECCR True-up and Projection filings.

2.1.5 Cost-Effectiveness

The main purpose of the energy audit is to discover energy efficiency options and changes that customers can choose to implement. Customers, on average, will choose to implement the most cost-effective options. Audit programs like this one serve energy customers by providing them with reliable information on which to base their energy efficiency decisions.

Florida Public Utilities Company
Residential Energy Survey Program

AT THE METER						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	374	0.121	0.143	37400	12.1	14.3
2016	374	0.121	0.143	37400	12.1	14.3
2017	374	0.121	0.143	37400	12.1	14.3
2018	374	0.121	0.143	37400	12.1	14.3
2019	374	0.121	0.143	37400	12.1	14.3
2020	374	0.121	0.143	37400	12.1	14.3
2021	374	0.121	0.143	37400	12.1	14.3
2022	374	0.121	0.143	37400	12.1	14.3
2023	374	0.121	0.143	37400	12.1	14.3
2024	374	0.121	0.143	37400	12.1	14.3

AT THE GENERATOR						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	386	0.1	0.2	38557	13.3	15.7
2016	386	0.1	0.2	38557	13.3	15.7
2017	386	0.1	0.2	38557	13.3	15.7
2018	386	0.1	0.2	38557	13.3	15.7
2019	386	0.1	0.2	38557	13.3	15.7
2020	386	0.1	0.2	38557	13.3	15.7
2021	386	0.1	0.2	38557	13.3	15.7
2022	386	0.1	0.2	38557	13.3	15.7
2023	386	0.1	0.2	38557	13.3	15.7
2024	386	0.1	0.2	38557	13.3	15.7

CUSTOMERS AND PARTICIPATION RATES					
YEAR	Total Number of Residential Customers	Total Number of Eligible Residential Customers	Annual Number of Program Participants	Total Penetration Level %	Cumulative Number of Program Participants*
2015	23284	23284	100	0.429	100
2016	23335	23335	100	0.857	200
2017	23387	23387	100	1.283	300
2018	23513	23513	100	1.701	400
2019	23639	23639	100	2.115	500
2020	23766	23766	100	2.525	600
2021	23894	23894	100	2.930	700
2022	24022	24022	100	3.330	800
2023	24151	24151	100	3.727	900
2024	24281	24281	100	4.118	1000

*Previously FPUC had 2,415 cumulative participants from 2001 through 2004 and 1,607 cumulative participants from 2005 through 2010, and 1,036 cumulative participants from 2011 through 2014.

2.2 Residential Heating & Cooling Efficiency Upgrade Program

2.2.1 Program Description

This program is directed at reducing the rate of growth in peak demand and energy throughout FPUC's electricity service territories. The program will do this by increasing the saturation of high-efficiency heat pumps and central air conditioning systems. The program requires that customer install a high-efficiency central air conditioning system or heat pump with a minimum 15 SEER.

The Residential Heating & Cooling Efficiency Upgrade Program focuses in two areas. The first is to incent customers operating inefficient heat pumps and air conditioners to replace them with more efficient units. The program also incents customers with resistance heating to install a new heat pump. The second area of focus for the program is to incent customers that are replacing a heat pump or air conditioner that has reached the end of its life with a more efficient heat pump or air conditioner than is required by codes and standards. The incentive to install a more efficient heat pump or air conditioner also applies to heat pumps and air conditioners being installed in new construction.

In 2014, the existing Residential Heating & Cooling Efficiency Upgrade Program resulted in heat pumps and air conditioners being installed under the program with SEER's ranging from 14 to 20 with the weighted average SEER being 2 SEER above code requirements.

The Residential Heating & Cooling Efficiency Upgrade Program is an update of an existing program to reflect current codes and standards as well as market conditions. The current program provides rebates for a 14 SEER; however, in 2015 the minimum 14 SEER becomes the standard. The program is eliminating the limitation that the residence not be a multifamily unit. The program is also being revised to allow permanant or stationary mobile homes. These revisions will make the program available to more customers and to especially focus on mobile homes which have air an conditioner with electric strip heating that could be replaced with a heat pump. These mobile homes account for a large portion of FPUC's high bill complaints especially in winter. The program is also being revised to eliminate the requirement that the customer's dwelling have ducts and allow for the new high efficiency ductless air conditioners and heat pumps. FPUC has also removed the limitations on reabtes from other utilties.

The Residential Heating & Cooling Efficiency Upgrade Program started in 2005.

2.2.2 Participation Standards

- The program applies to straight air conditioners or heat pumps.
- The program applies to replacements as well as new installations.
- Mobile homes are eligible if their wheels have been removed and they are set on a lot.

- The minimum qualifying efficiency rating for the replacement heat pump (ARI rating only) or central air conditioning system is 15.0 SEER.
- For a new heat pump installed or a heat pump being replaced, the maximum supplemental strip heating physically contained in the system shall not exceed 2 kW per nominal ton. On a system of less than 2.5 tons, a 5 kW heat strip will be allowed.
- For a heat pump using supplemental strip heating, a two-stage indoor thermostat is required.
- If replacing a straight cooling system, the residence cannot have oil or electric resistance as the primary heat source.
- HVAC contractors will submit rebate request forms to FPUC. The contractor, certifying the equipment installed in accordance with the program standards, will sign the form. The customer will sign the form verifying the equipment was installed and that the incentive recipient's name and mailing address are correct.
- The Heating and Cooling Rebate request form must be received within 1 year of the installation date of the unit to assure the payment of the dealer incentive.
- FPUC will randomly perform full field verifications on a minimum of 10 percent of the participating homes. Homes not selected for the field review will have a telephone or written verification to validate the rebate information.
- FPUC will inspect all mobile home applications to ensure that the wheels are removed and they are set on a lot.
- No payments will be made until FPUC verifies or validates rebate requests.

2.2.2.1 Rebates and Incentives.

Residential Heating & Cooling Efficiency Rebates		
	Customer Rebate	**Dealer Incentive**
Type 1	$100.00	$75.00
Type 2	$100.00	$25.00
Type 3	$100.00	$25.00
Type 4	$100.00	$25.00

Type 1 rebates and incentives are for a heat pump replacing resistance heat. Type 2 rebates and incentives are for a heat pump replacing a heat pump. Type 3 rebates and incentives

are for an air conditioner replacement. Type 4 rebates and incentives are for a new heat pump or air conditioner installation.

2.2.3 Benefits and Costs

Estimates for average benefits were updated from Energy Star data and FPUC's existing demand and energy savings for the program. This program estimates a revised reduction in demand of 1.80 kW per customer during the summer, 0.99 kW per customer during the winter, and a 3,661 kWh energy reduction annually. The FPUC nonrecurring cost is $337 per participant based on FPUC's 2014 costs and the customer cost is $1,520 based on actual customer costs for 2014.

2.2.4 Monitoring and Evaluation

Reasons for program participation and non-participation will be assessed through interviews conducted with program participants, non-participants and dealers. Depending upon the level of participation, surveys may be conducted among customers having upgraded their systems to determine customer satisfaction with the upgrades.

The reporting requirements for this program will follow Rule 25-17.0021 (5), Florida Administrative Code. Additionally, program expenses will be identified in the ECCR True-up and Projection filings.

2.2.5 Cost-Effectiveness

The cost-effectiveness FIRE model results are included in Appendix A.

Florida Public Utilities Company
Residential Heating & Cooling Efficiency Upgrade Program

AT THE METER						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	3,661	0.99	1.8	366100	99	180
2016	3,661	0.99	1.8	366100	99	180
2017	3,661	0.99	1.8	366100	99	180
2018	3,661	0.99	1.8	366100	99	180
2019	3,661	0.99	1.8	366100	99	180
2020	3,661	0.99	1.8	366100	99	180
2021	3,661	0.99	1.8	366100	99	180
2022	3,661	0.99	1.8	366100	99	180
2023	3,661	0.99	1.8	366100	99	180
2024	3,661	0.99	1.8	366100	99	180

AT THE GENERATOR						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	3774	1.1	2.0	377423	108.7	197.6
2016	3771	1.1	2.0	377083	108.7	197.6
2017	3771	1.1	2.0	377083	108.7	197.6
2018	3771	1.1	2.0	377083	108.7	197.6
2019	3771	1.1	2.0	377083	108.7	197.6
2020	3771	1.1	2.0	377083	108.7	197.6
2021	3771	1.1	2.0	377083	108.7	197.6
2022	3771	1.1	2.0	377083	108.7	197.6
2023	3771	1.1	2.0	377083	108.7	197.6
2024	3771	1.1	2.0	377083	108.7	197.6

CUSTOMERS AND PARTICIPATION RATES					
YEAR	Total Number of Residential Customers	Total Number of Eligible Residential Customers	Annual Number of Program Participants	Total Penetration Level %	Cumulative Number of Program Participants*
2015	23284	23284	100	0.429	100
2016	23335	23335	100	0.857	200
2017	23387	23387	100	1.283	300
2018	23513	23513	100	1.701	400
2019	23639	23639	100	2.115	500
2020	23766	23766	100	2.525	600
2021	23894	23894	100	2.930	700
2022	24022	24022	100	3.330	800
2023	24151	24151	100	3.727	900
2024	24281	24281	100	4.118	1000

*Previously FPUC had 906 cumulative participants from 2005 through 2010 and 1,065 cumulative participants from 2011 through 2014.

Commercial/Industrial Programs

3.1 Commercial Heating & Cooling Efficiency Upgrade Program

3.1.1 Program Description

FPUC is updating and continuing the Commercial Heating & Cooling Efficiency Upgrade Program providing rebates to small commercial customers (commercial establishments with a maximum of 5 ton units). This program is directed at reducing the rate of growth in peak demand and energy throughout FPUC's commercial sector. The program will do this by increasing the saturation of high-efficiency heat pumps and air conditioners. The program requires that customer install a high-efficiency central air conditioning system or heat pump with a minimum 15 SEER.

The Commercial Heating & Cooling Efficiency Upgrade Program is essentially the same program as the Residential Heating & Cooling Efficiency Upgrade Program only for FPUC's commercial sector.

The Commercial Heating & Cooling Efficiency Upgrade Program started in 2011 thirty days after FPUC's 2010 DSM Plan was approved. The program averaged 11 participants per year after the initial program start-up year. This DSM plan projects 10 participants per year.

3.1.2 Participation Standards

- The program applies to all non-residential customers.
- The program does not apply to units greater than 5 tons.
- The participation standards of the Residential Heating and Cooling Efficiency Upgrade program apply.

3.1.3 Rebates and Incentives.

Residential Heating & Cooling Efficiency Rebates		
	Customer Rebate	**Dealer Incentive**
Type 1	$100.00	$75.00
Type 2	$100.00	$25.00
Type 3	$100.00	$25.00
Type 4	$100.00	$25.00

Type 1 rebates and incentives are for a heat pump replacing resistance heat. Type 2 rebates and incentives are for a heat pump replacing a heat pump. Type 3 rebates and incentives are for an air conditioner replacement. Type 4 rebates and incentives are for a new heat pump or air conditioner installation.

3.1.4 Benefits and Costs

Demand and energy savings and customer cost are the same as those projected for the Residential Heating & Cooling Efficiency Upgrade Program. FPUC nonrecurring cost are projected to be $553 per participant based on FPUC's actual costs reflecting a higher cost than for the Residential Heating & Cooling Efficiency Upgrade Program due to the fewer number of participants.

3.1.5 Monitoring and Evaluation

Reasons for program participation and non-participation will be assessed through interviews conducted with program participants, non-participants and dealers. Depending upon the level of participation, surveys may be conducted among customers having upgraded their systems to determine customer satisfaction with the upgrades.

The reporting requirements for this program will follow Rule 25-17.0021 (5), Florida Administrative Code. Additionally, program expenses will be identified in the ECCR True-up and Projection filings.

3.1.6 Cost-Effectiveness

The cost-effectiveness FIRE model results are included in Appendix A.

Florida Public Utilities Company
Commercial Heating & Cooling Efficiency Upgrade Program

AT THE METER						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	3,661	0.99	1.8	36610	9.9	18
2016	3,661	0.99	1.8	36610	9.9	18
2017	3,661	0.99	1.8	36610	9.9	18
2018	3,661	0.99	1.8	36610	9.9	18
2019	3,661	0.99	1.8	36610	9.9	18
2020	3,661	0.99	1.8	36610	9.9	18
2021	3,661	0.99	1.8	36610	9.9	18
2022	3,661	0.99	1.8	36610	9.9	18
2023	3,661	0.99	1.8	36610	9.9	18
2024	3,661	0.99	1.8	36610	9.9	18
AT THE GENERATOR						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	3774	1.1	2.0	37742	10.9	19.8
2016	3774	1.1	2.0	37742	10.9	19.8
2017	3774	1.1	2.0	37742	10.9	19.8
2018	3774	1.1	2.0	37742	10.9	19.8
2019	3774	1.1	2.0	37742	10.9	19.8
2020	3774	1.1	2.0	37742	10.9	19.8
2021	3774	1.1	2.0	37742	10.9	19.8
2022	3774	1.1	2.0	37742	10.9	19.8
2023	3774	1.1	2.0	37742	10.9	19.8
2024	3774	1.1	2.0	37742	10.9	19.8

CUSTOMERS AND PARTICIPATION RATES					
YEAR	Total Number of Residential Customers	Total Number of Eligible Residential Customers	Annual Number of Program Participants	Total Penetration Level %	Cumulative Number of Program Participants*
2015	4275	4275	10	0.234	10
2016	4275	4275	10	0.468	20
2017	4275	4275	10	0.702	30
2018	4275	4275	10	0.936	40
2019	4275	4275	10	1.170	50
2020	4275	4275	10	1.404	60
2021	4275	4275	10	1.637	70
2022	4275	4275	10	1.871	80
2023	4275	4275	10	2.105	90
2024	4275	4275	10	2.339	100

* Previously FPUC had 34 cumulative participants from 2011 through 2014.

Commercial Chiller Upgrade Program

3.2.1 Program Description

The Commercial Chiller Upgrade Program is a continuation of the current program with updated costs and savings. The program is directed at reducing the rate of growth in peak demand and energy throughout FPUC's commercial/industrial sector. To serve this purpose, this program requires that commercial/industrial customers replace existing chillers with a more efficient system. By doing so, they will qualify for an incentive of up to $175 per kW of additional savings above the minimum efficiency levels.

The program covers water-cooled centrifugal chillers, water-cooled scroll or screw chillers, and air-cooled electric chillers. Minimum qualifications for efficiency exist for each of the chiller types based on size and are presented in the participation standards section of this program description. Interested customers will send project proposals to FPUC and a representative will schedule an on-site visit for inspection prior to installation. After the project is completed, a FPUC representative will conduct an on-site inspection. By following the guidelines, the customer will qualify for the rebate. The program started in 2011.

3.2.2 Participation Standards

- The program applies to all FPUC non-residential customers.
- Minimum qualifications for new chillers are as follows:
  - Water-Cooled Centrifugal Chillers:
    1. Under 150 tons = 0.65 kW/ton with a 5.4 COP
    2. 150 - 300 tons = 0.60 kW/ton with a 5.9 COP
    3. Over 300 tons = 0.56 kW/ton with a 6.3 COP
  - Water-Cooled Scroll or Screw Chillers:
    1. Under 150 tons = 0.72 kW/ton with a 4.9 COP
    2. 150 - 300 tons = 0.66 kW/ton with a 5.3 COP
    3. Over 300 tons = 0.59 kW/ton with a 5.9 COP
  - Air-Cooled Electric Chillers (any size):
    1. Any size = 1.17 kW/ton with a 3.0 COP

3.2.3 Benefits and Costs

Estimates for benefits were adopted from TECO's Commercial Chiller Upgrade program. This program estimates a 42.8 kW and 31.7 kW reduction per customer during the summer and winter, respectively. The program estimates a 81,943 kWh energy reduction annually per customer. The utility nonrecurring cost is $6,382 based on actual costs for FPUC in 2014.

3.2.4 Monitoring and Evaluation

Reasons for program participation and non-participation will be assessed through interviews conducted with program participants and non-participants. Depending upon the level of participation, surveys may be conducted among customers having upgraded chillers to determine customer satisfaction.

The reporting requirements for this program will follow Rule 25-17.0021 (5), Florida Administrative Code. Additionally, program expenses will be identified in the ECCR True-up and Projection filings.

3.2.5 Cost-Effectiveness

The cost-effectiveness FIRE model results are included in Appendix A.

Florida Public Utilities Company
Commercial Chiller Upgrade Program

AT THE METER						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	81,943	31.7	42.8	81943	31.7	42.8
2016	81,943	31.7	42.8	81943	31.7	42.8
2017	81,943	31.7	42.8	81943	31.7	42.8
2018	81,943	31.7	42.8	81943	31.7	42.8
2019	81,943	31.7	42.8	81943	31.7	42.8
2020	81,943	31.7	42.8	163886	63.4	85.6
2021	81,943	31.7	42.8	163886	63.4	85.6
2022	81,943	31.7	42.8	163886	63.4	85.6
2023	81,943	31.7	42.8	163886	63.4	85.6
2024	81,943	31.7	42.8	163886	63.4	85.6

AT THE GENERATOR						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	84477	34.8	47.0	84477	34.8	47.0
2016	84477	34.8	47.0	84477	34.8	47.0
2017	84477	34.8	47.0	84477	34.8	47.0
2018	84477	34.8	47.0	84477	34.8	47.0
2019	84477	34.8	47.0	84477	34.8	47.0
2020	84477	34.8	47.0	168955	69.6	94.0
2021	84477	34.8	47.0	168955	69.6	94.0
2022	84477	34.8	47.0	168955	69.6	94.0
2023	84477	34.8	47.0	168955	69.6	94.0
2024	84477	34.8	47.0	168955	69.6	94.0

CUSTOMERS AND PARTICIPATION RATES					
YEAR	Total Number of Residential Customers	Total Number of Eligible Residential Customers	Annual Number of Program Participants	Total Penetration Level %	Cumulative Number of Program Participants*
2015	4275	4275	1	0.023	1
2016	4275	4285	1	0.047	2
2017	4275	4294	1	0.070	3
2018	4275	4317	1	0.094	4
2019	4275	4340	1	0.117	5
2020	4275	4364	2	0.164	7
2021	4275	4387	2	0.211	9
2022	4275	4411	2	0.257	11
2023	4275	4435	2	0.304	13
2024	4275	4458	2	0.351	15

3.3 Commercial Reflective Roof Program

3.3.1 Program Description

The Commercial Reflective Roof Program is a new program that provides rebates to nonresidential customers that either convert their existing roof to a cool roof or install a new cool roof on an existing building or a new building. The rebate covers up to 25% of the incremental cost of providing the cool roof compared to a standard roof. Rebates will be $0.075 per sq ft for new roofs on new or existing facilities and $0.325 per sq ft for roofs converting to a cool roof. Roofing material must be Energy Star certified in all cases. The program will reduce energy and demand required for cooling. Participation rates are measured per 1000 sq. ft. of roof.

FPUC will work with roofing contractors to promote the program in a manner similar to the Residential and Commercial Heating & Cooling Upgrade Programs. The roofing contractors will provide copies of their proposal to provide roofing services for FPUC's customers. FPUC will inspect the roof before work begins and after the work is completed. FPUC will make the determination of which level of rebate will apply to the project and that the project qualifies for a rebate by using Energy Star certified materials.

The program will start upon approval of FPUC's 2015 DSM Plan and Program Standards. Because time will be required to develop relationships with the roofing contractors to promote the program, no participants in the program are projected in 2015.

3.3.2 Participation Standards

- The program applies to all FPUC non-residential customers.
- Roofs must cover air conditioned space.
- Roofing material must be Energy Star certified.

3.3.3 Benefits and Costs

Estimates for benefits were taken from the Commercial Reflective Roof measure of Gulf's Commercial Building Efficiency Program. The program estimates a 0.91 kW demand and 2,450 kWh energy saving per 1000 sq ft of cool roof installed. The utility nonrecurring cost is assumed to be $110.60 per 1000 sq ft. The utility nonrecurring costs are assumed to be the same as for the Commercial Heating & Cooling Efficiency Upgrade Program due to the similarity of the programs assuming an average of 5000 sq ft of roof per project. The rebate values if $0.075 per sq ft for new roofs and $0.325 per sq ft for cool roof conversions were developed as the average of ranges for the different roofing technologies.

3.3.4 Monitoring and Evaluation

Reasons for program participation and non-participation will be assessed through interviews conducted with program participants and non-participants. Depending upon the level

of participation, surveys may be conducted among customers to determine customer satisfaction.

The reporting requirements for this program will follow Rule 25-17.0021 (5), Florida Administrative Code. Additionally, program expenses will be identified in the ECCR True-up and Projection filings.

Revised Table Submitted on March 19th 2015 (01614-15)

Florida Public Utilities Company
Commercial Reflective Roof Program

AT THE METER						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	2,450	0	0.91	0	0	0
2016	2,450	0	0.91	12250	0	4.55
2017	2,450	0	0.91	24500	0	9.1
2018	2,450	0	0.91	36750	0	13.65
2019	2,450	0	0.91	49000	0	18.2
2020	2,450	0	0.91	61250	0	22.75
2021	2,450	0	0.91	61250	0	22.75
2022	2,450	0	0.91	61250	0	22.75
2023	2,450	0	0.91	61250	0	22.75
2024	2,450	0	0.91	61250	0	22.75

AT THE GENERATOR						
YEAR	Per Customer kWh Reduction	Per Customer Winter kW Reduction	Per Customer Summer kW Reduction	Total Annual kWh Reduction	Total Annual Winter kW Reduction	Total Annual Summer kW Reduction
2015	2526	0.0	1.0	0	0.0	0.0
2016	2526	0.0	1.0	12629	0.0	5.0
2017	2526	0.0	1.0	25258	0.0	9.9
2018	2526	0.0	1.0	37887	0.0	14.9
2019	2526	0.0	1.0	50515	0.0	19.8
2020	2526	0.0	1.0	63144	0.0	24.8
2021	2526	0.0	1.0	63144	0.0	24.8
2022	2526	0.0	1.0	63144	0.0	24.8
2023	2526	0.0	1.0	63144	0.0	24.8
2024	2526	0.0	1.0	63144	0.0	24.8

CUSTOMERS AND PARTICIPATION RATES					
YEAR	Total Number of Residential Customers	Total Number of Eligible Residential Customers	Annual Number of Program Participants	Total Penetration Level %	Cumulative Number of Program Participants*
2015	13600	13600	0	0.000	0
2016	13600	13600	5	0.037	5
2017	13600	13600	10	0.110	15
2018	13600	13600	15	0.221	30
2019	13600	13600	20	0.368	50
2020	13600	13600	25	0.551	75
2021	13600	13600	25	0.735	100
2022	13600	13600	25	0.919	125
2023	13600	13600	25	1.103	150
2024	13600	13600	25	1.287	175

4.0 Energy Education Programs

4.1 Conservation Demonstration and Development (CDD) Program

4.1.1 Program Description

The primary purpose of the Conservation Demonstration and Development (CDD) program is to pursue research, development, and demonstration projects designed to promote energy efficiency and conservation. This program will supplement and complement the other demand-side management programs offered by FPUC.

The CDD program is meant to be an umbrella program for the identification, development, demonstration, and evaluation of promising new end-use technologies and or energy efficiency measures. The CDD program does not focus on any specific end-use technology but, instead, will address a wide variety of energy applications.

4.1.2 Participation Standards

The projects that may be studied within this program will vary greatly and, therefore, will need careful screening. The screening criteria will include the potential for peak demand and energy reductions, the technology's state-of-development, and an evaluation of the degree of potential customer acceptance and marketability.

The activities that may take place under the auspices of this program include:

- Literature searches and reviews.
- Engineering appraisals.
- Financial analyses of promising programs, projects or technologies.
- Baseline data collection.
- Field-testing with customers.
- Technology demonstrations.
- Pilot programs.

Field-testing will be limited to the demonstration of emerging end-use technologies that meet the guidelines described in the Program Description section above. Funding for the field-testing will be constrained by this program's expenditure limitations. If any field-testing or pilot projects require funding beyond these limitations and if FPUC believes them necessary, the Florida Public Service Commission will be asked to specifically approve them for Energy Conservation Cost Recovery.

Florida Public Utilities Company will limit the total CDD expenditures to a maximum of $75,000 per year. The Company will also notify the Florida Public Service Commission of any

CDD project that exceeds $15,000. Costs for CDD projects that meet the program's criteria for acceptance will be charged to Energy Conservation Cost Recovery account.

The projects undertaken by this program are research and development projects. The levels of costs and benefits and the potential peak demand and energy reductions are not known with sufficient certainty. The major thrust of the activities performed under the CDD program will be to develop better estimates of these economic drivers.

4.1.3 Benefits and Costs

This program will enable FPUC to "pursue research, development, and demonstration projects designed to promote energy efficiency and conservation" as stated in the FPSC Order No. 22176 issued November 14, 1989, in Docket No. 890737-PU and is consistent with meeting the goals in Rule 25-17.001 of the Florida Administrative Code.

CDD projects will enable the collection of actual data from field tests. Engineering estimates and modeling techniques can be tested and validated. Future cost-benefit analyses for the subject CDD projects will be more reliable, thereby enabling better assessments of the expected future peak demand and energy conservation potential.

CDD projects will uncover implementation barriers and potential disadvantages thereby enabling customer acceptance and satisfaction to be better gauged. These are important things to learn. Customer response will ultimately determine the success of new ideas and products.

4.1.4 Monitoring and Evaluation

Any technology investigated as a CDD project will be investigated using well-accepted methods of measurement and evaluation. Before any project is approved for study, the project's justification will be clearly documented. The justification will include:

- Detailed project description (a-priori).
- Research design plan.
- Project potential.
- Project alignment with CDD program goals.
- Project costs.

All expenditures allocated to this program will be properly accounted for and reported.

All approved CDD projects that do not require field-testing will be fully documented. The documentation will include descriptions of the methodology, modeling, and engineering estimation procedures used to justify the study's results and conclusions.

Specific deliverables that will be provided from all CDD projects include:

- Detailed project description (a-posteriori).
- Conservation potential.
    - Achieved.
    - Projected..

- Technical evaluation.
- Cost-benefit considerations.
- Customer acceptance.
    - Achieved with test subjects.
    - Projected.

These findings will be reported and filed with the Florida Public Service Commission's staff for their review and consideration.

4.1.5 Cost-Effectiveness

Standard cost-effectiveness analysis is not applicable for research and development activities. The purpose of these activities is to discover promising energy efficiency options and changes that customers may someday choose to implement. Customers, on average, will choose to implement the most cost-effective options. Programs like this one serves FPUC and its energy customers by garnering new, reliable information upon which to base future demand-side management programs and services.

4.2 *Low Income Energy Outreach Program*

4.2.1 Program Description

The Low Income Energy Outreach Program is an educational program designed to enhance the effectiveness of existing weatherization programs for low-income households. FPUC's Low Income Energy Outreach Program partners with Department of Economic Opportunity approved Low Income Weatherization Program operators by offering Residential Energy Surveys scheduled by the Low Income Weatherization Program operators, weatherization contractor training, distributing energy efficiency educational literature to participants, and hosting energy conservation events customized for low income households. The Low Income Energy Outreach Program consists of the following four major components:

Residential Energy Surveys:

The Low Income Weatherization Program operators will be responsible for scheduling Residential Energy Surveys to be conducted by FPUC with the low-income households. The Low Income Weatherization Program operators are in the best position to identify low-income households that would benefit from the Residential Energy Surveys. For instance households that have already received conservation audits from the Low Income Weatherization Program operators will not need to receive a Residential Energy Survey from FPUC. Each low-income household receiving a FPUC Residential Energy Survey will receive an Energy Conservation Kit from FPUC which contains chalking, weather stripping, two LED bulbs, lighting and wall socket insulation, and a water temperature thermometer. While Energy Conservation Kit components provide demand and energy savings, the intent of the kit is to provide samples of these low cost energy conservation measures that can easily be implemented by the low-income households.

Contractor Training:

Training will be provided by FPUC to educate and inform weatherization contractors about thermal envelope improvement best practices, product procurement ideas, and emerging weatherization strategies. Training events will occur on an annual basis throughout each of the counties FPUC serves. These efforts will include coordination with the Weatherization Assistance Program Technical Assistance Center.

Demographic Targeted Energy Materials:

Energy Conservation materials that are specifically geared towards low income households will be compiled by FPUC and provided by the approved weatherization organization performing the energy improvements.

Community Conservation Events:

Annual Community Conservation events will be conducted in each of the territories that FPUC serves. These events will educate and inform low income households about the weatherization programs offered in their county and depending upon the event each participant will receive FPUC's Energy Conservation Kit along with information about reading electric bills and energy conservation tips.

4.2.2 Participation Standards

Eligibility standards for the Low Income Energy Outreach Program apply to both the Weatherization program operators as well as the FPUC Residential customers.

Weatherization Organization Partnership Requirements:

Each low income weatherization organization partner must comply with the Florida Department of Economic Opportunity policy of using weatherization organizations that have been approved by the county with which they operate as provided within the following link: http://www.floridajobs.org/community-planning-and-development/community-services/weatherization-assistance-program/contact-your-local-weatherization-office-for-help

Residential Customer Participant Eligibility Requirements:

The low income household must have a residential electric service account with FPUC, must meet the income verification requirements specified by the local low income weatherization organization, the home must be greater than 3 years old, and the customer must receive a FPUC Residential Energy Survey if deemed required by the low income weatherization organization

4.2.3 Benefits and Costs

The main purpose of the Low Income Energy Outreach Program is designed to ensure that low income households are implementing all the necessary energy efficiency measures available. Customers participating in this program are likely to have the thermal efficiency and weatherization improvements implemented by the eligible weatherization program operator. Program costs include funding for the four components of this program, which are designed to benefit the 8434 eligible low income residents in the four counties that FPUC Electric Division operates.

4.2.4 Monitoring & Evaluation

The Low Income Energy Outreach Program will primarily be made available to eligible customers through the Low Income Weatherization Program operators. The availability of the Low Income Energy Outreach Program will also be communicated to residential customers using traditional mediums such as bill inserts, newspaper advertisements, and social media. FPUC conducts follow-up surveys after customers have received Residential Energy Surveys. For Low Income Energy Outreach Participants not receiving a FPUC Residential Energy Survey, the Low Income Weatherization Program operator will be responsible for providing FPUC the participant information and FPUC will conduct a follow-up survey similar to that conducted for the Residential Energy Survey participants. Data concerning conservation measures implemented are accumulated so the impact of the program can be more accurately measured. FPUC will also seek feedback and ongoing discussion with Low Income Weatherization Program operators to continuously explore options for improvements for communicating the availability of the program to eligible residential customers.

4.2.5 Cost Effectiveness

The Low Income Energy Outreach Program is designed as an educational and outreach program and not as an incentive-based program. Traditional cost effectiveness analysis was not performed for this educational program.

4.3 Commercial Energy Consultation Program

The Florida Public Utilities Company Commercial Energy Consultation Program is designed to directly communicate the availability of the commercial DSM programs to commercial customers. This program allows for FPUC energy conservation representatives to conduct commercial site visits to educate customers about FPUC's commercial DSM programs, assess the potential for applicable DSM Programs, conduct an electric bill review, offer commercial energy savings suggestions, and inform customer about FPUC's commercial online energy efficiency resources and tools.

Commercial customers seeking to participate in the Commercial Energy Consultation Program are expected to schedule the consultation by calling 800.427.7712.

Appendix A
Cost Effectiveness Evaluation

Appendix A
Cost Effectiveness Evaluation

This appendix presents the results of the cost-effectiveness tests performed on the Demand-Side Management (DSM) programs described in FPUC's 2015 DSM Plan. The cost-effectiveness tests were performed using the Florida Integrated Resource Evaluator (FIRE) model, which has been previously relied upon by the Florida Public Service Commission (PSC) in evaluating DSM measures. The FIRE model was selected for use in evaluating the cost-effectiveness of FPUC's DSM programs as it considers the cost-effectiveness tests required pursuant to Rule 27-17.008, Florida Administrative Code (F.A.C). The FIRE model provides output in a format that is consistent with the requirements of the *Florida Public Service Commission Cost Effectiveness Manual For Demand Side Management Programs and Self-Service Wheeling Proposals*, which is incorporated by reference into Rule 27-17.008.

The remainder of this appendix presents a description of the FIRE model, a qualitative, general discussion of the cost-effectiveness evaluations, a summary of the cost-effectiveness results, and the FIRE model output reports for each of FPUC's DSM programs presented in FPUC's DSM Plan.

A.1 Overview of the FIRE Model

The FIRE model is a computer-based program originally developed by Florida Power Corporation (now Duke Energy Florida, Inc. or DEF) in 1992 in order to evaluate the cost-effectiveness of DSM. The output format of the model was originally developed to be consistent with the specifications of the Florida Public Service Commission and amended Rule 25-17.008 F.A.C. issued on July 2, 1991. The FIRE model has been used to evaluate the cost-effectiveness of DSM in numerous Dockets.

The FIRE model presents cost-effectiveness evaluations of three different tests - the Total Resources Cost (TRC) test, the Participant Test, and the Rate Impact (RIM) Test. The cost-effectiveness of each measure is developed with respect to a so-called "avoided unit." The utility avoids construction of this unit through the implementation of a DSM program to slow the

growth of energy demand. The cost of each DSM program is compared with the equivalent costs associated with the construction and operation of the avoided unit. Depending on the demand-side program under analysis, this avoided unit may be avoided completely, may be deferred to a date further in the future, or may be supplanted by a different unit type due to changes in the utility's need profile. For FPUC, this avoided unit is replaced by purchase power since FPUC purchases all of its power.

The FIRE model requires two different types of input files: an input file containing data specific to the avoided unit and an input file containing data specific to the DSM program to be evaluated. The FIRE model provides various output sheets, including the three cost-effectiveness tests (RIM, Participant, and TRC tests).

A.2 FIRE Model Cost-Effectiveness Test

The three FIRE model cost effectiveness tests are explained as follows:

- RIM Test--The Rate Impact Test is used to best approximate the effect that the implementation of a particular measure would have upon a utility's rate payers. Costs and benefits related to the cash flow of a utility are incorporated into this test.
- Participant Test--The Participant Test measures the effect of the DSM measure on the participating customers. Only costs and benefits directly related to these customers are included in the analysis. Rebates or incentives available for participation in the demand-side program are included while their associated costs to the utility are ignored.
- TRC Test--The purpose of the TRC test is to measure the overall benefit-to-cost ratio of the demand-side program. This test incorporates the cost to both the utility and the participant. Additional externalities may also included if they can be quantified. Costs to the utility and to the participating customer are included, while any transfer payments between the utility and its customers are not. These internal transfers are a cost to one party and a direct benefit to another and cancel out in the overall analysis.

A.3 General Discussion of the Cost-Effectiveness Results

As discussed previously, the FIRE model was used to evaluate the cost-effectiveness of the DSM programs included in FPUC's 2015 DSM Plan. The FIRE model was selected as it is a model which has been used in numerous PSC proceedings and also because it provides output in a format consistent with PSC requirements for reporting the cost-effectiveness of DSM. For

purposes of FPUC's DSM Plan, the avoided unit costs are the projected purchase power costs. Given that that PSC approved numeric conservation goals for the 2015 through 2024 period, the FIRE model evaluation was performed for the same 10 year period. It should be noted that several of FPUC's DSM programs involve conservation measures with expected lives that exceed 10 years (i.e., heat pump rebates, roof rebates, chiller upgrade, etc). As such, utilizing a 10 year evaluation period does not capture the entire life cycle benefits of those types of measures.

Another factor to consider when viewing the results of the cost-effectiveness analyses presented herein is that the program-specific assumptions were intended to be representative of FPUC's average customer base. That is, energy savings corresponding to a given program were based on what may be achieved for a typical customer. However, it may not be correct to assume that the types of customers that participate in a given program are representative of an average customer profile. Stated otherwise, those customers that may choose to participate in a given DSM program will do so based on consideration of their own personal energy usage, their discretionary income, and other, non-quantifiable factors (such as the non-monetary value they place on energy efficiency).

When reviewing the results of the cost-effectiveness evaluations, all of the aforementioned factors should be considered. Taking such factors into consideration, the results of the cost-effectiveness evaluations should be viewed as useful for informational purposes, but not a definitive determinant of the overall benefits associated with FPUC's DSM programs.

A.4 Summary of Cost-Effectiveness Results

The following table presents the cost-effectiveness of each of FPUC's programs for the RIM, Participant, and TRC test.

Summary of Cost-Effectiveness Results			
Program	**Rate Impact Test**	**Participants Test**	**Total Resource Cost Test**
Residential			
Energy Survey	0.14	1.00	0.18
Heating & Cooling Efficiency	1.22	1.40	1.47
Commercial			
Heating & Cooling Efficiency	1.14	1.37	1.31
Chiller Upgrade	1.14	1.39	1.35
Reflective Roof	1.01	1.39	1.17

A-5 Residential Energy Survey

INPUT DATA -- PART 1

PROGRAM: Residential Energy Survey Program

I. PROGRAM DEMAND SAVINGS AND LINE LOSSES

(1) CUSTOMER KW REDUCTION AT THE METER	0.143	KW /CUST
(2) GENERATOR KW REDUCTION PER CUSTOMER	0.157	KW GEN/CUST
(3) KW LINE LOSS PERCENTAGE	8.9	%
(4) GENERATION KWH REDUCTION PER CUSTOMER	385.6	KWH/CUST/YR
(5) KWH LINE LOSS PERCENTAGE	3.0	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER KWH PROGRAM INCREASE AT METER	0.0	KWH/CUST/YR
(8)* CUSTOMER KWH REDUCTION AT METER	374	KWH/CUST/YR

II. ECONOMIC LIFE AND K FACTORS

(1) STUDY PERIOD FOR CONSERVATION PROGRAM	10	YEARS
(2) GENERATOR ECONOMIC LIFE	10	YEARS
(3) T & D ECONOMIC LIFE	10	YEARS
(4) K FACTOR FOR GENERATION	0.00	
(5) K FACTOR FOR T & D	0.00	
(6)* SWITCH REV REQ(0) OR VAL-OF-DEF (1)	1	

III. UTILITY AND CUSTOMER COSTS

(1)** UTILITY NONRECURRING COST PER CUSTOMER	522.00	$/CUST
(2)** UTILITY RECURRING COST PER CUSTOMER	0.00	$/CUST/YR
(3) UTILITY COST ESCALATION RATE	2.30	%
(4) CUSTOMER EQUIPMENT COST	0.00	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	0.00	%
(6) CUSTOMER O & M COST	0.00	$/CUST/YR
(7) CUSTOMER O & M ESCALATION RATE	2.30	%
(8)* CUSTOMER TAX CREDIT PER INSTALLATION	0.00	$/CUST
(9)* CUSTOMER TAX CREDIT ESCALATION RATE	0.0	%
(10)* INCREASED SUPPLY COSTS	0.00	$/CUST/YR
(11)* SUPPLY COSTS ESCALATION RATE	2.30	%
(12)* UTILITY DISCOUNT RATE	7.19	%
(13)* UTILITY AFUDC RATE	0.00	%
(14)* UTILITY NON RECURRING REBATE/INCENTIVE	0.00	$/CUST
(15)* UTILITY RECURRING REBATE/INCENTIVE	0.00	$/CUST/YR
(16)* UTILITY REBATE/INCENTIVE ESCAL RATE	0.0	%

IV. AVOIDED GENERATOR, TRANS. AND DIST. COSTS

(1) BASE YEAR	2015	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2015	
(3) IN-SERVICE YEAR FOR AVOIDED T & D	2015	
(4) BASE YEAR AVOIDED GENERATING UNIT COST	0	$/KW
(5) BASE YEAR AVOIDED TRANSMISSION COST	0	$/KW
(6) BASE YEAR DISTRIBUTION COST	0	$/KW
(7) GEN, TRAN, & DIST COST ESCALATION RATE	0	%
(8) GENERATOR FIXED O & M COST	0	$/KW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	0	%
(10) TRANSMISSION FIXED O & M COST	0.89	$/KW/YR
(11) DISTRIBUTION FIXED O & M COST	22.01	$/KW/YR
(12) T&D FIXED O&M ESCALATION RATE	2.3	%
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0	CENTS/KWH
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	0	%
(15) GENERATOR CAPACITY FACTOR	48.8	%
(16) AVOIDED GENERATING UNIT FUEL COST	5.446	CENTS/KWH
(17) AVOIDED GEN UNIT FUEL ESCALATION RATE	0.09	%
(18)* AVOIDED PURCHASE CAPACITY COST PER KW	172.18	$/KW/YR
(19)* CAPACITY COST ESCALATION RATE	2.71	%

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON-FUEL COST IN CUSTOMER BILL	7.687	CENTS/KWH
(2) NON-FUEL ESCALATION RATE	1.15	%
(3) CUSTOMER DEMAND CHARGE PER KW	0.00	$/KW/MO
(4) DEMAND CHARGE ESCALATION RATE	0.00	%
(5)* DIVERSITY and ANNUAL DEMAND ADJUSTMENT FACTOR FOR CUSTOMER BILL	1.0	

* FIRE Program Version Number: 1.03

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

** NONRECURRING & RECURRING COSTS IN INPUTS III.(1 & 2) DO NOT INCLUDE CUSTOMER REBATES PAID BY THE UTILITY. UTILITY REBATES ARE INPUT IN III.(14 & 15).

PROGRAM: Residential Heating & Cooling Efficiency Upgrade Program

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	AVOIDED MARGINAL FUEL COST (C/KWH)	INCREASED MARGINAL FUEL COST (C/KWH)	REPLACEMENT FUEL COST (C/KWH)	PROGRAM KW EFFECTIVENESS FACTOR	PROGRAM KWH EFFECTIVENESS FACTOR
2015	100	50	5.454	5.454	5.454	5.45	1	1
2016	200	150	5.369	5.369	5.369	5.369	1	1
2017	300	250	5.418	5.418	5.418	5.418	1	1
2018	400	350	5.467	5.467	5.467	5.467	1	1
2019	500	450	5.310	5.310	5.310	5.310	1	1
2020	600	550	5.214	5.214	5.214	5.214	1	1
2021	700	650	5.295	5.295	5.295	5.295	1	1
2022	800	750	5.335	5.335	5.335	5.335	1	1
2023	900	850	5.491	5.491	5.491	5.491	1	1
2024	1000	950	5.565	5.565	5.565	5.565	1	1

AVOIDED GENERATION UNIT BENEFITS

PROGRAM: Residential Energy Survey Program

* UNIT SIZE OF AVOIDED GENERATION UNIT = 0.16 kW
* INSERVICE COSTS OF AVOIDED GEN. UNIT (000) = $0

(1) Year	(1A)* VALUE OF DEFERRAL FACTOR	(2) AVOIDED GEN UNIT CAPACITY COST $(000)	(2A)* AVOIDED ANNUAL UNIT KWH GEN (000)	(3) AVOIDED UNIT FIXED O&M COST $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M COST $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(6A) AVOIDED PURCHASED CAPACITY COSTS $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.140	0.14
2016	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.421	0.42
2017	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.704	0.70
2018	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.995	0.99
2019	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	1.290	1.29
2020	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	2.234	2.23
2021	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	2.881	2.88
2022	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	3.361	3.36
2023	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	3.761	3.76
2024	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	4.250	4.25
NOMINAL		0.00	0.00	0.00	0.00	0.00	0.00	20.04	20.04
NPV		0.00		0.00	0.00	0.00	0.00	12.91	12.91

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

AVOIDED T & D AND PROGRAM FUEL BENEFITS

PROGRAM: Residential Energy Survey Program

* INSERVICE COSTS OF AVOIDED TRANS. (000) = $0

* INSERVICE COSTS OF AVOIDED DIST. (000) = $0

(1) Year	(2) AVOIDED TRANSMISSION CAPACITY COST $(000)	(3) AVOIDED TRANSMISSION O&M COST (000)	(4) TOTAL AVOIDED TRANSMISSION COST $(000)	(5) AVOIDED DISTRIBUTION CAPACITY COST $(000)	(6) AVOIDED DISTRIBUTION O&M COST $(000)	(7) TOTAL AVOIDED DISTRIBUTION COST $(000)	(8) PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0007	0.0007	0.00	0.02	0.02	1.05
2016	0.00	0.0021	0.0021	0.00	0.05	0.05	3.11
2017	0.00	0.0037	0.0037	0.00	0.09	0.09	5.22
2018	0.00	0.0052	0.0052	0.00	0.13	0.13	7.38
2019	0.00	0.0069	0.0069	0.00	0.17	0.17	9.21
2020	0.00	0.0086	0.0086	0.00	0.21	0.21	11.06
2021	0.00	0.0104	0.0104	0.00	0.26	0.26	13.27
2022	0.00	0.0123	0.0123	0.00	0.30	0.30	15.43
2023	0.00	0.0142	0.0142	0.00	0.35	0.35	18.00
2024	0.00	0.0163	0.0163	0.00	0.40	0.40	20.38
NOMINAL	0.00	0.08	0.08	0.00	1.99	1.99	104.10
NPV	0.00	0.05	0.05	0.00	1.30	1.30	68.75

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET : DSM PROGRAM FUEL SAVINGS
PROGRAM: Residential Energy Survey Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	REDUCTION IN KWH GENERATION NET NEW CUST KWH (000)	AVOIDED MARGINAL FUEL COST - REDUCED KWH $(000)	INCREASE IN KWH GENERATION NET NEW CUST KWH (000)	INCREASED MARGINAL FUEL COST - INCREASE KWH $(000)	NET AVOIDED PROGRAM FUEL SAVINGS $(000)	EFFECTIVE PROGRAM FUEL SAVINGS $(000)
2015	19.28	1.0514	0.0000	0.0000	1.0514	1.0514
2016	57.84	3.1052	0.0000	0.0000	3.1052	3.1052
2017	96.39	5.2225	0.0000	0.0000	5.2225	5.2225
2018	134.95	7.3776	0.0000	0.0000	7.3776	7.3776
2019	173.51	9.2131	0.0000	0.0000	9.2131	9.2131
2020	212.06	11.0569	0.0000	0.0000	11.0569	11.0569
2021	250.62	13.2703	0.0000	0.0000	13.2703	13.2703
2022	289.18	15.4275	0.0000	0.0000	15.4275	15.4275
2023	327.73	17.9958	0.0000	0.0000	17.9958	17.9958
2024	366.29	20.3840	0.0000	0.0000	20.3840	20.3840
NOMINAL	1,927.8351	104.1042	0.0000	0.0000	104.1042	104.1042
NPV		68.7526	0.0000	0.0000	68.7526	68.7526

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET: UTILITY COSTS, PARTICIPANT COSTS, AND REV LOSS/GAIN
PROGRAM: Residential Energy Survey Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	<------ UTILITY PROGRAM COSTS & REBATES ---------->						<---------- PARTICIPATING CUSTOMER COSTS & BENEFITS---------->										
YEAR	UTIL NONREC. COSTS $(000)	UTIL RECUR COSTS $(000)	TOTAL UTIL PGM COSTS $(000)	UTIL NONREC. REBATES $(000)	UTIL RECUR. REBATES $(000)	TOTAL REBATE/ INCENT. COSTS $(000)	PARTIC. CUST EQUIP COSTS $(000)	PARTIC. CUST O & M COSTS $(000)	TOTAL PARTIC. CUST COSTS $(000)	REDUCT. IN CUST. KWH (000)	RED. REV. - FUEL PORTION $(000)	RED. REV. NONFUEL PORTION $(000)	EFFECT. REV. REDUCT. IN BILL $(000)	INC. IN CUST. KWH (000)	INC. REV. - FUEL PORTION $(000)	INC. REV. NONFUEL PORTION	EFFECT. REVENUE INC. IN BILL $(000)
2015	52.2000	0.0000	52.2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	18.70	1.0199	1.4375	2.4574	0.0000	0.0000	0.0000	0.0000
2016	53.4006	0.0000	53.4006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	56.10	3.0120	4.3620	7.3740	0.0000	0.0000	0.0000	0.0000
2017	54.6288	0.0000	54.6288	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	93.50	5.0658	7.3545	12.4203	0.0000	0.0000	0.0000	0.0000
2018	55.8853	0.0000	55.8853	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	130.90	7.1563	10.4153	17.5716	0.0000	0.0000	0.0000	0.0000
2019	57.1706	0.0000	57.1706	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	168.30	8.9367	13.5459	22.4827	0.0000	0.0000	0.0000	0.0000
2020	58.4856	0.0000	58.4856	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	205.70	10.7252	16.7476	27.4728	0.0000	0.0000	0.0000	0.0000
2021	59.8307	0.0000	59.8307	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	243.10	12.8721	20.0214	32.8935	0.0000	0.0000	0.0000	0.0000
2022	61.2068	0.0000	61.2068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	280.50	14.9647	23.3687	38.3334	0.0000	0.0000	0.0000	0.0000
2023	62.6146	0.0000	62.6146	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	317.90	17.4559	26.7907	44.2466	0.0000	0.0000	0.0000	0.0000
2024	64.0547	0.0000	64.0547	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	355.30	19.7724	30.2887	50.0612	0.0000	0.0000	0.0000	0.0000
NOMINAL	579.4778	0.0000	579.4778	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,870.0000	100.9811	154.3323	255.3134	0.0000	0.0000	0.0000	0.0000
NPV	426.8894	0.0000	426.8894	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		66.6900	101.6209	168.3110		0.0000	0.0000	0.0000

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

TOTAL RESOURCE COST TESTS
PROGRAM: Residential Energy Survey Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	INCREMENTAL PURCHASED POWER BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	52.20	0.00	0.00	52.20	0.14	0.02	1.05	0.00	1.21	(50.99)	(50.99)
2016	0.00	53.40	0.00	0.00	53.40	0.42	0.06	3.11	0.00	3.58	(49.82)	(97.47)
2017	0.00	54.63	0.00	0.00	54.63	0.70	0.09	5.22	0.00	6.02	(48.61)	(139.77)
2018	0.00	55.89	0.00	0.00	55.89	0.99	0.13	7.38	0.00	8.51	(47.38)	(178.24)
2019	0.00	57.17	0.00	0.00	57.17	1.29	0.18	9.21	0.00	10.68	(46.49)	(213.46)
2020	0.00	58.49	0.00	0.00	58.49	2.23	0.22	11.06	0.00	13.51	(44.97)	(245.24)
2021	0.00	59.83	0.00	0.00	59.83	2.88	0.27	13.27	0.00	16.42	(43.41)	(273.86)
2022	0.00	61.21	0.00	0.00	61.21	3.36	0.32	15.43	0.00	19.10	(42.10)	(299.76)
2023	0.00	62.61	0.00	0.00	62.61	3.76	0.37	18.00	0.00	22.12	(40.49)	(322.99)
2024	0.00	64.05	0.00	0.00	64.05	4.25	0.42	20.38	0.00	25.05	(39.00)	(343.87)
NOMINAL	0.00	579.48	0.00	0.00	515.42	20.04	2.07	104.10	0.00	101.16	(453.27)	
NPV	0.00	426.89	0.00	0.00	392.60	12.91	1.36	68.75	0.00	69.61	(343.87)	

Discount Rate: 7.19%
Benefit/Cost Ratio [col (11) / col (6)]: 0.18

PARTICIPANT COSTS AND BENEFITS
PROGRAM: Residential Energy Survey Program

(1) YEAR	(2) SAVINGS IN PARTICIPANTS BILL $(000)	(3) TAX CREDITS $(000)	(4) UTILITY REBATES $(000)	(5) OTHER BENEFITS $(000)	(6) TOTAL BENEFITS $(000)	(7) CUSTOMER EQUIPMENT COSTS $(000)	(8) CUSTOMER O & M COSTS $(000)	(9) OTHER COSTS $(000)	(10) TOTAL COSTS $(000)	(11) NET BENEFITS $(000)	(12) CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	2.46	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	2.46	2.46
2016	7.37	0.00	0.00	0.00	7.37	0.00	0.00	0.00	0.00	7.37	9.34
2017	12.42	0.00	0.00	0.00	12.42	0.00	0.00	0.00	0.00	12.42	20.15
2018	17.57	0.00	0.00	0.00	17.57	0.00	0.00	0.00	0.00	17.57	34.41
2019	22.48	0.00	0.00	0.00	22.48	0.00	0.00	0.00	0.00	22.48	51.44
2020	27.47	0.00	0.00	0.00	27.47	0.00	0.00	0.00	0.00	27.47	70.86
2021	32.89	0.00	0.00	0.00	32.89	0.00	0.00	0.00	0.00	32.89	92.55
2022	38.33	0.00	0.00	0.00	38.33	0.00	0.00	0.00	0.00	38.33	116.12
2023	44.25	0.00	0.00	0.00	44.25	0.00	0.00	0.00	0.00	44.25	141.51
2024	50.06	0.00	0.00	0.00	50.06	0.00	0.00	0.00	0.00	50.06	168.31
NOMINAL	255.31	0.00	0.00	0.00	255.31	0.00	0.00	0.00	0.00	255.31	
NPV	168.31	0.00	0.00	0.00	168.31	0.00	0.00	0.00	0.00	168.31	

In-service year of generation unit: 2015
Discount rate: 7.19%
Benefit/Cost Ratio: 1.00

RATE IMPACT TEST
PROGRAM: Residential Energy Survey Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS TO ALL CUSTOMERS $(000)	CUMULATIVE DISCOUNTED NET BENEFIT $(000)
2015	0.00	52.20	0.00	2.46	0.00	54.66	1.19	0.02	0.00	0.00	1.21	(53.45)	(53.45)
2016	0.00	53.40	0.00	7.37	0.00	60.77	3.53	0.06	0.00	0.00	3.58	(57.19)	(106.80)
2017	0.00	54.63	0.00	12.42	0.00	67.05	5.93	0.09	0.00	0.00	6.02	(61.03)	(159.92)
2018	0.00	55.89	0.00	17.57	0.00	73.46	8.37	0.13	0.00	0.00	8.51	(64.95)	(212.66)
2019	0.00	57.17	0.00	22.48	0.00	79.65	10.50	0.18	0.00	0.00	10.68	(68.97)	(264.90)
2020	0.00	58.49	0.00	27.47	0.00	85.96	13.29	0.22	0.00	0.00	13.51	(72.45)	(316.10)
2021	0.00	59.83	0.00	32.89	0.00	92.72	16.15	0.27	0.00	0.00	16.42	(76.31)	(366.41)
2022	0.00	61.21	0.00	38.33	0.00	99.54	18.79	0.32	0.00	0.00	19.10	(80.44)	(415.88)
2023	0.00	62.61	0.00	44.25	0.00	106.86	21.76	0.37	0.00	0.00	22.12	(84.74)	(464.50)
2024	0.00	64.05	0.00	50.06	0.00	114.12	24.63	0.42	0.00	0.00	25.05	(89.06)	(512.18)
NOMINAL	0.00	579.48	0.00	255.31	0.00	834.79	124.14	2.07	0.00	0.00	126.21	(708.58)	
NPV	0.00	426.89	0.00	168.31	0.00	595.20	81.66	1.36	0.00	0.00	83.02	(512.18)	

Discount rate: 7.19%
Benefit / Cost Ratio [col (12) / col (7)]: 0.14

A-6 Residential Heating and Cooling Efficiency Upgrade

INPUT DATA -- PART 1

PROGRAM: Residential Heating & Cooling Upgrade Program

I. PROGRAM DEMAND SAVINGS AND LINE LOSSES

(1) CUSTOMER KW REDUCTION AT THE METER	1.80	KW /CUST
(2) GENERATOR KW REDUCTION PER CUSTOMER	1.98	KW GEN/CUST
(3) KW LINE LOSS PERCENTAGE	8.9	%
(4) GENERATION KWH REDUCTION PER CUSTOMER	3,774.2	KWH/CUST/YR
(5) KWH LINE LOSS PERCENTAGE	3.0	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER KWH PROGRAM INCREASE AT METER	0.0	KWH/CUST/YR
(8)* CUSTOMER KWH REDUCTION AT METER	3,661	KWH/CUST/YR

II. ECONOMIC LIFE AND K FACTORS

(1) STUDY PERIOD FOR CONSERVATION PROGRAM	10	YEARS
(2) GENERATOR ECONOMIC LIFE	10	YEARS
(3) T & D ECONOMIC LIFE	10	YEARS
(4) K FACTOR FOR GENERATION	0.00	
(5) K FACTOR FOR T & D	0.00	
(6)* SWITCH REV REQ(0) OR VAL-OF-DEF (1)	1	

III. UTILITY AND CUSTOMER COSTS

(1)** UTILITY NONRECURRING COST PER CUSTOMER	337.00	$/CUST
(2)** UTILITY RECURRING COST PER CUSTOMER	0.00	$/CUST/YR
(3) UTILITY COST ESCALATION RATE	2.30	%
(4) CUSTOMER EQUIPMENT COST	1,520.00	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	2.30	%
(6) CUSTOMER O & M COST	0.00	$/CUST/YR
(7) CUSTOMER O & M ESCALATION RATE	2.30	%
(8)* CUSTOMER TAX CREDIT PER INSTALLATION	0.00	$/CUST
(9)* CUSTOMER TAX CREDIT ESCALATION RATE	0.0	%
(10)* INCREASED SUPPLY COSTS	0.00	$/CUST/YR
(11)* SUPPLY COSTS ESCALATION RATE	2.30	%
(12)* UTILITY DISCOUNT RATE	7.19	%
(13)* UTILITY AFUDC RATE	0.00	%
(14)* UTILITY NON RECURRING REBATE/INCENTIVE	125.00	$/CUST
(15)* UTILITY RECURRING REBATE/INCENTIVE	0.00	$/CUST/YR
(16)* UTILITY REBATE/INCENTIVE ESCAL RATE	0.0	%

IV. AVOIDED GENERATOR, TRANS. AND DIST. COSTS

(1) BASE YEAR	2015	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2015	
(3) IN-SERVICE YEAR FOR AVOIDED T & D	2015	
(4) BASE YEAR AVOIDED GENERATING UNIT COST	0	$/KW
(5) BASE YEAR AVOIDED TRANSMISSION COST	0	$/KW
(6) BASE YEAR DISTRIBUTION COST	0	$/KW
(7) GEN, TRAN, & DIST COST ESCALATION RATE	0	%
(8) GENERATOR FIXED O & M COST	0	$/KW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	0	%
(10) TRANSMISSION FIXED O & M COST	0.89	$/KW/YR
(11) DISTRIBUTION FIXED O & M COST	22.01	$/KW/YR
(12) T&D FIXED O&M ESCALATION RATE	2.3	%
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0	CENTS/KWH
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	0	%
(15) GENERATOR CAPACITY FACTOR	48.8	%
(16) AVOIDED GENERATING UNIT FUEL COST	5.446	CENTS/KWH
(17) AVOIDED GEN UNIT FUEL ESCALATION RATE	0.09	%
(18)* AVOIDED PURCHASE CAPACITY COST PER KW	172.18	$/KW/YR
(19)* CAPACITY COST ESCALATION RATE	2.71	%

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON-FUEL COST IN CUSTOMER BILL	7.687	CENTS/KWH
(2) NON-FUEL ESCALATION RATE	1.15	%
(3) CUSTOMER DEMAND CHARGE PER KW	0.00	$/KW/MO
(4) DEMAND CHARGE ESCALATION RATE	0.00	%
(5)* DIVERSITY and ANNUAL DEMAND ADJUSTMENT FACTOR FOR CUSTOMER BILL	1.0	

* FIRE Program Version Number: 1.03

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

** NONRECURRING & RECURRING COSTS IN INPUTS III.(1 & 2) DO NOT INCLUDE CUSTOMER REBATES PAID BY THE UTILITY. UTILITY REBATES ARE INPUT IN III.(14 & 15).

PROGRAM: Residential Heating & Cooling Efficiency Upgrade Program

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	AVOIDED MARGINAL FUEL COST (C/KWH)	INCREASED MARGINAL FUEL COST (C/KWH)	REPLACEMENT FUEL COST (C/KWH)	PROGRAM KW EFFECTIVENESS FACTOR	PROGRAM KWH EFFECTIVENESS FACTOR
2015	100	50	5.454	5.454	5.454	5.45	1	1
2016	200	150	5.369	5.369	5.369	5.369	1	1
2017	300	250	5.418	5.418	5.418	5.418	1	1
2018	400	350	5.467	5.467	5.467	5.467	1	1
2019	500	450	5.310	5.310	5.310	5.310	1	1
2020	600	550	5.214	5.214	5.214	5.214	1	1
2021	700	650	5.295	5.295	5.295	5.295	1	1
2022	800	750	5.335	5.335	5.335	5.335	1	1
2023	900	850	5.491	5.491	5.491	5.491	1	1
2024	1000	950	5.565	5.565	5.565	5.565	1	1

AVOIDED GENERATION UNIT BENEFITS

PROGRAM: Residential Heating & Cooling Upgrade Program

* UNIT SIZE OF AVOIDED GENERATION UNIT = 1.98 kW

* INSERVICE COSTS OF AVOIDED GEN. UNIT (000) = $0

(1) Year	(1A)* VALUE OF DEFERRAL FACTOR	(2) AVOIDED GEN UNIT CAPACITY COST $(000)	(2A)* AVOIDED ANNUAL UNIT KWH GEN (000)	(3) AVOIDED UNIT FIXED O&M COST $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M COST $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(6A) AVOIDED PURCHASED CAPACITY COSTS $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	17.617	17.62
2016	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	53.028	53.03
2017	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	88.676	88.68
2018	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	125.225	125.23
2019	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	162.391	162.39
2020	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	281.156	281.16
2021	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	362.636	362.64
2022	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	423.049	423.05
2023	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	473.410	473.41
2024	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	534.962	534.96
NOMINAL		0.00	0.00	0.00	0.00	0.00	0.00	2,522.15	2,522.15
NPV		0.00		0.00	0.00	0.00	0.00	1,624.95	1,624.95

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

AVOIDED T & D AND PROGRAM FUEL BENEFITS

PROGRAM: Residential Heating & Cooling Upgrade Program

* INSERVICE COSTS OF AVOIDED TRANS. (000) = $0

* INSERVICE COSTS OF AVOIDED DIST. (000) = $0

(1) Year	(2) AVOIDED TRANSMISSION CAPACITY COST $(000)	(3) AVOIDED TRANSMISSION O&M COST (000)	(4) TOTAL AVOIDED TRANSMISSION COST $(000)	(5) AVOIDED DISTRIBUTION CAPACITY COST $(000)	(6) AVOIDED DISTRIBUTION O&M COST $(000)	(7) TOTAL AVOIDED DISTRIBUTION COST $(000)	(8) PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0879	0.0879	0.00	2.17	2.17	10.29
2016	0.00	0.2698	0.2698	0.00	6.67	6.67	30.40
2017	0.00	0.4601	0.4601	0.00	11.38	11.38	51.12
2018	0.00	0.6589	0.6589	0.00	16.30	16.30	72.22
2019	0.00	0.8667	0.8667	0.00	21.43	21.43	90.19
2020	0.00	1.0836	1.0836	0.00	26.80	26.80	108.23
2021	0.00	1.3101	1.3101	0.00	32.40	32.40	129.90
2022	0.00	1.5464	1.5464	0.00	38.24	38.24	151.02
2023	0.00	1.7929	1.7929	0.00	44.34	44.34	176.16
2024	0.00	2.0500	2.0500	0.00	50.70	50.70	199.53
NOMINAL	0.00	10.13	10.13	0.00	250.43	250.43	1,019.05
NPV	0.00	6.64	6.64	0.00	164.17	164.17	673.00

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET : DSM PROGRAM FUEL SAVINGS
PROGRAM: Residential Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	REDUCTION IN KWH GENERATION NET NEW CUST KWH (000)	AVOIDED MARGINAL FUEL COST - REDUCED KWH $(000)	INCREASE IN KWH GENERATION NET NEW CUST KWH (000)	INCREASED MARGINAL FUEL COST - INCREASE KWH $(000)	NET AVOIDED PROGRAM FUEL SAVINGS $(000)	EFFECTIVE PROGRAM FUEL SAVINGS $(000)
2015	188.71	10.2923	0.0000	0.0000	10.2923	10.2923
2016	566.13	30.3957	0.0000	0.0000	30.3957	30.3957
2017	943.56	51.1219	0.0000	0.0000	51.1219	51.1219
2018	1,320.98	72.2179	0.0000	0.0000	72.2179	72.2179
2019	1,698.40	90.1851	0.0000	0.0000	90.1851	90.1851
2020	2,075.82	108.2335	0.0000	0.0000	108.2335	108.2335
2021	2,453.25	129.8995	0.0000	0.0000	129.8995	129.8995
2022	2,830.67	151.0163	0.0000	0.0000	151.0163	151.0163
2023	3,208.09	176.1564	0.0000	0.0000	176.1564	176.1564
2024	3,585.52	199.5339	0.0000	0.0000	199.5339	199.5339
NOMINAL	18,871.1340	1,019.0526	0.0000	0.0000	1,019.0526	1,019.0526
NPV		673.0035	0.0000	0.0000	673.0035	673.0035

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET: UTILITY COSTS, PARTICIPANT COSTS, AND REV LOSS/GAIN
PROGRAM: Residential Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	<------ UTILITY PROGRAM COSTS & REBATES ---------->						<---------- PARTICIPATING CUSTOMER COSTS & BENEFITS---------->										
YEAR	UTIL NONREC. COSTS $(000)	UTIL RECUR COSTS $(000)	TOTAL UTIL PGM COSTS $(000)	UTIL NONREC. REBATES $(000)	UTIL RECUR. REBATES $(000)	TOTAL REBATE/ INCENT. COSTS $(000)	PARTIC. CUST EQUIP COSTS $(000)	PARTIC. CUST O & M COSTS $(000)	TOTAL PARTIC. CUST COSTS $(000)	REDUCT. IN CUST. KWH (000)	RED. REV. - FUEL PORTION $(000)	RED. REV. NONFUEL PORTION $(000)	EFFECT. REV. REDUCT. IN BILL $(000)	INC. IN CUST. KWH (000)	INC. REV. - FUEL PORTION $(000)	INC. REV. NONFUEL PORTION	EFFECT. REVENUE INC. IN BILL $(000)
2015	33.7000	0.0000	33.7000	12.5000	0.0000	12.5000	152.0000	0.0000	152.0000	183.05	9.9835	14.0711	24.0546	0.0000	0.0000	0.0000	0.0000
2016	34.4751	0.0000	34.4751	12.5000	0.0000	12.5000	155.4960	0.0000	155.4960	549.15	29.4839	42.6986	72.1825	0.0000	0.0000	0.0000	0.0000
2017	35.2680	0.0000	35.2680	12.5000	0.0000	12.5000	159.0724	0.0000	159.0724	915.25	49.5882	71.9827	121.5710	0.0000	0.0000	0.0000	0.0000
2018	36.0792	0.0000	36.0792	12.5000	0.0000	12.5000	162.7311	0.0000	162.7311	1,281.35	70.0514	101.9348	171.9862	0.0000	0.0000	0.0000	0.0000
2019	36.9090	0.0000	36.9090	12.5000	0.0000	12.5000	166.4739	0.0000	166.4739	1,647.45	87.4796	132.5662	220.0458	0.0000	0.0000	0.0000	0.0000
2020	37.7579	0.0000	37.7579	12.5000	0.0000	12.5000	170.3028	0.0000	170.3028	2,013.55	104.9865	163.8886	268.8751	0.0000	0.0000	0.0000	0.0000
2021	38.6264	0.0000	38.6264	12.5000	0.0000	12.5000	174.2198	0.0000	174.2198	2,379.65	126.0025	195.9139	321.9164	0.0000	0.0000	0.0000	0.0000
2022	39.5148	0.0000	39.5148	12.5000	0.0000	12.5000	178.2268	0.0000	178.2268	2,745.75	146.4858	228.6541	375.1399	0.0000	0.0000	0.0000	0.0000
2023	40.4236	0.0000	40.4236	12.5000	0.0000	12.5000	182.3260	0.0000	182.3260	3,111.85	170.8717	262.1215	432.9932	0.0000	0.0000	0.0000	0.0000
2024	41.3533	0.0000	41.3533	12.5000	0.0000	12.5000	186.5195	0.0000	186.5195	3,477.95	193.5479	296.3283	489.8763	0.0000	0.0000	0.0000	0.0000
NOMINAL	374.1073	0.0000	374.1073	125.0000	0.0000	125.0000	1,687.3683	0.0000	1,687.3683	18,305.0000	988.4810	1,510.1598	2,498.6408	0.0000	0.0000	0.0000	0.0000
NPV	275.5972	0.0000	275.5972	93.2862	0.0000	93.2862	1,243.0496	0.0000	1,243.0496		652.8134	994.3974	1,647.2108		0.0000	0.0000	0.0000

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

TOTAL RESOURCE COST TESTS
PROGRAM: Residential Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	INCREMENTAL PURCHASED POWER BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	33.70	152.00	0.00	185.70	17.62	2.26	10.29	0.00	30.17	(155.53)	(155.53)
2016	0.00	34.48	155.50	0.00	189.97	53.03	6.94	30.40	0.00	90.37	(99.60)	(248.45)
2017	0.00	35.27	159.07	0.00	194.34	88.68	11.84	51.12	0.00	151.64	(42.70)	(285.62)
2018	0.00	36.08	162.73	0.00	198.81	125.23	16.95	72.22	0.00	214.40	15.59	(272.96)
2019	0.00	36.91	166.47	0.00	203.38	162.39	22.30	90.19	0.00	274.88	71.49	(218.81)
2020	0.00	37.76	170.30	0.00	208.06	281.16	27.88	108.23	0.00	417.27	209.21	(70.96)
2021	0.00	38.63	174.22	0.00	212.85	362.64	33.71	129.90	0.00	526.25	313.40	135.66
2022	0.00	39.51	178.23	0.00	217.74	423.05	39.79	151.02	0.00	613.86	396.11	379.30
2023	0.00	40.42	182.33	0.00	222.75	473.41	46.13	176.16	0.00	695.70	472.95	650.68
2024	0.00	41.35	186.52	0.00	227.87	534.96	52.75	199.53	0.00	787.24	559.37	950.12
NOMINAL	0.00	374.11	1,687.37	0.00	1,833.60	2,522.15	260.56	1,019.05	0.00	3,014.52	1,740.29	
NPV	0.00	275.60	1,243.05	0.00	1,396.66	1,624.95	170.81	673.00	0.00	2,047.34	950.12	

Discount Rate: 7.19%
Benefit/Cost Ratio [col (11) / col (6)]: 1.47

PARTICIPANT COSTS AND BENEFITS
PROGRAM: Residential Heating & Cooling Upgrade Program

(1) YEAR	(2) SAVINGS IN PARTICIPANTS BILL $(000)	(3) TAX CREDITS $(000)	(4) UTILITY REBATES $(000)	(5) OTHER BENEFITS $(000)	(6) TOTAL BENEFITS $(000)	(7) CUSTOMER EQUIPMENT COSTS $(000)	(8) CUSTOMER O & M COSTS $(000)	(9) OTHER COSTS $(000)	(10) TOTAL COSTS $(000)	(11) NET BENEFITS $(000)	(12) CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	24.05	0.00	12.50	0.00	36.55	152.00	0.00	0.00	152.00	(115.45)	(115.45)
2016	72.18	0.00	12.50	0.00	84.68	155.50	0.00	0.00	155.50	(70.81)	(181.51)
2017	121.57	0.00	12.50	0.00	134.07	159.07	0.00	0.00	159.07	(25.00)	(203.27)
2018	171.99	0.00	12.50	0.00	184.49	162.73	0.00	0.00	162.73	21.76	(185.60)
2019	220.05	0.00	12.50	0.00	232.55	166.47	0.00	0.00	166.47	66.07	(135.55)
2020	268.88	0.00	12.50	0.00	281.38	170.30	0.00	0.00	170.30	111.07	(57.06)
2021	321.92	0.00	12.50	0.00	334.42	174.22	0.00	0.00	174.22	160.20	48.55
2022	375.14	0.00	12.50	0.00	387.64	178.23	0.00	0.00	178.23	209.41	177.36
2023	432.99	0.00	12.50	0.00	445.49	182.33	0.00	0.00	182.33	263.17	328.36
2024	489.88	0.00	12.50	0.00	502.38	186.52	0.00	0.00	186.52	315.86	497.45
NOMINAL	2,498.64	0.00	125.00	0.00	2,623.64	1,687.37	0.00	0.00	1,687.37	936.27	
NPV	1,647.21	0.00	93.29	0.00	1,740.50	1,243.05	0.00	0.00	1,243.05	497.45	

In-service year of generation unit: 2015
Discount rate: 7.19%
Benefit/Cost Ratio: 1.40

RATE IMPACT TEST
PROGRAM: Residential Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS TO ALL CUSTOMERS $(000)	CUMULATIVE DISCOUNTED NET BENEFIT $(000)
2015	0.00	33.70	12.50	24.05	0.00	70.25	27.91	2.26	0.00	0.00	30.17	(40.08)	(40.08)
2016	0.00	34.48	12.50	72.18	0.00	119.16	83.42	6.94	0.00	0.00	90.37	(28.79)	(66.94)
2017	0.00	35.27	12.50	121.57	0.00	169.34	139.80	11.84	0.00	0.00	151.64	(17.70)	(82.35)
2018	0.00	36.08	12.50	171.99	0.00	220.57	197.44	16.95	0.00	0.00	214.40	(6.17)	(87.36)
2019	0.00	36.91	12.50	220.05	0.00	269.45	252.58	22.30	0.00	0.00	274.88	5.42	(83.25)
2020	0.00	37.76	12.50	268.88	0.00	319.13	389.39	27.88	0.00	0.00	417.27	98.14	(13.90)
2021	0.00	38.63	12.50	321.92	0.00	373.04	492.54	33.71	0.00	0.00	526.25	153.20	87.11
2022	0.00	39.51	12.50	375.14	0.00	427.15	574.07	39.79	0.00	0.00	613.86	186.70	201.94
2023	0.00	40.42	12.50	432.99	0.00	485.92	649.57	46.13	0.00	0.00	695.70	209.78	322.31
2024	0.00	41.35	12.50	489.88	0.00	543.73	734.50	52.75	0.00	0.00	787.24	243.51	452.67
NOMINAL	0.00	374.11	125.00	2,498.64	0.00	2,997.75	3,541.20	260.56	0.00	0.00	3,801.76	804.01	
NPV	0.00	275.60	93.29	1,647.21	0.00	2,016.09	2,297.95	170.81	0.00	0.00	2,468.77	452.67	

Discount rate: 7.19%
Benefit / Cost Ratio [col (12) / col (7)]: 1.22

A-7 Commercial Heating and Cooling Efficiency Upgrade

INPUT DATA -- PART 1

PROGRAM: Commercial Heating & Cooling Upgrade Program

I. PROGRAM DEMAND SAVINGS AND LINE LOSSES

(1) CUSTOMER KW REDUCTION AT THE METER	1.80	KW /CUST
(2) GENERATOR KW REDUCTION PER CUSTOMER	1.98	KW GEN/CUST
(3) KW LINE LOSS PERCENTAGE	8.9	%
(4) GENERATION KWH REDUCTION PER CUSTOMER	3,774.2	KWH/CUST/YR
(5) KWH LINE LOSS PERCENTAGE	3.0	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER KWH PROGRAM INCREASE AT METER	0.0	KWH/CUST/YR
(8)* CUSTOMER KWH REDUCTION AT METER	3,661	KWH/CUST/YR

II. ECONOMIC LIFE AND K FACTORS

(1) STUDY PERIOD FOR CONSERVATION PROGRAM	10	YEARS
(2) GENERATOR ECONOMIC LIFE	10	YEARS
(3) T & D ECONOMIC LIFE	10	YEARS
(4) K FACTOR FOR GENERATION	0.00	
(5) K FACTOR FOR T & D	0.00	
(6)* SWITCH REV REQ(0) OR VAL-OF-DEF (1)	1	

III. UTILITY AND CUSTOMER COSTS

(1)** UTILITY NONRECURRING COST PER CUSTOMER	553.00	$/CUST
(2)** UTILITY RECURRING COST PER CUSTOMER	0.00	$/CUST/YR
(3) UTILITY COST ESCALATION RATE	2.30	%
(4) CUSTOMER EQUIPMENT COST	1,520.00	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	2.30	%
(6) CUSTOMER O & M COST	0.00	$/CUST/YR
(7) CUSTOMER O & M ESCALATION RATE	2.30	%
(8)* CUSTOMER TAX CREDIT PER INSTALLATION	0.00	$/CUST
(9)* CUSTOMER TAX CREDIT ESCALATION RATE	0.0	%
(10)* INCREASED SUPPLY COSTS	0.00	$/CUST/YR
(11)* SUPPLY COSTS ESCALATION RATE	2.30	%
(12)* UTILITY DISCOUNT RATE	7.19	%
(13)* UTILITY AFUDC RATE	0.00	%
(14)* UTILITY NON RECURRING REBATE/INCENTIVE	125.00	$/CUST
(15)* UTILITY RECURRING REBATE/INCENTIVE	0.00	$/CUST/YR
(16)* UTILITY REBATE/INCENTIVE ESCAL RATE	0.0	%

IV. AVOIDED GENERATOR, TRANS. AND DIST. COSTS

(1) BASE YEAR	2015	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2015	
(3) IN-SERVICE YEAR FOR AVOIDED T & D	2015	
(4) BASE YEAR AVOIDED GENERATING UNIT COST	0	$/KW
(5) BASE YEAR AVOIDED TRANSMISSION COST	0	$/KW
(6) BASE YEAR DISTRIBUTION COST	0	$/KW
(7) GEN, TRAN, & DIST COST ESCALATION RATE	0	%
(8) GENERATOR FIXED O & M COST	0	$/KW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	0	%
(10) TRANSMISSION FIXED O & M COST	0.89	$/KW/YR
(11) DISTRIBUTION FIXED O & M COST	22.01	$/KW/YR
(12) T&D FIXED O&M ESCALATION RATE	2.3	%
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0	CENTS/KWH
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	0	%
(15) GENERATOR CAPACITY FACTOR	48.8	%
(16) AVOIDED GENERATING UNIT FUEL COST	5.446	CENTS/KWH
(17) AVOIDED GEN UNIT FUEL ESCALATION RATE	0.09	%
(18)* AVOIDED PURCHASE CAPACITY COST PER KW	172.18	$/KW/YR
(19)* CAPACITY COST ESCALATION RATE	2.71	%

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON-FUEL COST IN CUSTOMER BILL	7.400	CENTS/KWH
(2) NON-FUEL ESCALATION RATE	1.15	%
(3) CUSTOMER DEMAND CHARGE PER KW	0.00	$/KW/MO
(4) DEMAND CHARGE ESCALATION RATE	0.00	%
(5)* DIVERSITY and ANNUAL DEMAND ADJUSTMENT FACTOR FOR CUSTOMER BILL	1.0	

* FIRE Program Version Number: 1.03

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

** NONRECURRING & RECURRING COSTS IN INPUTS III.(1 & 2) DO NOT INCLUDE CUSTOMER REBATES PAID BY THE UTILITY. UTILITY REBATES ARE INPUT IN III.(14 & 15).

PROGRAM: Residential Heating & Cooling Efficiency Upgrade Program

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	AVOIDED MARGINAL FUEL COST (C/KWH)	INCREASED MARGINAL FUEL COST (C/KWH)	REPLACEMENT FUEL COST (C/KWH)	PROGRAM KW EFFECTIVENESS FACTOR	PROGRAM KWH EFFECTIVENESS FACTOR
2015	10	5	5.454	5.454	5.454	5.45	1	1
2016	20	15	5.369	5.369	5.369	5.369	1	1
2017	30	25	5.418	5.418	5.418	5.418	1	1
2018	40	35	5.467	5.467	5.467	5.467	1	1
2019	50	45	5.310	5.310	5.310	5.310	1	1
2020	60	55	5.214	5.214	5.214	5.214	1	1
2021	70	65	5.295	5.295	5.295	5.295	1	1
2022	80	75	5.335	5.335	5.335	5.335	1	1
2023	90	85	5.491	5.491	5.491	5.491	1	1
2024	100	95	5.565	5.565	5.565	5.565	1	1

AVOIDED GENERATION UNIT BENEFITS

PROGRAM: Commercial Heating & Cooling Upgrade Program

* UNIT SIZE OF AVOIDED GENERATION UNIT = 1.98 kW

* INSERVICE COSTS OF AVOIDED GEN. UNIT (000) = $0

(1) Year	(1A)* VALUE OF DEFERRAL FACTOR	(2) AVOIDED GEN UNIT CAPACITY COST $(000)	(2A)* AVOIDED ANNUAL UNIT KWH GEN (000)	(3) AVOIDED UNIT FIXED O&M COST $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M COST $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(6A) AVOIDED PURCHASED CAPACITY COSTS $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	1.762	1.76
2016	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	5.303	5.30
2017	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	8.868	8.87
2018	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	12.523	12.52
2019	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	16.239	16.24
2020	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	28.116	28.12
2021	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	36.264	36.26
2022	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	42.305	42.30
2023	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	47.341	47.34
2024	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	53.496	53.50
NOMINAL		0.00	0.00	0.00	0.00	0.00	0.00	252.21	252.21
NPV		0.00		0.00	0.00	0.00	0.00	162.49	162.49

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

AVOIDED T & D AND PROGRAM FUEL BENEFITS

PROGRAM: Commercial Heating & Cooling Upgrade Program

* INSERVICE COSTS OF AVOIDED TRANS. (000) = $0

* INSERVICE COSTS OF AVOIDED DIST. (000) = $0

(1) Year	(2) AVOIDED TRANSMISSION CAPACITY COST $(000)	(3) AVOIDED TRANSMISSION O&M COST (000)	(4) TOTAL AVOIDED TRANSMISSION COST $(000)	(5) AVOIDED DISTRIBUTION CAPACITY COST $(000)	(6) AVOIDED DISTRIBUTION O&M COST $(000)	(7) TOTAL AVOIDED DISTRIBUTION COST $(000)	(8) PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0088	0.0088	0.00	0.22	0.22	1.03
2016	0.00	0.0270	0.0270	0.00	0.67	0.67	3.04
2017	0.00	0.0460	0.0460	0.00	1.14	1.14	5.11
2018	0.00	0.0659	0.0659	0.00	1.63	1.63	7.22
2019	0.00	0.0867	0.0867	0.00	2.14	2.14	9.02
2020	0.00	0.1084	0.1084	0.00	2.68	2.68	10.82
2021	0.00	0.1310	0.1310	0.00	3.24	3.24	12.99
2022	0.00	0.1546	0.1546	0.00	3.82	3.82	15.10
2023	0.00	0.1793	0.1793	0.00	4.43	4.43	17.62
2024	0.00	0.2050	0.2050	0.00	5.07	5.07	19.95
NOMINAL	0.00	1.01	1.01	0.00	25.04	25.04	101.91
NPV	0.00	0.66	0.66	0.00	16.42	16.42	67.30

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET : DSM PROGRAM FUEL SAVINGS
PROGRAM: Commercial Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	REDUCTION IN KWH GENERATION NET NEW CUST KWH (000)	AVOIDED MARGINAL FUEL COST - REDUCED KWH $(000)	INCREASE IN KWH GENERATION NET NEW CUST KWH (000)	INCREASED MARGINAL FUEL COST - INCREASE KWH $(000)	NET AVOIDED PROGRAM FUEL SAVINGS $(000)	EFFECTIVE PROGRAM FUEL SAVINGS $(000)
2015	18.87	1.0292	0.0000	0.0000	1.0292	1.0292
2016	56.61	3.0396	0.0000	0.0000	3.0396	3.0396
2017	94.36	5.1122	0.0000	0.0000	5.1122	5.1122
2018	132.10	7.2218	0.0000	0.0000	7.2218	7.2218
2019	169.84	9.0185	0.0000	0.0000	9.0185	9.0185
2020	207.58	10.8234	0.0000	0.0000	10.8234	10.8234
2021	245.32	12.9899	0.0000	0.0000	12.9899	12.9899
2022	283.07	15.1016	0.0000	0.0000	15.1016	15.1016
2023	320.81	17.6156	0.0000	0.0000	17.6156	17.6156
2024	358.55	19.9534	0.0000	0.0000	19.9534	19.9534
NOMINAL	1,887.1134	101.9053	0.0000	0.0000	101.9053	101.9053
NPV		67.3003	0.0000	0.0000	67.3003	67.3003

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET: UTILITY COSTS, PARTICIPANT COSTS, AND REV LOSS/GAIN
PROGRAM: Commercial Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	<------ UTILITY PROGRAM COSTS & REBATES ---------->						<---------- PARTICIPATING CUSTOMER COSTS & BENEFITS---------->										
YEAR	UTIL NONREC. COSTS $(000)	UTIL RECUR COSTS $(000)	TOTAL UTIL PGM COSTS $(000)	UTIL NONREC. REBATES $(000)	UTIL RECUR. REBATES $(000)	TOTAL REBATE/ INCENT. COSTS $(000)	PARTIC. CUST EQUIP COSTS $(000)	PARTIC. CUST O & M COSTS $(000)	TOTAL PARTIC. CUST COSTS $(000)	REDUCT. IN CUST. KWH (000)	RED. REV. - FUEL PORTION $(000)	RED. REV. NONFUEL PORTION $(000)	EFFECT. REV. REDUCT. IN BILL $(000)	INC. IN CUST. KWH (000)	INC. REV. - FUEL PORTION $(000)	INC. REV. NONFUEL PORTION	EFFECT. REVENUE INC. IN BILL $(000)
2015	5.5300	0.0000	5.5300	1.2500	0.0000	1.2500	15.2000	0.0000	15.2000	18.31	0.9984	1.3546	2.3529	0.0000	0.0000	0.0000	0.0000
2016	5.6572	0.0000	5.6572	1.2500	0.0000	1.2500	15.5496	0.0000	15.5496	54.92	2.9484	4.1104	7.0588	0.0000	0.0000	0.0000	0.0000
2017	5.7873	0.0000	5.7873	1.2500	0.0000	1.2500	15.9072	0.0000	15.9072	91.53	4.9588	7.0092	11.9680	0.0000	0.0000	0.0000	0.0000
2018	5.9204	0.0000	5.9204	1.2500	0.0000	1.2500	16.2731	0.0000	16.2731	128.14	7.0051	9.9257	16.9309	0.0000	0.0000	0.0000	0.0000
2019	6.0566	0.0000	6.0566	1.2500	0.0000	1.2500	16.6474	0.0000	16.6474	164.75	8.7480	12.7617	21.5096	0.0000	0.0000	0.0000	0.0000
2020	6.1959	0.0000	6.1959	1.2500	0.0000	1.2500	17.0303	0.0000	17.0303	201.36	10.4986	15.7770	26.2756	0.0000	0.0000	0.0000	0.0000
2021	6.3384	0.0000	6.3384	1.2500	0.0000	1.2500	17.4220	0.0000	17.4220	237.97	12.6002	18.8599	31.4602	0.0000	0.0000	0.0000	0.0000
2022	6.4842	0.0000	6.4842	1.2500	0.0000	1.2500	17.8227	0.0000	17.8227	274.58	14.6486	22.0117	36.6603	0.0000	0.0000	0.0000	0.0000
2023	6.6333	0.0000	6.6333	1.2500	0.0000	1.2500	18.2326	0.0000	18.2326	311.19	17.0872	25.2335	42.3207	0.0000	0.0000	0.0000	0.0000
2024	6.7859	0.0000	6.7859	1.2500	0.0000	1.2500	18.6520	0.0000	18.6520	347.80	19.3548	28.5265	47.8813	0.0000	0.0000	0.0000	0.0000
NOMINAL	61.3891	0.0000	61.3891	12.5000	0.0000	12.5000	168.7368	0.0000	168.7368	1,830.5000	98.8481	145.5702	244.4183	0.0000	0.0000	0.0000	0.0000
NPV	45.2241	0.0000	45.2241	9.3286	0.0000	9.3286	124.3050	0.0000	124.3050		65.2813	95.8881	161.1694		0.0000	0.0000	0.0000

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

TOTAL RESOURCE COST TESTS
PROGRAM: Commercial Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	INCREMENTAL PURCHASED POWER BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	5.53	15.20	0.00	20.73	1.76	0.23	1.03	0.00	3.02	(17.71)	(17.71)
2016	0.00	5.66	15.55	0.00	21.21	5.30	0.69	3.04	0.00	9.04	(12.17)	(29.07)
2017	0.00	5.79	15.91	0.00	21.69	8.87	1.18	5.11	0.00	15.16	(6.53)	(34.75)
2018	0.00	5.92	16.27	0.00	22.19	12.52	1.70	7.22	0.00	21.44	(0.75)	(35.36)
2019	0.00	6.06	16.65	0.00	22.70	16.24	2.23	9.02	0.00	27.49	4.78	(31.74)
2020	0.00	6.20	17.03	0.00	23.23	28.12	2.79	10.82	0.00	41.73	18.50	(18.66)
2021	0.00	6.34	17.42	0.00	23.76	36.26	3.37	12.99	0.00	52.62	28.86	0.37
2022	0.00	6.48	17.82	0.00	24.31	42.30	3.98	15.10	0.00	61.39	37.08	23.17
2023	0.00	6.63	18.23	0.00	24.87	47.34	4.61	17.62	0.00	69.57	44.70	48.82
2024	0.00	6.79	18.65	0.00	25.44	53.50	5.27	19.95	0.00	78.72	53.29	77.35
NOMINAL	0.00	61.39	168.74	0.00	204.69	252.21	26.06	101.91	0.00	301.45	150.05	
NPV	0.00	45.22	124.30	0.00	155.91	162.49	17.08	67.30	0.00	204.73	77.35	

Discount Rate: 7.19%
Benefit/Cost Ratio [col (11) / col (6)]: 1.31

PARTICIPANT COSTS AND BENEFITS
PROGRAM: Commercial Heating & Cooling Upgrade Program

(1) YEAR	(2) SAVINGS IN PARTICIPANTS BILL $(000)	(3) TAX CREDITS $(000)	(4) UTILITY REBATES $(000)	(5) OTHER BENEFITS $(000)	(6) TOTAL BENEFITS $(000)	(7) CUSTOMER EQUIPMENT COSTS $(000)	(8) CUSTOMER O & M COSTS $(000)	(9) OTHER COSTS $(000)	(10) TOTAL COSTS $(000)	(11) NET BENEFITS $(000)	(12) CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	2.35	0.00	1.25	0.00	3.60	15.20	0.00	0.00	15.20	(11.60)	(11.60)
2016	7.06	0.00	1.25	0.00	8.31	15.55	0.00	0.00	15.55	(7.24)	(18.35)
2017	11.97	0.00	1.25	0.00	13.22	15.91	0.00	0.00	15.91	(2.69)	(20.69)
2018	16.93	0.00	1.25	0.00	18.18	16.27	0.00	0.00	16.27	1.91	(19.14)
2019	21.51	0.00	1.25	0.00	22.76	16.65	0.00	0.00	16.65	6.11	(14.51)
2020	26.28	0.00	1.25	0.00	27.53	17.03	0.00	0.00	17.03	10.50	(7.10)
2021	31.46	0.00	1.25	0.00	32.71	17.42	0.00	0.00	17.42	15.29	2.98
2022	36.66	0.00	1.25	0.00	37.91	17.82	0.00	0.00	17.82	20.09	15.34
2023	42.32	0.00	1.25	0.00	43.57	18.23	0.00	0.00	18.23	25.34	29.88
2024	47.88	0.00	1.25	0.00	49.13	18.65	0.00	0.00	18.65	30.48	46.19
NOMINAL	244.42	0.00	12.50	0.00	256.92	168.74	0.00	0.00	168.74	88.18	
NPV	161.17	0.00	9.33	0.00	170.50	124.30	0.00	0.00	124.30	46.19	

In-service year of generation unit: 2015
Discount rate: 7.19%
Benefit/Cost Ratio: 1.37

RATE IMPACT TEST
PROGRAM: Commercial Heating & Cooling Upgrade Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS TO ALL CUSTOMERS $(000)	CUMULATIVE DISCOUNTED NET BENEFIT $(000)
2015	0.00	5.53	1.25	2.35	0.00	9.13	2.79	0.23	0.00	0.00	3.02	(6.12)	(6.12)
2016	0.00	5.66	1.25	7.06	0.00	13.97	8.34	0.69	0.00	0.00	9.04	(4.93)	(10.71)
2017	0.00	5.79	1.25	11.97	0.00	19.01	13.98	1.18	0.00	0.00	15.16	(3.84)	(14.06)
2018	0.00	5.92	1.25	16.93	0.00	24.10	19.74	1.70	0.00	0.00	21.44	(2.66)	(16.22)
2019	0.00	6.06	1.25	21.51	0.00	28.82	25.26	2.23	0.00	0.00	27.49	(1.33)	(17.23)
2020	0.00	6.20	1.25	26.28	0.00	33.72	38.94	2.79	0.00	0.00	41.73	8.01	(11.57)
2021	0.00	6.34	1.25	31.46	0.00	39.05	49.25	3.37	0.00	0.00	52.62	13.58	(2.62)
2022	0.00	6.48	1.25	36.66	0.00	44.39	57.41	3.98	0.00	0.00	61.39	16.99	7.83
2023	0.00	6.63	1.25	42.32	0.00	50.20	64.96	4.61	0.00	0.00	69.57	19.37	18.95
2024	0.00	6.79	1.25	47.88	0.00	55.92	73.45	5.27	0.00	0.00	78.72	22.81	31.15
NOMINAL	0.00	61.39	12.50	244.42	0.00	318.31	354.12	26.06	0.00	0.00	380.18	61.87	
NPV	0.00	45.22	9.33	161.17	0.00	215.72	229.80	17.08	0.00	0.00	246.88	31.15	

Discount rate: 7.19%
Benefit / Cost Ratio [col (12) / col (7)]: 1.14

A-8 Commercial Chiller Upgrade

INPUT DATA -- PART 1

PROGRAM: Commercial - Chiller Upgrade

I. PROGRAM DEMAND SAVINGS AND LINE LOSSES

(1) CUSTOMER KW REDUCTION AT THE METER	42.80	KW /CUST
(2) GENERATOR KW REDUCTION PER CUSTOMER	46.98	KW GEN/CUST
(3) KW LINE LOSS PERCENTAGE	8.9	%
(4) GENERATION KWH REDUCTION PER CUSTOMER	84,477.3	KWH/CUST/YR
(5) KWH LINE LOSS PERCENTAGE	3.0	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER KWH PROGRAM INCREASE AT METER	0.0	KWH/CUST/YR
(8)* CUSTOMER KWH REDUCTION AT METER	81,943	KWH/CUST/YR

II. ECONOMIC LIFE AND K FACTORS

(1) STUDY PERIOD FOR CONSERVATION PROGRAM	10	YEARS
(2) GENERATOR ECONOMIC LIFE	10	YEARS
(3) T & D ECONOMIC LIFE	10	YEARS
(4) K FACTOR FOR GENERATION	0.00	
(5) K FACTOR FOR T & D	0.00	
(6)* SWITCH REV REQ(0) OR VAL-OF-DEF (1)	1	

III. UTILITY AND CUSTOMER COSTS

(1)** UTILITY NONRECURRING COST PER CUSTOMER	6,382.00	$/CUST
(2)** UTILITY RECURRING COST PER CUSTOMER	0.00	$/CUST/YR
(3) UTILITY COST ESCALATION RATE	2.30	%
(4) CUSTOMER EQUIPMENT COST	34,045.00	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	2.30	%
(6) CUSTOMER O & M COST	0.00	$/CUST/YR
(7) CUSTOMER O & M ESCALATION RATE	2.30	%
(8)* CUSTOMER TAX CREDIT PER INSTALLATION	0.00	$/CUST
(9)* CUSTOMER TAX CREDIT ESCALATION RATE	0.0	%
(10)* INCREASED SUPPLY COSTS	0.00	$/CUST/YR
(11)* SUPPLY COSTS ESCALATION RATE	2.30	%
(12)* UTILITY DISCOUNT RATE	7.19	%
(13)* UTILITY AFUDC RATE	0.00	%
(14)* UTILITY NON RECURRING REBATE/INCENTIVE	7,490.00	$/CUST
(15)* UTILITY RECURRING REBATE/INCENTIVE	0.00	$/CUST/YR
(16)* UTILITY REBATE/INCENTIVE ESCAL RATE	0.0	%

IV. AVOIDED GENERATOR, TRANS. AND DIST. COSTS

(1) BASE YEAR	2015	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2015	
(3) IN-SERVICE YEAR FOR AVOIDED T & D	2015	
(4) BASE YEAR AVOIDED GENERATING UNIT COST	0	$/KW
(5) BASE YEAR AVOIDED TRANSMISSION COST	0	$/KW
(6) BASE YEAR DISTRIBUTION COST	0	$/KW
(7) GEN, TRAN, & DIST COST ESCALATION RATE	0	%
(8) GENERATOR FIXED O & M COST	0	$/KW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	0	%
(10) TRANSMISSION FIXED O & M COST	0.89	$/KW/YR
(11) DISTRIBUTION FIXED O & M COST	22.01	$/KW/YR
(12) T&D FIXED O&M ESCALATION RATE	2.3	%
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0	CENTS/KWH
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	0	%
(15) GENERATOR CAPACITY FACTOR	48.8	%
(16) AVOIDED GENERATING UNIT FUEL COST	5.446	CENTS/KWH
(17) AVOIDED GEN UNIT FUEL ESCALATION RATE	0.09	%
(18)* AVOIDED PURCHASE CAPACITY COST PER KW	172.18	$/KW/YR
(19)* CAPACITY COST ESCALATION RATE	2.71	%

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON-FUEL COST IN CUSTOMER BILL	4.329	CENTS/KWH
(2) NON-FUEL ESCALATION RATE	1.15	%
(3) CUSTOMER DEMAND CHARGE PER KW	4.76	$/KW/MO
(4) DEMAND CHARGE ESCALATION RATE	6.36	%
(5)* DIVERSITY and ANNUAL DEMAND ADJUSTMENT FACTOR FOR CUSTOMER BILL	1.0	

* FIRE Program Version Number: 1.03

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

** NONRECURRING & RECURRING COSTS IN INPUTS III.(1 & 2) DO NOT INCLUDE CUSTOMER REBATES PAID BY THE UTILITY. UTILITY REBATES ARE INPUT IN III.(14 & 15).

PROGRAM: Commercial - Chiller Upgrade

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	AVOIDED MARGINAL FUEL COST (C/KWH)	INCREASED MARGINAL FUEL COST (C/KWH)	REPLACEMENT FUEL COST (C/KWH)	PROGRAM KW EFFECTIVENESS FACTOR	PROGRAM KWH EFFECTIVENESS FACTOR
2015	1.0	0.5	5.454	5.454	5.454	5.45	1	1
2016	2.0	1.5	5.369	5.369	5.369	5.369	1	1
2017	3.0	2.5	5.418	5.418	5.418	5.418	1	1
2018	4.0	3.5	5.467	5.467	5.467	5.467	1	1
2019	5.0	4.5	5.310	5.310	5.310	5.310	1	1
2020	7.0	6	5.214	5.214	5.214	5.214	1	1
2021	9.0	8	5.295	5.295	5.295	5.295	1	1
2022	11.0	10	5.335	5.335	5.335	5.335	1	1
2023	13.0	12	5.491	5.491	5.491	5.491	1	1
2024	15.0	14	5.565	5.565	5.565	5.565	1	1

0.04329 $/KWH

AVOIDED GENERATION UNIT BENEFITS

PROGRAM: Commercial - Chiller Upgrade

* UNIT SIZE OF AVOIDED GENERATION UNIT = 46.98 kW
* INSERVICE COSTS OF AVOIDED GEN. UNIT (000) = $0

(1) Year	(1A)* VALUE OF DEFERRAL FACTOR	(2) AVOIDED GEN UNIT CAPACITY COST $(000)	(2A)* AVOIDED ANNUAL UNIT KWH GEN (000)	(3) AVOIDED UNIT FIXED O&M COST $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M COST $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(6A) AVOIDED PURCHASED CAPACITY COSTS $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	4.189	4.19
2016	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	12.609	12.61
2017	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	21.085	21.09
2018	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	29.776	29.78
2019	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	38.613	38.61
2020	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	72.930	72.93
2021	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	106.125	106.13
2022	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	134.122	134.12
2023	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	158.917	158.92
2024	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	187.456	187.46
NOMINAL		0.00	0.00	0.00	0.00	0.00	0.00	765.82	765.82
NPV		0.00		0.00	0.00	0.00	0.00	483.27	483.27

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

AVOIDED T & D AND PROGRAM FUEL BENEFITS

PROGRAM: Commercial - Chiller Upgrade

* INSERVICE COSTS OF AVOIDED TRANS. (000) = $0

* INSERVICE COSTS OF AVOIDED DIST. (000) = $0

(1) Year	(2) AVOIDED TRANSMISSION CAPACITY COST $(000)	(3) AVOIDED TRANSMISSION O&M COST (000)	(4) TOTAL AVOIDED TRANSMISSION COST $(000)	(5) AVOIDED DISTRIBUTION CAPACITY COST $(000)	(6) AVOIDED DISTRIBUTION O&M COST $(000)	(7) TOTAL AVOIDED DISTRIBUTION COST $(000)	(8) PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0209	0.0209	0.00	0.52	0.52	2.30
2016	0.00	0.0642	0.0642	0.00	1.59	1.59	6.80
2017	0.00	0.1094	0.1094	0.00	2.71	2.71	11.44
2018	0.00	0.1567	0.1567	0.00	3.87	3.87	16.16
2019	0.00	0.2061	0.2061	0.00	5.10	5.10	20.19
2020	0.00	0.2811	0.2811	0.00	6.95	6.95	26.43
2021	0.00	0.3834	0.3834	0.00	9.48	9.48	35.78
2022	0.00	0.4903	0.4903	0.00	12.12	12.12	45.07
2023	0.00	0.6019	0.6019	0.00	14.88	14.88	55.66
2024	0.00	0.7183	0.7183	0.00	17.76	17.76	65.82
NOMINAL	0.00	3.03	3.03	0.00	74.99	74.99	285.66
NPV	0.00	1.94	1.94	0.00	48.03	48.03	184.19

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET : DSM PROGRAM FUEL SAVINGS
PROGRAM: Commercial - Chiller Upgrade

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	REDUCTION IN KWH GENERATION NET NEW CUST KWH (000)	AVOIDED MARGINAL FUEL COST - REDUCED KWH $(000)	INCREASE IN KWH GENERATION NET NEW CUST KWH (000)	INCREASED MARGINAL FUEL COST - INCREASE KWH $(000)	NET AVOIDED PROGRAM FUEL SAVINGS $(000)	EFFECTIVE PROGRAM FUEL SAVINGS $(000)
2015	42.24	2.3037	0.0000	0.0000	2.3037	2.3037
2016	126.72	6.8034	0.0000	0.0000	6.8034	6.8034
2017	211.19	11.4425	0.0000	0.0000	11.4425	11.4425
2018	295.67	16.1643	0.0000	0.0000	16.1643	16.1643
2019	380.15	20.1859	0.0000	0.0000	20.1859	20.1859
2020	506.86	26.4279	0.0000	0.0000	26.4279	26.4279
2021	675.82	35.7846	0.0000	0.0000	35.7846	35.7846
2022	844.77	45.0687	0.0000	0.0000	45.0687	45.0687
2023	1,013.73	55.6638	0.0000	0.0000	55.6638	55.6638
2024	1,182.68	65.8163	0.0000	0.0000	65.8163	65.8163
NOMINAL	5,279.8325	285.6609	0.0000	0.0000	285.6609	285.6609
NPV		184.1869	0.0000	0.0000	184.1869	184.1869

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET: UTILITY COSTS, PARTICIPANT COSTS, AND REV LOSS/GAIN
PROGRAM: Commercial - Chiller Upgrade

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	<------ UTILITY PROGRAM COSTS & REBATES ---------->						<---------- PARTICIPATING CUSTOMER COSTS & BENEFITS---------->										
YEAR	UTIL NONREC. COSTS $(000)	UTIL RECUR COSTS $(000)	TOTAL UTIL PGM COSTS $(000)	UTIL NONREC. REBATES $(000)	UTIL RECUR. REBATES $(000)	TOTAL REBATE/ INCENT. COSTS $(000)	PARTIC. CUST EQUIP COSTS $(000)	PARTIC. CUST O & M COSTS $(000)	TOTAL PARTIC. CUST COSTS $(000)	REDUCT. IN CUST. KWH (000)	RED. REV. - FUEL PORTION $(000)	RED. REV. NONFUEL PORTION $(000)	EFFECT. REV. REDUCT. IN BILL $(000)	INC. IN CUST. KWH (000)	INC. REV. - FUEL PORTION $(000)	INC. REV. NONFUEL PORTION	EFFECT. REVENUE INC. IN BILL $(000)
2015	6.3820	0.0000	6.3820	7.4900	0.0000	7.4900	34.0450	0.0000	34.0450	40.97	2.2346	2.9960	5.2306	0.0000	0.0000	0.0000	0.0000
2016	6.5288	0.0000	6.5288	7.4900	0.0000	7.4900	34.8280	0.0000	34.8280	122.91	6.5993	9.2825	15.8818	0.0000	0.0000	0.0000	0.0000
2017	6.6789	0.0000	6.6789	7.4900	0.0000	7.4900	35.6291	0.0000	35.6291	204.86	11.0992	15.9874	27.0866	0.0000	0.0000	0.0000	0.0000
2018	6.8326	0.0000	6.8326	7.4900	0.0000	7.4900	36.4485	0.0000	36.4485	286.80	15.6794	23.1441	38.8235	0.0000	0.0000	0.0000	0.0000
2019	6.9897	0.0000	6.9897	7.4900	0.0000	7.4900	37.2869	0.0000	37.2869	368.74	19.5803	30.7885	50.3688	0.0000	0.0000	0.0000	0.0000
2020	14.3010	0.0000	14.3010	14.9800	0.0000	14.9800	76.2889	0.0000	76.2889	491.66	25.6350	42.5014	68.1365	0.0000	0.0000	0.0000	0.0000
2021	14.6299	0.0000	14.6299	14.9800	0.0000	14.9800	78.0436	0.0000	78.0436	655.54	34.7111	58.7072	93.4182	0.0000	0.0000	0.0000	0.0000
2022	14.9664	0.0000	14.9664	14.9800	0.0000	14.9800	79.8386	0.0000	79.8386	819.43	43.7166	76.0718	119.7884	0.0000	0.0000	0.0000	0.0000
2023	15.3106	0.0000	15.3106	14.9800	0.0000	14.9800	81.6749	0.0000	81.6749	983.32	53.9939	94.6894	148.6832	0.0000	0.0000	0.0000	0.0000
2024	15.6627	0.0000	15.6627	14.9800	0.0000	14.9800	83.5534	0.0000	83.5534	1,147.20	63.8418	114.6616	178.5034	0.0000	0.0000	0.0000	0.0000
NOMINAL	108.2825	0.0000	108.2825	112.3500	0.0000	112.3500	577.6368	0.0000	577.6368	5,121.4375	277.0911	468.8299	745.9210	0.0000	0.0000	0.0000	0.0000
NPV	75.2551	0.0000	75.2551	79.0424	0.0000	79.0424	401.4509	0.0000	401.4509		178.6613	298.9279	477.5892		0.0000	0.0000	0.0000

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

TOTAL RESOURCE COST TESTS
PROGRAM: Commercial - Chiller Upgrade

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	INCREMENTAL PURCHASED POWER BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	6.38	34.05	0.00	40.43	4.19	0.54	2.30	0.00	7.03	(33.40)	(33.40)
2016	0.00	6.53	34.83	0.00	41.36	12.61	1.65	6.80	0.00	21.06	(20.29)	(52.33)
2017	0.00	6.68	35.63	0.00	42.31	21.09	2.81	11.44	0.00	35.34	(6.97)	(58.39)
2018	0.00	6.83	36.45	0.00	43.28	29.78	4.03	16.16	0.00	49.97	6.69	(52.96)
2019	0.00	6.99	37.29	0.00	44.28	38.61	5.30	20.19	0.00	64.10	19.82	(37.94)
2020	0.00	14.30	76.29	0.00	90.59	72.93	7.23	26.43	0.00	106.59	16.00	(26.63)
2021	0.00	14.63	78.04	0.00	92.67	106.13	9.87	35.78	0.00	151.77	59.10	12.33
2022	0.00	14.97	79.84	0.00	94.80	134.12	12.62	45.07	0.00	191.81	97.00	71.99
2023	0.00	15.31	81.67	0.00	96.99	158.92	15.49	55.66	0.00	230.07	133.08	148.36
2024	0.00	15.66	83.55	0.00	99.22	187.46	18.48	65.82	0.00	271.75	172.54	240.72
NOMINAL	0.00	108.28	577.64	0.00	586.70	765.82	78.02	285.66	0.00	857.75	443.58	
NPV	0.00	75.26	401.45	0.00	423.59	483.27	49.97	184.19	0.00	571.95	240.72	

Discount Rate: 7.19%
Benefit/Cost Ratio [col (11) / col (6)]: 1.35

PARTICIPANT COSTS AND BENEFITS
PROGRAM: Commercial - Chiller Upgrade

(1) YEAR	(2) SAVINGS IN PARTICIPANTS BILL $(000)	(3) TAX CREDITS $(000)	(4) UTILITY REBATES $(000)	(5) OTHER BENEFITS $(000)	(6) TOTAL BENEFITS $(000)	(7) CUSTOMER EQUIPMENT COSTS $(000)	(8) CUSTOMER O & M COSTS $(000)	(9) OTHER COSTS $(000)	(10) TOTAL COSTS $(000)	(11) NET BENEFITS $(000)	(12) CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	5.23	0.00	7.49	0.00	12.72	34.05	0.00	0.00	34.05	(21.32)	(21.32)
2016	15.88	0.00	7.49	0.00	23.37	34.83	0.00	0.00	34.83	(11.46)	(32.01)
2017	27.09	0.00	7.49	0.00	34.58	35.63	0.00	0.00	35.63	(1.05)	(32.93)
2018	38.82	0.00	7.49	0.00	46.31	36.45	0.00	0.00	36.45	9.86	(24.92)
2019	50.37	0.00	7.49	0.00	57.86	37.29	0.00	0.00	37.29	20.57	(9.34)
2020	68.14	0.00	14.98	0.00	83.12	76.29	0.00	0.00	76.29	6.83	(4.51)
2021	93.42	0.00	14.98	0.00	108.40	78.04	0.00	0.00	78.04	30.35	15.50
2022	119.79	0.00	14.98	0.00	134.77	79.84	0.00	0.00	79.84	54.93	49.29
2023	148.68	0.00	14.98	0.00	163.66	81.67	0.00	0.00	81.67	81.99	96.33
2024	178.50	0.00	14.98	0.00	193.48	83.55	0.00	0.00	83.55	109.93	155.18
NOMINAL	745.92	0.00	112.35	0.00	858.27	577.64	0.00	0.00	577.64	280.63	
NPV	477.59	0.00	79.04	0.00	556.63	401.45	0.00	0.00	401.45	155.18	

In-service year of generation unit: 2015
Discount rate: 7.19%
Benefit/Cost Ratio: 1.39

RATE IMPACT TEST
PROGRAM: Commercial - Chiller Upgrade

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS TO ALL CUSTOMERS $(000)	CUMULATIVE DISCOUNTED NET BENEFIT $(000)
2015	0.00	6.38	7.49	5.23	0.00	19.10	6.49	0.54	0.00	0.00	7.03	(12.07)	(12.07)
2016	0.00	6.53	7.49	15.88	0.00	29.90	19.41	1.65	0.00	0.00	21.06	(8.84)	(20.32)
2017	0.00	6.68	7.49	27.09	0.00	41.26	32.53	2.81	0.00	0.00	35.34	(5.91)	(25.46)
2018	0.00	6.83	7.49	38.82	0.00	53.15	45.94	4.03	0.00	0.00	49.97	(3.17)	(28.04)
2019	0.00	6.99	7.49	50.37	0.00	64.85	58.80	5.30	0.00	0.00	64.10	(0.75)	(28.61)
2020	0.00	14.30	14.98	68.14	0.00	97.42	99.36	7.23	0.00	0.00	106.59	9.17	(22.12)
2021	0.00	14.63	14.98	93.42	0.00	123.03	141.91	9.87	0.00	0.00	151.77	28.75	(3.17)
2022	0.00	14.97	14.98	119.79	0.00	149.73	179.19	12.62	0.00	0.00	191.81	42.07	22.70
2023	0.00	15.31	14.98	148.68	0.00	178.97	214.58	15.49	0.00	0.00	230.07	51.09	52.02
2024	0.00	15.66	14.98	178.50	0.00	209.15	253.27	18.48	0.00	0.00	271.75	62.61	85.54
NOMINAL	0.00	108.28	112.35	745.92	0.00	966.55	1,051.48	78.02	0.00	0.00	1,129.50	162.95	
NPV	0.00	75.26	79.04	477.59	0.00	631.89	667.45	49.97	0.00	0.00	717.42	85.54	

Discount rate: 7.19%
Benefit / Cost Ratio [col (12) / col (7)]: 1.14

PROGRAM: Commercial - Reflective Roof Program

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	AVOIDED MARGINAL FUEL COST (C/KWH)	INCREASED MARGINAL FUEL COST (C/KWH)	REPLACEMENT FUEL COST (C/KWH)	PROGRAM KW EFFECTIVENESS FACTOR	PROGRAM KWH EFFECTIVENESS FACTOR
2015	0	0	5.454	5.454	5.454	5.45	1	1
2016	10	5	5.369	5.369	5.369	5.369	1	1
2017	30	20	5.418	5.418	5.418	5.418	1	1
2018	60	45	5.467	5.467	5.467	5.467	1	1
2019	100	80	5.310	5.310	5.310	5.310	1	1
2020	150	125	5.214	5.214	5.214	5.214	1	1
2021	200	175	5.295	5.295	5.295	5.295	1	1
2022	250	225	5.335	5.335	5.335	5.335	1	1
2023	300	275	5.491	5.491	5.491	5.491	1	1
2024	350	325	5.565	5.565	5.565	5.565	1	1

Revised Cost Effectivness Results: 4/20/15

A-9 Commercial Reflective Roof

PROGRAM: Commercial - Reflective Roof Program

I. PROGRAM DEMAND SAVINGS AND LINE LOSSES

(1) CUSTOMER KW REDUCTION AT THE METER	0.910	KW /CUST
(2) GENERATOR KW REDUCTION PER CUSTOMER	0.999	KW GEN/CUST
(3) KW LINE LOSS PERCENTAGE	8.9	%
(4) GENERATION KWH REDUCTION PER CUSTOMER	2,525.8	KWH/CUST/YR
(5) KWH LINE LOSS PERCENTAGE	3.0	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER KWH PROGRAM INCREASE AT METER	0.0	KWH/CUST/YR
(8)* CUSTOMER KWH REDUCTION AT METER	2,450	KWH/CUST/YR

II. ECONOMIC LIFE AND K FACTORS

(1) STUDY PERIOD FOR CONSERVATION PROGRAM	10	YEARS
(2) GENERATOR ECONOMIC LIFE	10	YEARS
(3) T & D ECONOMIC LIFE	10	YEARS
(4) K FACTOR FOR GENERATION	0.00	
(5) K FACTOR FOR T & D	0.00	
(6)* SWITCH REV REQ(0) OR VAL-OF-DEF (1)	1	

III. UTILITY AND CUSTOMER COSTS

(1)** UTILITY NONRECURRING COST PER CUSTOMER	110.60	$/CUST
(2)** UTILITY RECURRING COST PER CUSTOMER	0.00	$/CUST/YR
(3) UTILITY COST ESCALATION RATE	2.30	%
(4) CUSTOMER EQUIPMENT COST	800.00	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	2.30	%
(6) CUSTOMER O & M COST	0.00	$/CUST/YR
(7) CUSTOMER O & M ESCALATION RATE	2.30	%
(8)* CUSTOMER TAX CREDIT PER INSTALLATION	0.00	$/CUST
(9)* CUSTOMER TAX CREDIT ESCALATION RATE	0.0	%
(10)* INCREASED SUPPLY COSTS	0.00	$/CUST/YR
(11)* SUPPLY COSTS ESCALATION RATE	2.30	%
(12)* UTILITY DISCOUNT RATE	7.19	%
(13)* UTILITY AFUDC RATE	0.00	%
(14)* UTILITY NON RECURRING REBATE/INCENTIVE	200.00	$/CUST
(15)* UTILITY RECURRING REBATE/INCENTIVE	0.00	$/CUST/YR
(16)* UTILITY REBATE/INCENTIVE ESCAL RATE	0.0	%

IV. AVOIDED GENERATOR, TRANS. AND DIST. COSTS

(1) BASE YEAR	2015	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2015	
(3) IN-SERVICE YEAR FOR AVOIDED T & D	2015	
(4) BASE YEAR AVOIDED GENERATING UNIT COST	0	$/KW
(5) BASE YEAR AVOIDED TRANSMISSION COST	0	$/KW
(6) BASE YEAR DISTRIBUTION COST	0	$/KW
(7) GEN, TRAN, & DIST COST ESCALATION RATE	0	%
(8) GENERATOR FIXED O & M COST	0	$/KW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	0	%
(10) TRANSMISSION FIXED O & M COST	0.89	$/KW/YR
(11) DISTRIBUTION FIXED O & M COST	22.01	$/KW/YR
(12) T&D FIXED O&M ESCALATION RATE	2.3	%
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0	CENTS/KWH
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	0	%
(15) GENERATOR CAPACITY FACTOR	48.8	%
(16) AVOIDED GENERATING UNIT FUEL COST	5.446	CENTS/KWH
(17) AVOIDED GEN UNIT FUEL ESCALATION RATE	0.09	%
(18)* AVOIDED PURCHASE CAPACITY COST PER KW	172.18	$/KW/YR
(19)* CAPACITY COST ESCALATION RATE	2.71	%

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON-FUEL COST IN CUSTOMER BILL	4.938	CENTS/KWH
(2) NON-FUEL ESCALATION RATE	1.15	%
(3) CUSTOMER DEMAND CHARGE PER KW	3.26	$/KW/MO
(4) DEMAND CHARGE ESCALATION RATE	5.81	%
(5)* DIVERSITY and ANNUAL DEMAND ADJUSTMENT FACTOR FOR CUSTOMER BILL	1.0	

* FIRE Program Version Number: 1.03

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

** NONRECURRING & RECURRING COSTS IN INPUTS III.(1 & 2) DO NOT INCLUDE CUSTOMER REBATES PAID BY THE UTILITY. UTILITY REBATES ARE INPUT IN III.(14 & 15).

PROGRAM: Commercial - Reflective Roof Program

* Avoided Generation Unit: PPA
* Program Generation Equivilency Factor: 1.00

(1) YEAR	(2) CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	(3) ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	(4) UTILITY AVERAGE SYSTEM FUEL COSTS (C/KWH)	(5) AVOIDED MARGINAL FUEL COST (C/KWH)	(6) INCREASED MARGINAL FUEL COST (C/KWH)	(7) REPLACEMENT FUEL COST (C/KWH)	(8) PROGRAM KW EFFECTIVENESS FACTOR	(9) PROGRAM KWH EFFECTIVENESS FACTOR
2015	0	0	5.454	5.454	5.454	5.45	1	1
2016	5	2.5	5.369	5.369	5.369	5.369	1	1
2017	15	10	5.418	5.418	5.418	5.418	1	1
2018	30	22.5	5.467	5.467	5.467	5.467	1	1
2019	50	40	5.310	5.310	5.310	5.310	1	1
2020	75	62.5	5.214	5.214	5.214	5.214	1	1
2021	100	87.5	5.295	5.295	5.295	5.295	1	1
2022	125	112.5	5.335	5.335	5.335	5.335	1	1
2023	150	137.5	5.491	5.491	5.491	5.491	1	1
2024	175	165.5	5.565	5.565	5.565	5.565	1	1

AVOIDED GENERATION UNIT BENEFITS

PROGRAM: Commercial - Reflective Roof Program

* UNIT SIZE OF AVOIDED GENERATION UNIT = 1.00 kW

* INSERVICE COSTS OF AVOIDED GEN. UNIT (000) = $0

(1)	(1A)*	H4 * $/kW Wh times customers (2)	(2A)*	Zero (3)	(4)	Zero Wh times fuel cost (5)	(6)	(6A)	(7)
Year	VALUE OF DEFERRAL FACTOR	AVOIDED GEN UNIT CAPACITY COST $(000)	AVOIDED ANNUAL UNIT KWH GEN (000)	AVOIDED UNIT FIXED O&M COST $(000)	AVOIDED GEN UNIT VARIABLE O&M COST $(000)	AVOIDED GEN UNIT FUEL COST $(000)	REPLACEMENT FUEL COST $(000)	AVOIDED PURCHASED CAPACITY COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.000	0.00
2016	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.447	0.45
2017	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	1.793	1.79
2018	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	4.070	4.07
2019	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	7.298	7.30
2020	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	16.152	16.15
2021	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	24.679	24.68
2022	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	32.081	32.08
2023	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	38.716	38.72
2024	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	47.116	47.12
NOMINAL		0.00	0.00	0.00	0.00	0.00	0.00	172.35	172.35
NPV		0.00		0.00	0.00	0.00	0.00	105.66	105.66

Year	$/MWh from Myron's Avoided Costs.doc	$/kW from Myron's Avoided Costs.doc	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS kW	AVOIDED GEN UNIT CAPACITY COST
2015	54.54	178.32	0.00	$0.00
2016	53.69	178.92	2.50	$446.81
2017	54.18	179.52	9.99	$1,793.23
2018	54.67	181.08	22.48	$4,069.83
2019	53.10	182.64	39.96	$7,297.58
2020	52.14	258.72	62.43	$16,152.25
2021	52.95	282.36	87.40	$24,679.38
2022	53.35	285.48	112.38	$32,081.25
2023	54.91	281.88	137.35	$38,715.95
2024	55.65	285.00	165.32	$47,115.72

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

Avoided Gen Unit and Avoided Energy Unit dervied from Approved Econominc Parameters & avoid Cost Data and Expantion Document 2015 ($14.86/kW-Mo x 12 Mo)

Revised Cost Effectivness Results: 4/20/15

AVOIDED T & D AND PROGRAM FUEL BENEFITS

PROGRAM: Commercial - Reflective Roof Program

* INSERVICE COSTS OF AVOIDED TRANS. (000) = $0

* INSERVICE COSTS OF AVOIDED DIST. (000) = $0

(1) Year	(2) AVOIDED TRANSMISSION CAPACITY COST $(000)	(3) AVOIDED TRANSMISSION O&M COST (000)	(4) TOTAL AVOIDED TRANSMISSION COST $(000)	(5) AVOIDED DISTRIBUTION CAPACITY COST $(000)	(6) AVOIDED DISTRIBUTION O&M COST $(000)	(7) TOTAL AVOIDED DISTRIBUTION COST $(000)	(8) PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00
2016	0.00	0.0023	0.0023	0.00	0.06	0.06	0.34
2017	0.00	0.0093	0.0093	0.00	0.23	0.23	1.37
2018	0.00	0.0214	0.0214	0.00	0.53	0.53	3.11
2019	0.00	0.0389	0.0389	0.00	0.96	0.96	5.36
2020	0.00	0.0623	0.0623	0.00	1.54	1.54	8.23
2021	0.00	0.0892	0.0892	0.00	2.20	2.20	11.70
2022	0.00	0.1173	0.1173	0.00	2.90	2.90	15.16
2023	0.00	0.1466	0.1466	0.00	3.63	3.63	19.07
2024	0.00	0.1805	0.1805	0.00	4.47	4.47	23.26
NOMINAL	0.00	0.67	0.67	0.00	16.52	16.52	87.60
NPV	0.00	0.41	0.41	0.00	10.21	10.21	54.34

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET : DSM PROGRAM FUEL SAVINGS
PROGRAM: Commercial - Reflective Roof Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	REDUCTION IN KWH GENERATION NET NEW CUST KWH (000)	AVOIDED MARGINAL FUEL COST - REDUCED KWH $(000)	INCREASE IN KWH GENERATION NET NEW CUST KWH (000)	INCREASED MARGINAL FUEL COST - INCREASE KWH $(000)	NET AVOIDED PROGRAM FUEL SAVINGS $(000)	EFFECTIVE PROGRAM FUEL SAVINGS $(000)
2015	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
2016	6.31	0.3390	0.0000	0.0000	0.3390	0.3390
2017	25.26	1.3685	0.0000	0.0000	1.3685	1.3685
2018	56.83	3.1069	0.0000	0.0000	3.1069	3.1069
2019	101.03	5.3647	0.0000	0.0000	5.3647	5.3647
2020	157.86	8.2309	0.0000	0.0000	8.2309	8.2309
2021	221.01	11.7022	0.0000	0.0000	11.7022	11.7022
2022	284.15	15.1594	0.0000	0.0000	15.1594	15.1594
2023	347.29	19.0699	0.0000	0.0000	19.0699	19.0699
2024	418.02	23.2626	0.0000	0.0000	23.2626	23.2626
NOMINAL	1,617.7577	87.6040	0.0000	0.0000	87.6040	87.6040
NPV		54.3449	0.0000	0.0000	54.3449	54.3449

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

* WORKSHEET: UTILITY COSTS, PARTICIPANT COSTS, AND REV LOSS/GAIN
PROGRAM: Commercial - Reflective Roof Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	<------ UTILITY PROGRAM COSTS & REBATES ---------->						<---------- PARTICIPATING CUSTOMER COSTS & BENEFITS---------->										
YEAR	UTIL NONREC. COSTS $(000)	UTIL RECUR COSTS $(000)	TOTAL UTIL PGM COSTS $(000)	UTIL NONREC. REBATES $(000)	UTIL RECUR. REBATES $(000)	TOTAL REBATE/ INCENT. COSTS $(000)	PARTIC. CUST EQUIP COSTS $(000)	PARTIC. CUST O & M COSTS $(000)	TOTAL PARTIC. CUST COSTS $(000)	REDUCT. IN CUST. KWH (000)	RED. REV. - FUEL PORTION $(000)	RED. REV. NONFUEL PORTION $(000)	EFFECT. REV. REDUCT. IN BILL $(000)	INC. IN CUST. KWH (000)	INC. REV. - FUEL PORTION $(000)	INC. REV. NONFUEL PORTION	EFFECT. REVENUE INC. IN BILL $(000)
2015	5.0000	0.0000	5.0000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2016	0.5657	0.0000	0.5657	1.00	0.0000	1.0000	4.0920	0.0000	4.0920	6.13	0.3289	0.4001	0.7290	0.0000	0.0000	0.0000	0.0000
2017	1.1575	0.0000	1.1575	2.00	0.0000	2.0000	8.3722	0.0000	8.3722	24.50	1.3274	1.6364	2.9638	0.0000	0.0000	0.0000	0.0000
2018	1.7761	0.0000	1.7761	3.00	0.0000	3.0000	12.8472	0.0000	12.8472	55.13	3.0137	3.7659	6.7796	0.0000	0.0000	0.0000	0.0000
2019	2.4226	0.0000	2.4226	4.00	0.0000	4.0000	17.5236	0.0000	17.5236	98.00	5.2038	6.8506	12.0544	0.0000	0.0000	0.0000	0.0000
2020	3.0979	0.0000	3.0979	5.00	0.0000	5.0000	22.4083	0.0000	22.4083	153.13	7.9839	10.9571	18.9410	0.0000	0.0000	0.0000	0.0000
2021	3.1692	0.0000	3.1692	5.00	0.0000	5.0000	22.9237	0.0000	22.9237	214.38	11.3512	15.7089	27.0600	0.0000	0.0000	0.0000	0.0000
2022	3.2421	0.0000	3.2421	5.00	0.0000	5.0000	23.4509	0.0000	23.4509	275.63	14.7046	20.6913	35.3959	0.0000	0.0000	0.0000	0.0000
2023	3.3167	0.0000	3.3167	5.00	0.0000	5.0000	23.9903	0.0000	23.9903	336.88	18.4978	25.9189	44.4167	0.0000	0.0000	0.0000	0.0000
2024	3.3929	0.0000	3.3929	5.00	0.0000	5.0000	24.5420	0.0000	24.5420	405.48	22.5647	31.9870	54.5517	0.0000	0.0000	0.0000	0.0000
NOMINAL	27.1408	0.0000	27.1408	35.0000	0.0000	35.0000	160.1501	0.0000	160.1501	1,569.2250	84.9759	117.9161	202.8920	0.0000	0.0000	0.0000	0.0000
NPV	19.8047	0.0000	19.8047	23.5903	0.0000	23.5903	107.0861	0.0000	107.0861		52.7145	72.8666	125.5811		0.0000	0.0000	0.0000

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK

TOTAL RESOURCE COST TESTS
PROGRAM: Commercial - Reflective Roof Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	INCREMENTAL PURCHASED POWER BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	5.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	(5.00)	(5.00)
2016	0.00	0.57	4.09	0.00	4.66	0.45	0.06	0.34	0.00	0.84	(3.81)	(8.56)
2017	0.00	1.16	8.37	0.00	9.53	1.79	0.24	1.37	0.00	3.40	(6.13)	(13.89)
2018	0.00	1.78	12.85	0.00	14.62	4.07	0.55	3.11	0.00	7.73	(6.90)	(19.49)
2019	0.00	2.42	17.52	0.00	19.95	7.30	1.00	5.36	0.00	13.66	(6.28)	(24.25)
2020	0.00	3.10	22.41	0.00	25.51	16.15	1.60	8.23	0.00	25.98	0.48	(23.91)
2021	0.00	3.17	22.92	0.00	26.09	24.68	2.29	11.70	0.00	38.68	12.58	(15.61)
2022	0.00	3.24	23.45	0.00	26.69	32.08	3.02	15.16	0.00	50.26	23.57	(1.12)
2023	0.00	3.32	23.99	0.00	27.31	38.72	3.77	19.07	0.00	61.56	34.25	18.53
2024	0.00	3.39	24.54	0.00	27.93	47.12	4.65	23.26	0.00	75.02	47.09	43.74
NOMINAL	0.00	27.14	160.15	0.00	159.36	172.35	17.18	87.60	0.00	202.12	89.85	
NPV	0.00	19.80	107.09	0.00	111.94	105.66	10.62	54.34	0.00	130.47	43.74	

Discount Rate: 7.19%
Benefit/Cost Ratio [col (11) / col (6)]: 1.17

PARTICIPANT COSTS AND BENEFITS
PROGRAM: Commercial - Reflective Roof Program

(1) YEAR	(2) SAVINGS IN PARTICIPANTS BILL $(000)	(3) TAX CREDITS $(000)	(4) UTILITY REBATES $(000)	(5) OTHER BENEFITS $(000)	(6) TOTAL BENEFITS $(000)	(7) CUSTOMER EQUIPMENT COSTS $(000)	(8) CUSTOMER O & M COSTS $(000)	(9) OTHER COSTS $(000)	(10) TOTAL COSTS $(000)	(11) NET BENEFITS $(000)	(12) CUMULATIVE DISCOUNTED NET BENEFITS $(000)
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	0.73	0.00	1.00	0.00	1.73	4.09	0.00	0.00	4.09	(2.36)	(2.20)
2017	2.96	0.00	2.00	0.00	4.96	8.37	0.00	0.00	8.37	(3.41)	(5.17)
2018	6.78	0.00	3.00	0.00	9.78	12.85	0.00	0.00	12.85	(3.07)	(7.66)
2019	12.05	0.00	4.00	0.00	16.05	17.52	0.00	0.00	17.52	(1.47)	(8.77)
2020	18.94	0.00	5.00	0.00	23.94	22.41	0.00	0.00	22.41	1.53	(7.69)
2021	27.06	0.00	5.00	0.00	32.06	22.92	0.00	0.00	22.92	9.14	(1.67)
2022	35.40	0.00	5.00	0.00	40.40	23.45	0.00	0.00	23.45	16.94	8.75
2023	44.42	0.00	5.00	0.00	49.42	23.99	0.00	0.00	23.99	25.43	23.34
2024	54.55	0.00	5.00	0.00	59.55	24.54	0.00	0.00	24.54	35.01	42.09
NOMINAL	202.89	0.00	35.00	0.00	237.89	160.15	0.00	0.00	160.15	77.74	
NPV	125.58	0.00	23.59	0.00	149.17	107.09	0.00	0.00	107.09	42.09	

In-service year of generation unit: 2015
Discount rate: 7.19%
Benefit/Cost Ratio: 1.39

RATE IMPACT TEST
PROGRAM: Commercial - Reflective Roof Program

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T & D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS TO ALL CUSTOMERS $(000)	CUMULATIVE DISCOUNTED NET BENEFIT $(000)
2015	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	(5.00)	(5.00)
2016	0.00	0.57	1.00	0.73	0.00	2.29	0.79	0.06	0.00	0.00	0.84	(1.45)	(6.35)
2017	0.00	1.16	2.00	2.96	0.00	6.12	3.16	0.24	0.00	0.00	3.40	(2.72)	(8.72)
2018	0.00	1.78	3.00	6.78	0.00	11.56	7.18	0.55	0.00	0.00	7.73	(3.83)	(11.83)
2019	0.00	2.42	4.00	12.05	0.00	18.48	12.66	1.00	0.00	0.00	13.66	(4.81)	(15.47)
2020	0.00	3.10	5.00	18.94	0.00	27.04	24.38	1.60	0.00	0.00	25.98	(1.05)	(16.22)
2021	0.00	3.17	5.00	27.06	0.00	35.23	36.38	2.29	0.00	0.00	38.68	3.45	(13.95)
2022	0.00	3.24	5.00	35.40	0.00	43.64	47.24	3.02	0.00	0.00	50.26	6.62	(9.88)
2023	0.00	3.32	5.00	44.42	0.00	52.73	57.79	3.77	0.00	0.00	61.56	8.83	(4.81)
2024	0.00	3.39	5.00	54.55	0.00	62.94	70.38	4.65	0.00	0.00	75.02	12.08	1.66
NOMINAL	0.00	27.14	35.00	202.89	0.00	265.03	259.96	17.18	0.00	0.00	277.14	12.11	
NPV	0.00	19.80	23.59	125.58	0.00	168.98	160.01	10.62	0.00	0.00	170.63	1.66	

Discount rate: 7.19%
Benefit / Cost Ratio [col (12) / col (7)]: 1.01