INFORMATION SHEET

PRESIDING: Commissioner Brown-Bland, Presiding; Chair Mitchell and Commissioners Dockham, Patterson, Gray, and Clodfelter
PLACE: Dobbs Building, Room 2115, Raleigh, NC
DATE: Tuesday, June 11, 2019
TIME: 9:41 a.m. to 9:53 a.m.
DOCKET NO.: E-7, Sub 1192
VOLUME NUMBER:
COMPANIES: Duke Energy Carolinas, LLC
DESCRIPTION: Application of Duke Energy Carolinas, LLC, for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider Pursuant to N.C.G.S. § 62-133.9 and NCUC Rule R8-69

APPEARANCES

Please see attached.

WITNESSES

Please see attached.

EXHIBITS

Please see attached.

EMAIL DISTRIBUTION

TRANSCRIPT COPIES ORDERED: Fentress, Thompson, Smith, and Little
CONFIDENTIAL EXHIBITS:
TRANSCRIPT PAGES: 20
PREFILED PAGES: 146
TOTAL PAGES: 166
REPORTED BY: Kim Mitchell
DATE FILED: June 28, 2019

PLACE: Dobbs Building, Raleigh, North Carolina

DATE: Tuesday, June 11, 2019

TIME: 9:41 a.m. - 9:53 a.m.

DOCKET NO: E-7, Sub 1192

BEFORE: Commissioner ToNola D. Brown-Bland, Presiding
Chair Charlotte A. Mitchell
Commissioner Jerry C. Dockham
Commissioner James G. Patterson
Commissioner Lyons Gray
Commissioner Daniel G. Clodfelter

IN THE MATTER OF:

Application of Duke Energy Carolinas, LLC, for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider Pursuant to N.C.G.S. § 62-133.9 and NCUC Rule R8-69

NORTH CAROLINA UTILITIES COMMISSION

A P P E A R A N C E S:

FOR DUKE ENERGY CAROLINAS, LLC:

Kendrick Fentress, Esq.
Associate General Counsel
Duke Energy Corporation
411 Fayetteville Street
Raleigh, North Carolina 27601

FOR CAROLINA UTILITY CUSTOMERS ASSOCIATION, INC.:

Robert F. Page, Esq.
Crisp & Page, PLLC
4010 Barrett Drive, Suite 205
Raleigh, North Carolina 27609

FOR NORTH CAROLINA SUSTAINABLE ENERGY ASSOCIATION:

Benjamin Smith, Esq.
Regulatory Counsel
4600 Six Forks Road, Suite 300
Raleigh, North Carolina 27609

A P P E A R A N C E S Cont'd.:

FOR SIERRA CLUB:

Gudrun Thompson, Esq.
Senior Attorney
Southern Environmental Law Center
601 West Rosemary Street, Suite 220
Chapel Hill, North Carolina 27516

FOR CAROLINA INDUSTRIAL GROUP FOR FAIR UTILITY RATES, III:

Warren Hicks, Esq.
Bailey & Dixon
434 Fayetteville Street, Suite 2500
Raleigh, North Carolina 27601

FOR THE USING AND CONSUMING PUBLIC:

John Little, Esq.
North Carolina Utilities Commission
4326 Mail Service Center
Raleigh, North Carolina 27699-4300

TABLE OF CONTENTS

E X H I B I T S

I/A

NAVIGANT

2017 Evaluation Report for the Duke Energy Carolinas PowerShare® Program

Prepared for:

Duke Energy

March 20, 2018

Submitted by:
Navigant Consulting, Inc.
1375 Walnut St.
Suite 100
Boulder, CO 80302

303.728.2500
navigant.com

Prepared by:
Peter Steele-Mosey
Will Sierzchula
Jeff McMillan
Brian Eakin
Mark Bielecki
Stuart Schare

NAVIGANT

CONTENTS

NAVIGANT

EXECUTIVE SUMMARY

This document presents Navigant's evaluation of the Duke Energy Carolinas (DEC) PowerShare® Program for Program Year 2017. The PowerShare Program is a demand response (DR) program offered to commercial and industrial customers that is part of Duke Energy's portfolio of demand side management and energy efficiency (DSM/EE) programs. PowerShare offers participating commercial and industrial customers a financial incentive to reduce their electricity consumption when called upon by Duke Energy.

The DEC program offers customers the following four options:

- **Mandatory Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must reduce load during each Mandatory Curtailment Period to a contracted firm level.
- **Voluntary Curtailment:** In exchange for an event performance payment, participants may reduce load to a pre-nominated level during Voluntary Curtailment Periods.
- **Generator Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must transfer load from a Duke Energy source to a private generation source during Generator Curtailment Periods.
- **CallOption Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must reduce load during Emergency or Economic Curtailment periods to a contracted firm level. There are currently no DEC customers enrolled in CallOption Curtailment, so it is not addressed in this report.

Evaluation Objectives

The research objectives of this evaluation are as follows:

1. Review updates to the SAS code used by Duke Energy to estimate baseline as well as monthly and seasonal capability.
2. Audit the hourly kW DR event load shed for participating customers by replicating the Schneider Electric Energy Profiler Online™ (EPO) methods used to calculate the energy (kWh) and demand (kW) impacts used to determine settlement payments.

To complete the first objective, Navigant reviewed updates to the SAS code used by Duke Energy to determine participant baselines and monthly and seasonal capability. To complete the second objective, Navigant replicated the EPO energy and demand calculations used by Duke Energy to determine settlement payments.

Key Findings

This section presents Navigant's key evaluation findings for the two principal evaluation objectives:

NAVIGANT

Duke Energy Baseline SAS Code Review

Duke Energy Applied Updates Per Navigant's Recommendations. During the 2016 PowerShare evaluation, Navigant performed a detailed audit of the SAS code used by Duke Energy to calculate settlement baselines, as well as monthly and seasonal capabilities. As an outcome of this audit, Navigant provided Duke Energy with several recommendations to improve the functionality and organization of the SAS code. For 2017, Navigant again reviewed the SAS code and found that Duke Energy appropriately implemented the changes recommended by Navigant.

Verification and Validation of Settlement Energy and Demand Calculations

Settlement calculations verified as correct. Duke Energy uses EPO to determine the energy (kWh) and capacity (kW) values that are the basis for calculating monthly settlement amounts. Navigant replicated EPO's calculations for all participants from June through September of 2017. Because Duke Energy did not call any Voluntary curtailment events, and no customers were enrolled in the CallOption program, this report only includes Mandatory and Generator curtailment event results.

Initially, Navigant found a number of discrepancies between its energy and capacity settlement calculations and those provided by Duke Energy. After several discussions with Duke Energy, Navigant identified the following causes of discrepancies:

- Interval data issues related to power outages (caused most of the discrepancies)
- Missing usage data
- Alternate event test dates granted by Duke Energy under special circumstances, such as generator failure during primary testing period
- Meter clock drift that caused a mis-match of usage and times
- Customers leaving the program mid-month

Upon resolving those discrepancies, Navigant found that all of Duke Energy's estimates are accurate per the settlement algorithms defined by the program literature. A summary of the validation results, by option and credit type, may be found in Table E- 1 below. The program-level energy and demand impacts are shown in Table E-2 and Table E-3, respectively.

NAVIGANT

Table E- 1: Verification of EPO Calculations

Program Option	Credit Type	Customers	Unique Accounts	# of EPO Results Replicated[a]	Average % Absolute Error[b]
Mandatory Curtailment	Capacity	159	159	619	0.00%
Generator Curtailment	Energy	9	10	38	0.00%
Generator Curtailment	Capacity	9	10	38	0.00%

a. *The number of calculations reproduced by Navigant for this analysis. For energy there is one credit calculated per participating account per event. For capacity there is one credit calculated per participating account per month. The period of analysis for this evaluation included four months and four curtailment events. In a small number of cases, data was not available for every account for every event, which is why the number of replicated EPO results is slightly lower than the number of accounts times the number of events.*

b. *The absolute error represents the difference between Navigant's replicated settlement results and the EPO estimates used by Duke Energy. The near-zero error demonstrates that Navigant was able to replicate settlement calculations using the algorithms provided by Duke Energy.*

Source: EPO Settlement Data and Navigant analysis

Table E- 2: Summary of 2017 Event Energy Impacts at the Meter (Total Program MWh per Event)

Program Name	June 21st	July 19th	Aug.16th	Sep. 20th	Total (MWh)
Generator Curtailment	8.2	7.5	8.2	7.8	31.7

Source: EPO Settlement Data and Navigant analysis

Table E- 3: Total Monthly Capacity for 2017 at the Meter (MW)

Program Name	June	July	August	September	Average (MW)
Mandatory Curtailment	316	294	309	286	301
Generator Curtailment	8	7	8	8	8

Source: EPO Settlement Data and Navigant analysis

NAVIGANT

1. INTRODUCTION

This document presents Navigant's evaluation for the Duke Energy Carolinas (DEC) PowerShare® Program for Program Year 2017. The PowerShare Program is a demand response program offered to commercial and industrial customers that is part of Duke Energy's portfolio of demand side management and energy efficiency (DSM/EE) programs. PowerShare offers participating customers a financial incentive to reduce their electricity consumption when called upon by Duke Energy.

1.1 Program Overview

The customer contracts for DEC's PowerShare Program commence on the first day of the month and the initial contract term is three years. Customers can sign up for PowerShare at any time during the year if their DSM rider status is either Opted-In or Not Opted-Out (Opt-In then required to join the program). If they are Opted-Out, they must wait until one of the two Opt-In/Opt-Out election windows during the year (November-December or first week in March) is open in order to change their designation to Opt-In.

The DEC program offers customers four options to choose between: Mandatory Curtailment, Voluntary Curtailment, Generator Curtailment, and CallOption. There are currently no DEC customers enrolled in the CallOption PowerShare option. In addition, Duke Energy did not call any Voluntary curtailment events in the period of analysis. Consequently, this report focuses on Mandatory and Generator curtailment options:

- **Mandatory Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must commit to reduce load during each Mandatory Curtailment Period to a contracted firm level.
- **Generator Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must transfer load from a Duke Energy source to a private generation source during Generator Curtailment Periods.

The PowerShare Program is designed to encourage participating customers to reduce their electricity consumption for up to 100 hours each year on system peak days. Duke Energy contracts with Schneider Electric to calculate monthly customer settlements for the PowerShare Program. Schneider Electric is a specialized firm providing services in energy management and automation. The PowerShare settlements are calculated with the use of Schneider Electric's EPO, a hosted software application designed to assist utilities with energy data analysis. EPO uses participant interval data, Duke Energy-generated participant baselines, and a set of program option-specific formulas to calculate the event energy (kWh) and monthly capacity (kW) values that determine participant settlement payments.

1.2 Evaluation Objectives

The research objectives of this evaluation are:

1. Review updates to the SAS code used by Duke Energy to estimate baseline as well as monthly and seasonal capability.

2. Audit the hourly kW DR event load shed for participating customers by replicating the Schneider Electric EPO methods used to calculate the energy (kWh) and demand (kW) impacts that are used to determine settlement payments.

NAVIGANT

1.2.1 Review Updates to SAS Code Used for DR Baseline and Capability Calculations

During the 2016 PowerShare evaluation, Navigant performed a detailed audit of the SAS code used by Duke Energy to calculate settlement baselines, as well as monthly and seasonal capabilities. As an outcome of this audit, Navigant provided Duke Energy with several recommendations to improve the functionality and organization of the SAS code. For 2017, Navigant again reviewed the SAS code and found that Duke Energy appropriately implemented the changes recommended by Navigant. Navigant reviewed about 70 files as part of this process, which included code scripts and extracts. Navigant did not execute the code; however the Navigant analyst performed a detailed assessment of output extracts from each section of the code, and coordinated closely with the Duke Energy SAS code author throughout the review process.

1.2.2 Verify Energy and Demand Calculations Used for Settlement

To complete the second objective, Navigant replicated Duke Energy's energy and demand calculations to determine settlement payments, and compared these with the energy and demand values reported in the program's operational tracking database containing settlement reports exported from EPO.

Schneider Electric's EPO outputs a settlement report for each participant settlement (monthly capacity and event energy settlements). Each report contains the data (including the Duke Energy baseline and the participant actuals) used and the arithmetic applied to calculate the settlement payment.

To fulfill this task, Duke Energy directed Navigant to replicate the settlement arithmetic for all PowerShare participants from June through September of 2017. The purpose of this replication was to audit the process and ensure that all algorithms were applied as specified in the program literature. A detailed methodology and findings are presented later in this report.

1.3 Program Rules

This sub-section provides additional detail regarding the program rules, specifically, how much DR participants are required to provide, and a summary of participant credits. This information is a summary of the DEC PowerShare Program brochure to which interested readers should refer for additional detail.[1] This section does not address the CallOption program or Voluntary curtailment, because these program elements were not employed during the 2017 summer season. Mandatory and Generator Curtailment options are associated with one of two compliance plans:

- Fixed. A "Fixed" compliance plan is a "down by" requirement (i.e., when called participants must reduce demand **by** *X* amount).
- Firm. A "Firm" compliance plan is a "down to" requirement (i.e., when called participants must reduce demand **to** *X* amount).

Mandatory options operate under the "Firm" compliance plan, whereas the Generator options operate under the "Fixed" compliance plan.

[1] Duke Energy Carolinas, *PowerShare Carolinas* (Program Brochure), Accessed November 2017 https://www.duke-energy.com/business/products/powershare

NAVIGANT

All options require participants to commit to curtailing a minimum of 100 kW per event.

Table 1, below, presents some additional detail regarding the program rules for the two PowerShare options in DEC.

Table 1: Detailed PowerShare Option Rules

	Mandatory	Generator
Eligibility	Available to customers served on rate schedules LGS, I, OPT-V, and HP.	Available to customers served on rate schedules LGS, I, and OPT-V.
Notice	30 Minutes	15 Minutes
Curtailment Frequency and Timing	Curtailment may occur at any time, but may last no more than 10 hours per event. A maximum of 100 hours of curtailment may be called per year.	Curtailment may occur at any time, but may last no more than 10 hours per event. A maximum of 100 hours of curtailment may be called per year.
Energy Payment	***Event Energy Credits.*** Energy eligible for credit is calculated as the difference between Forecasted Demand and Firm Demand during the curtailment period times. Participants earn $0.1 of credit per kWh curtailed.	***Event Energy Credits.*** Energy eligible for credit is the amount of energy transferred to the generator up to the Maximum Curtailable Demand during Curtailment Period times and monthly tests. Participants earn $0.1 of credit per kWh transferred.
Capacity Payment	***Capacity Credits.*** Capacity eligible for credit (i.e., "Effective Curtailable Demand") is calculated by averaging the actual hourly load less the Firm Demand (the amount participant must curtail to) over the Exposure Period (hours of overall peak demand during which curtailment is most likely). Customer credits are $3.5/kW of Effective Curtailable Demand per month.	***Capacity Credits.*** The capacity eligible for credit is determined based on the average capacity generated during all Curtailment Periods and monthly tests, and is capped at participant Maximum Curtailable Demand. Eligible capacity is calculated monthly, and participants are paid $3.5/kW.
Penalty	Failure to reduce to Firm Demand levels incurs a penalty of $2/kWh for every kWh consumed above the Firm Demand level.	Failure to reduce by more than 50% of Maximum Curtailable Demand results in an energy charge of $2/kWh for energy shortfall below 50% of Maximum Curtailable Demand.

Source: Duke Energy program literature

NAVIGANT

2. EVALUATION METHODS

This section of the PowerShare evaluation outlines the methods employed by the evaluation team to complete the evaluation. This section is divided into two sub-sections:

- **Duke Energy Baseline SAS Code Audit.** This sub-section describes Navigant's approach to auditing the SAS code developed by Duke Energy to estimate participant baselines and calculate capabilities.
- **Replication of EPO Calculations.** This sub-section describes the approach and data used to replicate the EPO calculations that deliver the energy and demand used by Duke Energy to determine settlement payments.

2.1 Duke Energy Baseline SAS Code Audit

Navigant's approach to reviewing the SAS code was to focus on the changes implemented to the code based on the recommendations provided by Navigant during the 2016 evaluation. Navigant requested and reviewed a number of files containing SAS coding script and other extracts from the code. Navigant did not run the code.

2.2 Replication of EPO Calculations

This sub-section describes the approach and data used by Navigant to replicate the EPO calculations for energy and demand used by Duke Energy to determine settlement payments. It is divided in two parts:

- **Input Data.** This part lists the key data and documents used as inputs for this analysis.
- **Description of EPO Calculations.** This part provides the algebraic descriptions of the calculations replicated by Navigant.

2.2.1 Input Data

Navigant used the following key input data and documents to replicate the EPO settlement calculations:

1. EPO settlement results data
2. DEC PowerShare participant interval consumption data
3. DEC PowerShare program brochure[2]
4. DEC PowerShare 2017 event dates and times
5. Duke Energy pro forma data
6. The Schneider Electric summary of data required to complete settlement algorithms, provided to Navigant by Duke Energy
7. PowerShare program guidelines, provided to Navigant by Duke Energy

[2] The DEC PowerShare Program brochure can be found at https://www.duke-energy.com/business/products/powershare

NAVIGANT

2.2.2 Description of EPO Calculations

This section summarizes Navigant's replication of the EPO calculations that estimate the energy and demand values used by Duke Energy to determine settlement. Key terms include:

- **Exposure Period**: Hours of overall peak demand in which curtailment is most likely. Actual curtailment events can occur outside of the seasonal exposure period.
- **Forecasted Demand**: Estimated hourly demand a customer would normally exhibit in absence of curtailment.
- **Firm Demand**: Portion of demand not subject to curtailment.
- **Maximum Curtailable Demand**: Maximum amount of load transferred from the utility source to the generator during Curtailment Periods and monthly tests that is eligible for incentives.

Navigant applied the equations in this section to the interval consumption data resulting in the relevant energy or capacity credits. Navigant then compared the calculated credits to the EPO settlement data and verified that the results were essentially identical for each calculation.[3]

Monthly Capacity Credits (Applies Only to Mandatory Participants)

$$ECD = A_i - M$$

Where:

A_i	=	Average demand for month i during the exposure period
M	=	Firm demand
ECD	=	Effective Curtailment Demand

Event Energy Credits (Applies Only to Generator Participants)

$$GE = \sum_h (G_h)$$

Where:

GE	=	Generated energy eligible for credit
G_h	=	Energy generated in half hour h

Generated energy above the maximum curtailable demand for any half hour is not eligible.

Monthly Capacity Credits (Applies Only to Generator Participants)

$$AMGC = \sum_{e \in m} (GE_e) / \sum_{e \in m} (H_e)$$

Where:

[3] Some small insignificant differences in individual calculations were found due to rounding effects.

NAVIGANT

AMGC	=	Average monthly generated capacity
GE_e	=	Generated energy eligible for credit in event e
H_e	=	Number of half-hour intervals in event e
$e \in m$	=	Events occurring during month m

Events are defined as all generator curtailment events and tests in a given month.

NAVIGANT

3. EVALUATION FINDINGS AND RESULTS

This section describes the findings and results of Navigant's evaluation. It is divided into two sections:

- **Duke Energy Baseline SAS Code Audit.** This section describes Navigant's findings and recommendations based on our audit of the Duke Energy SAS code.
- **PowerShare Impacts and Findings from Navigant's Replication of EPO Calculations.** This section describes Navigant's findings based on our analysis of the program tracking database[4] and the replication of the EPO calculations that deliver the energy and demand impacts used by Duke Energy to determine settlement payments.

3.1 Duke Energy Baseline SAS Code Audit

Navigant found that Duke Energy addressed all recommendations from the 2016 PowerShare EM&V reports. This resulted in improvements to the code that should enhance the usability and mitigate the potential for errors.

3.2 PowerShare Impacts and Findings from Navigant's Replication of EPO Calculations

Navigant replicated the EPO calculations for all participants in the period from June - September of 2017. Initially, Navigant found a number of discrepancies between its energy and capacity settlement calculations and those provided by Duke Energy. After several discussions with Duke Energy, Navigant identified the following causes of discrepancies:

- Interval data issues related to power outages (caused most of the discrepancies)
- Missing data
- Alternate test dates granted by Duke Energy under special circumstances, such as generator failure during primary testing period
- Meter clock drift that caused a mismatch of usage and times
- Customers leaving the program mid-month

Upon resolving those discrepancies, Navigant found that all of Duke Energy's estimates are accurate per the settlement algorithms defined by the program literature. A summary of the validation results, by option and credit type, may be found in Table 2 below.

[4] The "program tracking database" refers to the documentation provided by Duke Energy outlining the reported capacity and energy values used by Duke Energy for settlement payment.

NAVIGANT

Table 2: Verification of EPO Calculations

Program Option	Credit Type	Customers	Unique Accounts	# of EPO Results Replicated[a]	Average % Absolute Error[b]
Mandatory Curtailment	Capacity	159	159	619	0.00%
Generator Curtailment	Energy	9	10	38	0.00%
Generator Curtailment	Capacity	9	10	38	0.00%

a. *The number of calculations reproduced by Navigant for this analysis. For energy there is one credit calculated per participating account per event. For capacity there is one credit calculated per participating account per month. The period of analysis for this evaluation included four months and four curtailment events. In a small number of cases, data was not available for every account for every event, which is why the number of replicated EPO results is slightly lower than the number of accounts times the number of events.*

b. *The absolute error represents the difference between Navigant's replicated settlement results and the EPO estimates used by Duke Energy. The near-zero error demonstrates that Navigant was able to replicate settlement calculations using the algorithms provided by Duke Energy.*

Source: EPO Settlement Data and Navigant analysis

Navigant calculated energy and capacity curtailment according EPO algorithms described above using Duke Energy's participant baselines and interval data. Duke Energy only called one-hour test events in June – September 2017, so the energy impacts only include generator curtailment. The results from these impacts are summarized in Table 3, below.

Table 3: Summary of 2017 Event Energy Impacts at the Meter (Total Program MWh per Event)

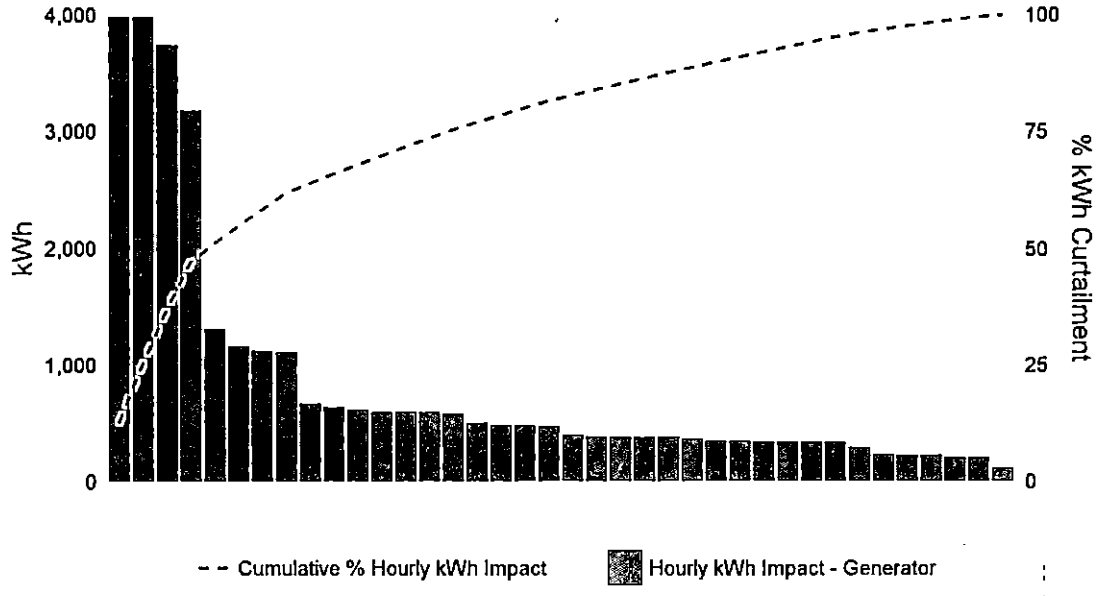
Program Name	June 21st	July 19th	Aug.16th	Sep. 20th	Total (MWh)
Generator Curtailment	8.2	7.5	8.2	7.8	31.7

Source: EPO Settlement Data and Navigant analysis

Total program impacts are driven by curtailment for individual meters. Figure 1 shows each meter's average hourly event energy reduction across the summer. These are sorted in descending order, to highlight the contrast between the largest and smallest contributors in the program.

NAVIGANT

Figure 1: Average Event Curtailment by Participant



Source: EPO Settlement Data and Navigant analysis

The PowerShare Program paid out capacity credits to participants for an average monthly capacity of approximately 301 MW during the summer of 2017. This value is calculated according the EPO algorithms described above using Duke Energy's participant baselines and participant interval data. As is the case for delivered energy, the vast majority of this was delivered by customers enrolled in the Mandatory Curtailment option. The total DR capacity per month for the summer of 2017 by PowerShare option is summarized in Table 4, below.

Table 4: Total Monthly Capacity for 2017 at the Meter (MW)

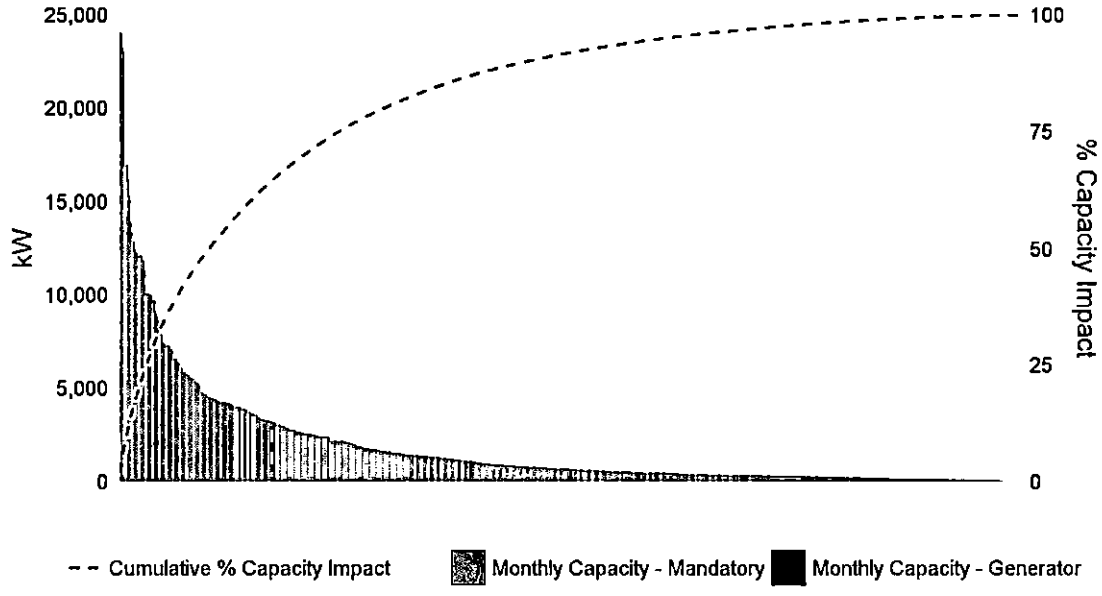
Program Name	June	July	August	September	Average (MW)
Mandatory Curtailment	316	294	309	286	301
Generator Curtailment	8	7	8	8	8

Source: EPO Settlement Data and Navigant analysis

Average monthly capacity was driven by a small percentage of meters. The top seven meters in terms of average monthly capacity accounted for 28% of total average monthly capacity.

NAVIGANT

Figure 2: Average Monthly Capacity by Participant



Source: EPO Settlement Data and Navigant analysis

Program participation[5] was consistent throughout the summer with an average of approximately 10 customers participating in the Generator Curtailment option. Table 5, below, provides a summary of the number of customers, that participated in each event.

Table 5: Summary of Participation by Event for 2017 (Number of Participants)

Program Name	June 21st	July 19th	Aug. 16th	Sep 20th	Average
Generator Curtailment	9	9	10	10	10

Source: EPO Settlement Data and Navigant analysis

[5] For the purposes of this evaluation report, a meter is defined as having "participated" in an event only when it delivers some (non-zero) energy reduction during the curtailment period.

NAVIGANT

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Duke Energy SAS Code Audit

Navigant's detailed review of Duke Energy's SAS code determined that Duke Energy addressed all recommendations from the 2016 EM&V report for improving the organization and functionality of the code. The evaluation team believes the code is functioning correctly and does not need further review or updates at this time.

4.2 Verification and Validation of Settlement Energy and Demand Calculations

Although Navigant initially encountered some discrepancies when replicating Duke Energy's settlement calculations, these discrepancies were a result of the process for making sure that all relevant information was exchanged between Navigant and Duke Energy for evaluation purposes. These discrepancies were eventually resolved, and Navigant found that Duke Energy's settlement calculations were accurate per the algorithms defined in Section 2.2. This finding confirms that Duke Energy's procedure for calculating impacts is functioning in accordance with the program definitions, and therefore there will be limited value in continuing to audit settlement calculations using the methods described in this report.

However, if future evaluation efforts include similar efforts to replicate the settlement calculations, Navigant recommends that Duke Energy implement a detailed process for tracking all outages such that it can easily be determined when missing interval data was replaced with pro forma figures to minimize the initial discrepancies and expedite the evaluation.

IA

Docket No. E-7, Sub 1192

Evans Exhibit B
Page 1 of 400

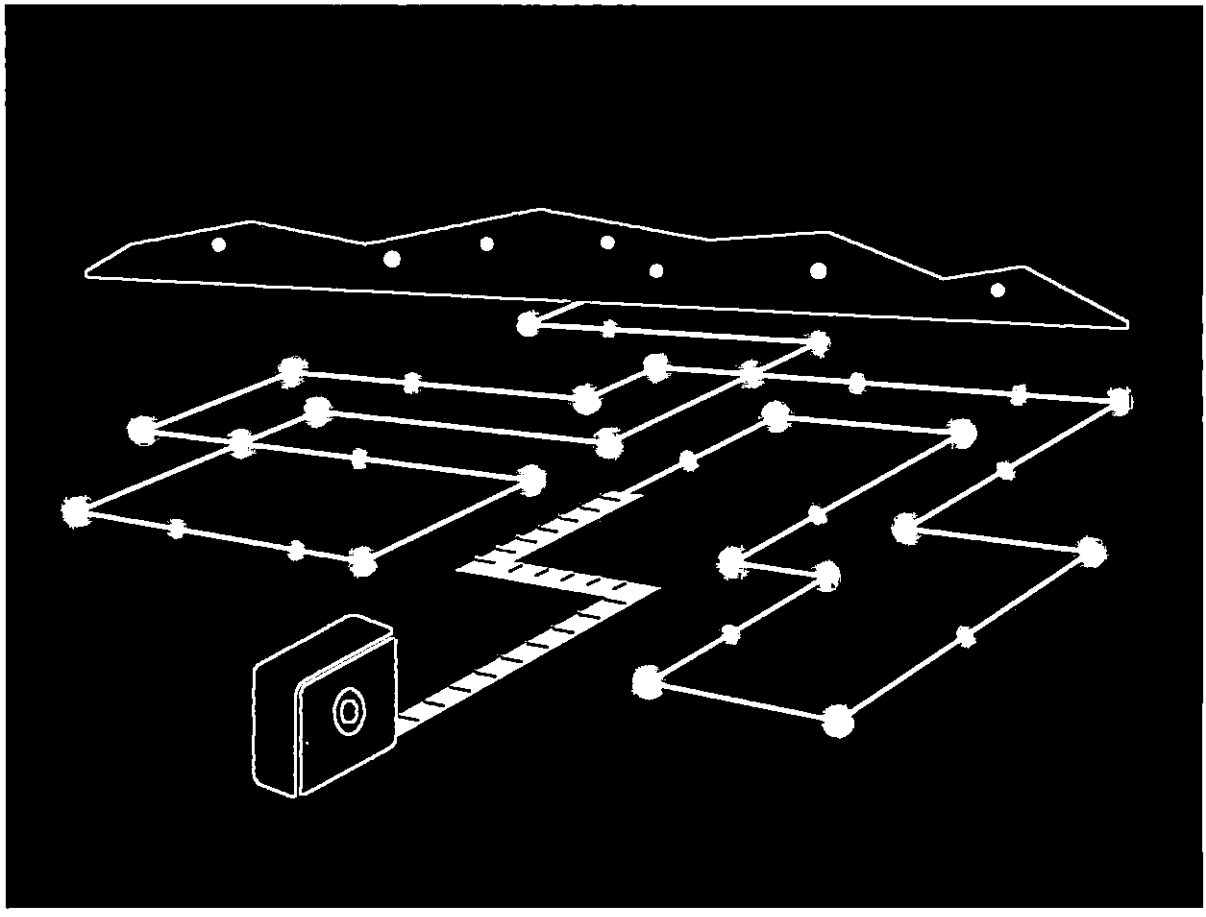
Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

filed in docket



Duke Energy Carolina/ Duke Energy Progress

Non-Residential Prescriptive Program Evaluation Report – Final

March 25, 2018

I/A

Docket No. E-7, Sub 1192

Evans Exhibit C
Page 1 of 146

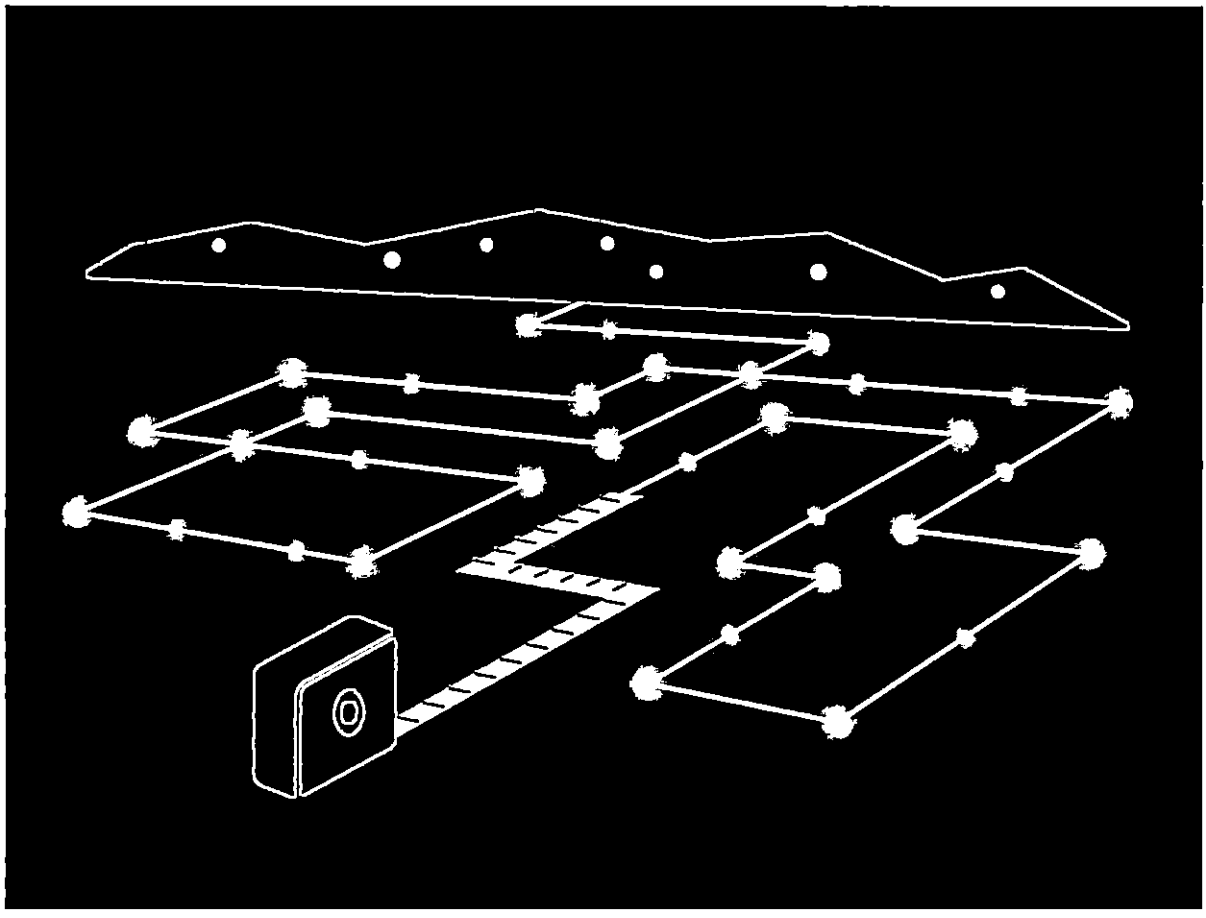
Opinion Dynamics

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

Filed in docket

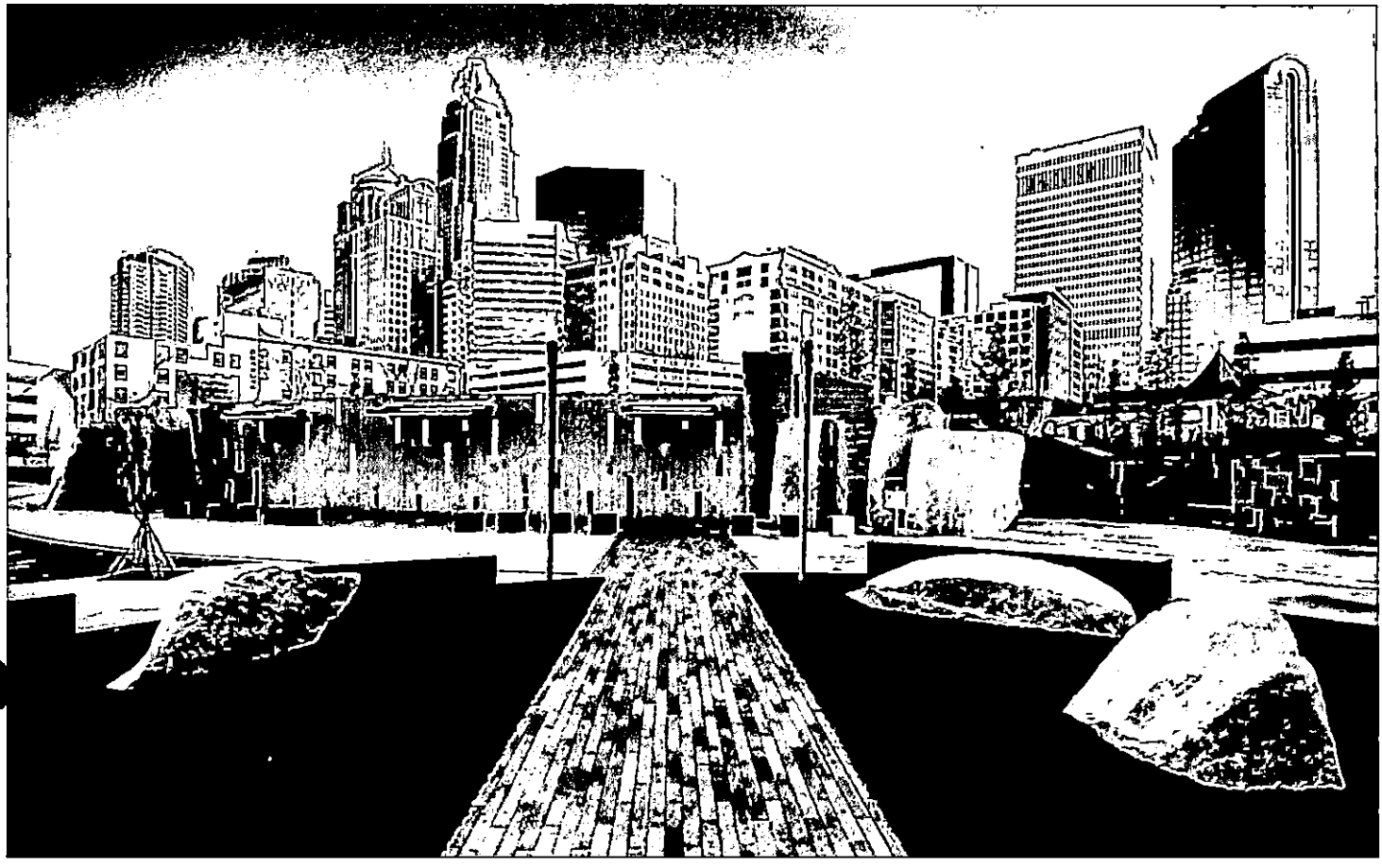


Duke Energy Progress & Duke Energy Carolinas

Energy Efficient Lighting & Retail LED Programs

Evaluation Report – Final

April 6, 2018



Duke Carolinas 2017 Power Manager Evaluation

May 1, 2018

Principal authors:

Ankit Jain, M.P.P.
Greg Sidorov, M.S.

Table of Figures

Table of Tables

1 Executive Summary

This report presents the results of Nexant's 2017 Power Manager impact evaluation for the Duke Energy Carolinas territory. Power Manager is a voluntary demand response program that provides incentives to residential customers who allow Duke Energy to reduce the use of their central air conditioners' outdoor compressors and fans on summer days with high energy usage. Events are typically called on weekday afternoons to ensure power reliability during high summer peak demand periods. Air conditioning control is conducted in one of three options: 50% cycling; 64% cycling; and 100% shed. During 50% and 64% cycling events, air conditioner control is randomly phased in over the first half hour of the event. At the end of those first 30 minutes, the cycling reduction is sustained through the remainder of the event (typically two or three hours). Over the last 30 minutes of a cycling event, air conditioning control is phased out in the order in which it began. During 100% shed events, which are designed for use during emergency conditions, all devices are instructed to immediately shed loads and deliver larger demand reductions than cycling events.

A key objective of the 2016 evaluation was to quantify the relationship between demand reductions, temperature, hour of day, and cycling strategy—referred to as the time-temperature matrix. This tool is leveraged in this study to predict the actual load reductions achieved during the 2017 Power Manager events, as well as the program capability under extreme conditions. In order to develop the time-temperature matrix, the 2016 events were intentionally called for a range of different temperatures, under different cycling strategies and for different dispatch data. The data collected on the weather sensitivity of air conditioner load and the reductions observed for events tested were used to develop estimates of demand reduction for a range of temperatures, including the 102°F conditions that drive resource planning. The system temperature conditions are calculated by averaging hourly temperatures of weather stations in Greenville/Spartanburg, South Carolina, Charlotte, North Carolina, and Greensboro, North Carolina. Because dispatch hours vary for individual events, throughout this document, the maximum system temperature for the day is reported for comparison.[1] More information on the 2016 evaluation and results can be found in Appendix C.

One Power Manager event was called in 2017: a general population 64% cycling event called for 3 hours starting at 3pm. During the 64% cycling event, the time-temperature matrix predicted a per device impact of 0.88 kW. With 250,400 devices dispatched, this would have yielded an aggregate load drop of 220.9 MW during the 3 hour event window. These impacts are at the meter, as is the case for all impacts mentioned in this report.

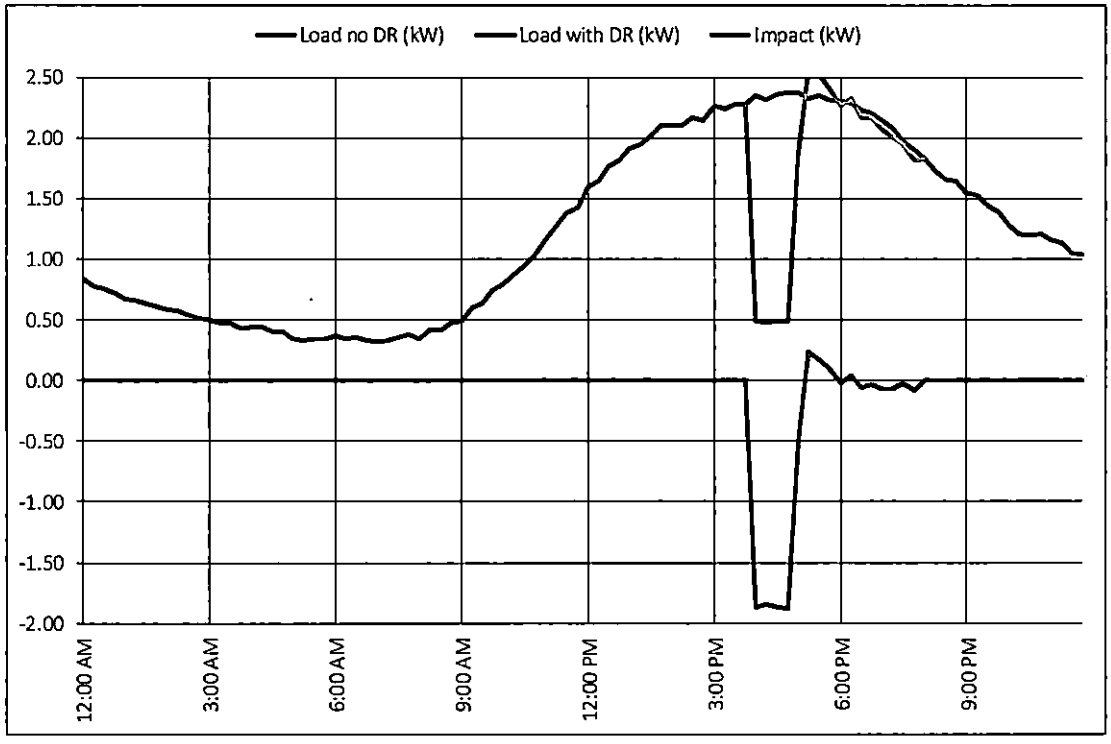
Because Power Manager delivers larger reductions when temperatures are hotter, the expected load reduction for a 102°F day are 1.87 kW per device or 2.22 kW per household using 100% shed during the peak hour, giving an aggregate load reduction of 467 MW as seen in Figure 1-1. At that temperature, expected reductions from non-emergency dispatch – defined as a three hour 64% cycling event, starting at 3pm – is 1.46 kW per device or 1.74 kW per customer. With 50% cycling, reductions are 0.89 kW per device or 1.05 kW per customer for a three hour event.

[1] The temperatures during event hours may be lower since electric loads lag temperature peaks due to insulation in homes, coincidence of residential and nonresidential loads and occupancy patterns.

Figure 1-1: Demand Reduction Capability on a 102°F with 100% Emergency Shed

INPUTS	
True Cycle	100
Event start (excludes phase in)	4 PM
Event duration	1
Daily Max Temp (F)	102
Devices	250,400

Event Window Avg. Impacts		
Load without DR	2.35	kW per device
Load with DR	0.49	kW per device
Impact per device	-1.87	kW per device
Impact (MW)	-467.0	MW



Key findings of the impact evaluation include:

- While emergency operations are rare and ideally avoided, they represent the full demand reduction capability of Power Manager;
- Not only do Power Manager demand reductions grow on a percentage basis with hotter weather and with deeper cycling, but so do the air conditioner loads available for curtailment;
- If 100% emergency shed becomes necessary on a 102°F day, Power Manager can deliver 1.87 kW of demand reductions per device or 2.22 kW per household;
- Because there are approximately 250,400 devices, the expected aggregate reductions total 467 MW;
- Reductions are larger with hotter temperatures and more aggressive load control operations; and
- The event start time also influences the magnitude of reductions which, generally, are larger during hours when air conditioner loads are highest.

2 Introduction

This report presents the results of the 2017 Power Manager impact evaluation for the Duke Energy Carolinas (DEC) territory. Power Manager is a voluntary demand response program that provides incentives to residential customers who allow Duke Energy to reduce the use of their central air conditioner's outdoor compressor and fan during summer days with high energy usage. The DEC operations team schedules and calls Power Manager events for testing, economic, or system emergency purposes.

2.1 Key Research Questions

The study analysis was designed to leverage the prior year's study to answer a few key questions related to the load reduction capability of the program:

- What demand reductions were achieved during the event called in 2017?
- What demand reduction is the program capable of delivering under emergency conditions?

To answer these questions, Nexant used the results from the 2016 load impact evaluation to estimate the load impacts that were actually delivered during 2017 events, as well as what the program is capable of delivering under extreme conditions. More information on the 2016 analysis and results can be found in Appendix C.

2.2 Program Description

Power Manager is a voluntary demand response program that provides incentives to residential customers who allow Duke Energy to cycle their central air conditioner's outdoor compressor and fan on summer days with high energy usage. All Power Manager participants have a load cycling switch device installed on all of their outdoor air conditioner units. The device reduces the customer's air conditioner run time when a Power Manager event is called. Duke Energy Carolinas (DEC) initiates events by sending a signal to all participating devices through its own paging network. The signal instructs the switch devices to cycle or fully shed the air conditioning system, reducing AC load during events. The DEC operations team schedules and calls Power Manager events for testing, economic, or system emergency purposes.

The DEC Power Manager event season runs during the summer cooling season and participants receive financial incentives for their participation in the form of $8 credits applied to each of their July through October bills. DEC switches use a TrueCycle algorithm, which uses stored historic data, to estimate the run time (or duty cycle) of air conditioners as a function of hour of day and temperature at each specific site, and aims to curtail use by a specified amount—50%, 64%, or 100% (emergency shed).

2.3 Participant Characteristics

The Duke Energy Carolinas service territory spans much of the western half of North Carolina and northwestern South Carolina. By early summer of 2017, slightly more than 208,000 customers and 250,000 air conditioners were participating in Power Manager. On average, there are 1.20 air conditioner

units per customer. Duke Energy Carolinas serves approximately 2.15 million residential customers, of which roughly 1.27 million are eligible for the Power Manager program. Overall, Duke Energy Carolinas has enrolled 16.4% of eligible customers to date.

2.4 2017 Demand Reduction

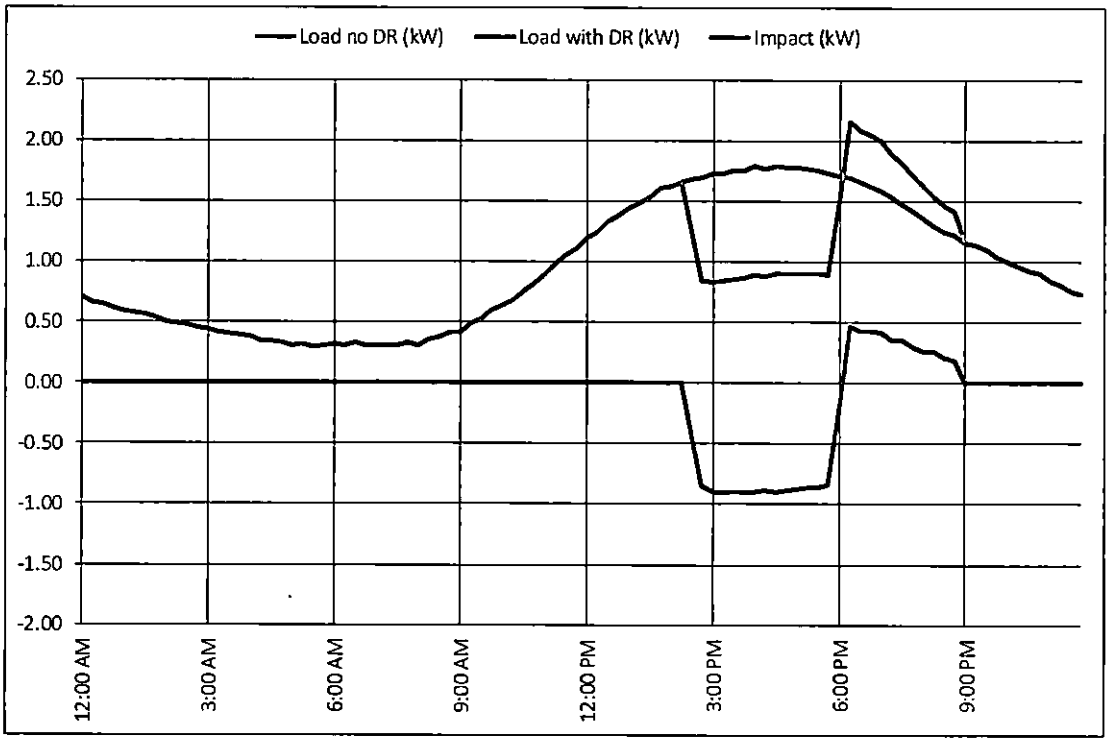
On July 13th, Power Manager was used in response to an unexpected reduction in system capacity. During the general population event, 209,000 customers (250,400 devices) were dispatched from 3pm to 6pm. The maximum temperature on that day, as an average of the same three weather station measurements, was 93.7°F.

The event was called on a day with a maximum temperature just under 94°F. The predicted load impacts are presented in Figure 2-1. It was modeled as a 64% true cycle event to reflect that it was not dispatched as an emergency shed (100% true cycle).

Figure 2-1: Predicted Load Impacts for July 13, 2017 General Population Event

INPUTS	
True Cycle	64
Event start (excludes phase in)	3 PM
Event duration	3
Daily Max Temp (F)	94
Devices	250,400

Event Window Avg. Impacts		
Load without DR	1.76	kW per device
Load with DR	0.88	kW per device
Impact per device	-0.88	kW per device
Impact (MW)	-220.9	MW



The load profiles generated by the time-temperature matrix do not exactly reflect the actual event conditions. The event was called due to a capacity shortage and did not have a half hour ramp-in period as is typically the case during general population events. Normally, events that are dispatched under non-emergency conditions have a half hour period prior to the official start of the event window when devices are gradually dispatched; resulting in a pre-event load reduction. While this graph shows that ramp-in, in actuality the load reduction would have begun promptly at 3pm with a steep drop in load amongst the Power Manager participants.

The time-temperature matrix predicted a per device impact of 0.88 kW. With 250,400 devices dispatched, this would have yielded an aggregate load drop of 220.9 MW during the 3 hour event window.

2.5 Demand Reduction Capability for 102˚F Conditions

While Power Manager is typically dispatched for economic reasons or research, its primary purpose is to deliver demand relief during extreme conditions when demand is high and capacity is constrained. Since 2006, Duke Energy Carolinas has experienced 5 weekdays and 2 weekend days when system temperatures reached 100˚F or more. Several of these days occurred in 2007, when on the hottest weekday system temperatures reached 103˚F. Extreme temperature conditions can trigger Power Manager emergency operations where all devices are instructed to instantaneously shed loads and deliver larger demand reductions than normal cycling events (100% emergency shed). While emergency operations are rare and ideally avoided, they represent the full demand reduction capability of Power Manager.

Figure 2-2: Demand Reduction Capability on a 102°F with 100% Emergency Shed

INPUTS	
True Cycle	100
Event start (excludes phase in)	4 PM
Event duration	1
Daily Max Temp (F)	102
Devices	250,400

Event Window Avg. Impacts		
Load without DR	2.35	kW per device
Load with DR	0.49	kW per device
Impact per device	-1.87	kW per device
Impact (MW)	-467.0	MW
% Impact	-79.3%	%

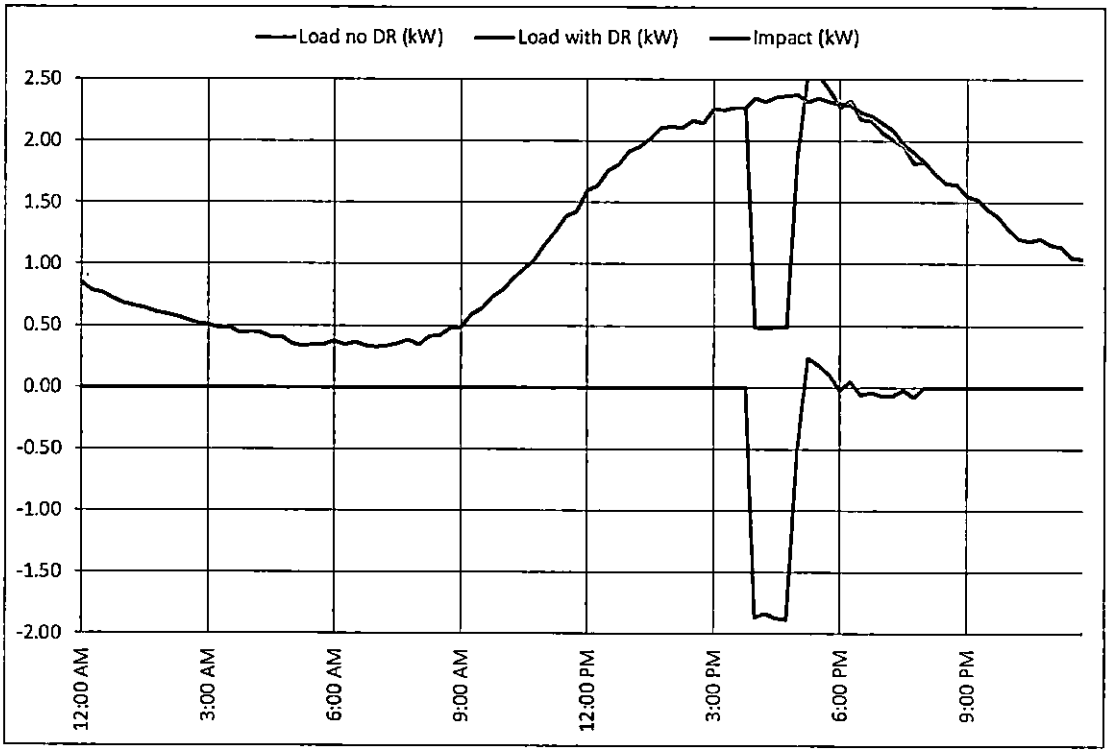


Figure 2-2 shows the demand reduction capability of the program if 100% shed becomes necessary on a 102°F day for a single hour. Individual air conditioner units are expected to deliver 1.87 kW of demand reduction or 2.22 kW per household (on average Power Manager participants have 1.19 units). Because there are approximately 250,400 devices, the expected aggregate reductions total is 467 MW.

Power Manager can deliver substantial demand reductions under 102°F conditions, even if emergency shed operations are not employed and non-emergency dispatch is employed. With a three hour 64% cycling event, demand reductions average 365.5 MW across the dispatch hours, as shown in Figure 2-3. With longer events, reductions vary slightly across fifteen minute intervals but are generally larger when air conditioner use is highest. The reduction capability is lowest, averaging 221.8 MW across three dispatch hours, when less extensive load control strategies, such as 50% cycling, are employed, as show in Figure 2-4.

Figure 2-3: Demand Reduction Capability on a 102˚F with 64% Cycling

INPUTS	
True Cycle	64
Event start (excludes phase in)	3 PM
Event duration	3
Daily Max Temp (F)	102
Devices	250,400

Event Window Avg. Impacts		
Load without DR	2.32	kW per device
Load with DR	0.86	kW per device
Impact per device	-1.46	kW per device
Impact (MW)	-365.5	MW
% Impact	-62.9%	%

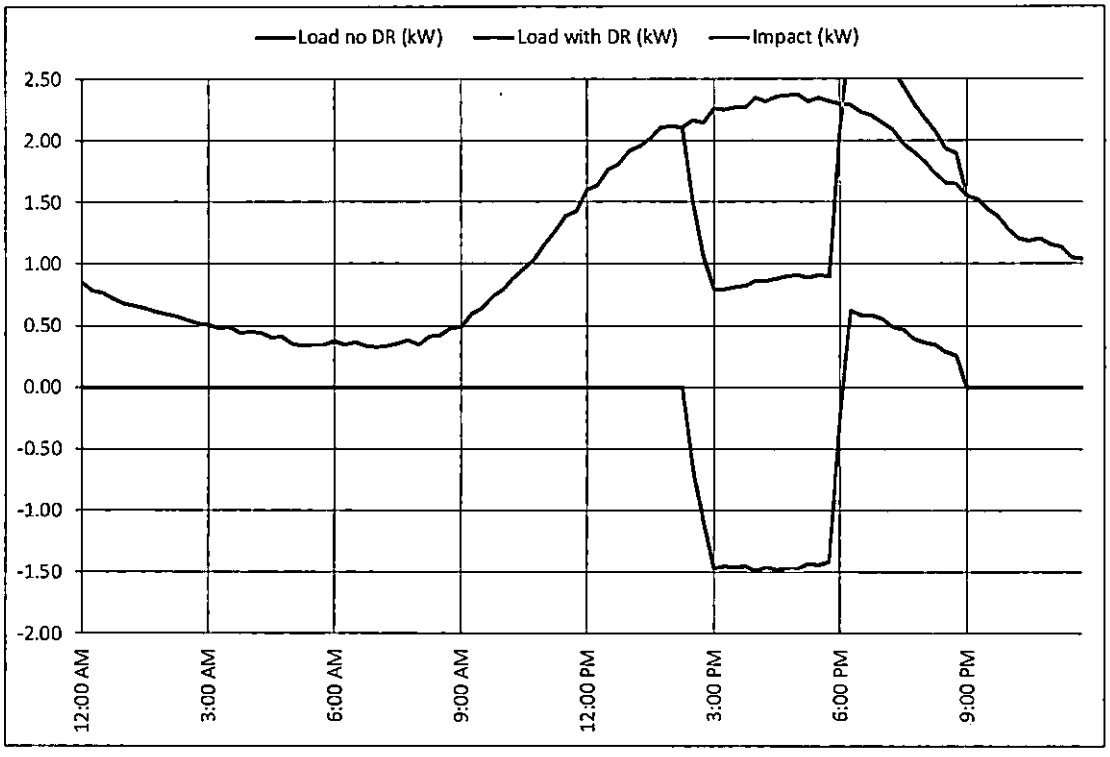
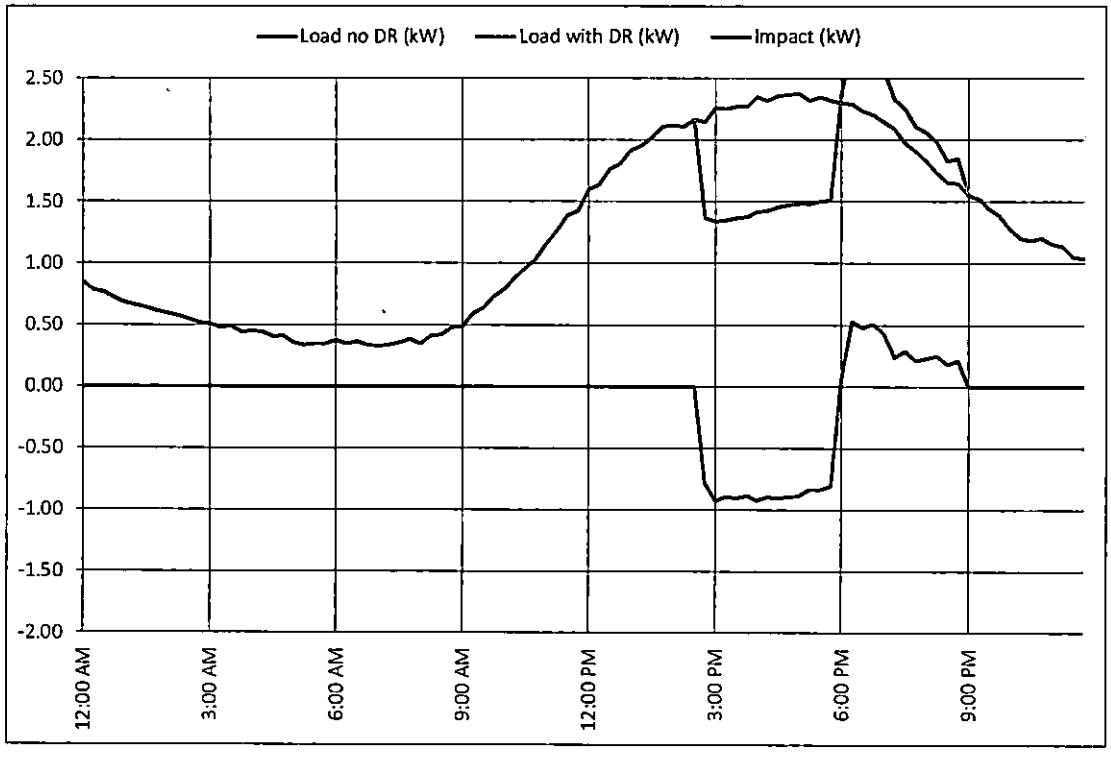


Figure 2-4: Demand Reduction Capability on a 102°F using 50% Cycling

INPUTS	
True Cycle	50
Event start (excludes phase in)	3 PM
Event duration	3
Daily Max Temp (F)	102
Devices	250,400

Event Window Avg. Impacts		
Load without DR	2.32	kW per device
Load with DR	1.43	kW per device
Impact per device	-0.89	kW per device
Impact (MW)	-221.8	MW
% Impact	-38.2%	%



2.6 Demand Reduction Capability by Temperature, Cycling Strategy, and Event Start Time

Table 2-1 summarizes the estimated demand reduction for 100% emergency shed by event start time, and daily maximum system temperature, assuming a one hour event. Table 2-2 summarizes similar information for non-emergency dispatch operations assuming a three hour event. Most non-emergency operations start at 3pm or 4 pm. All estimated impacts exclude the 30 minute periods when the 64% and 50% cycling are randomly phased in and phased out. In practice, event day impacts may vary due to unique weather patterns or day characteristics.

Table 2-1: Emergency Shed Per Device Demand Impacts by Temperature and Event Start

True Cycle	Daily Max (F)	Start Time (1 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
100	74	-0.16	-0.20	-0.25	-0.26	-0.28	-0.30	-0.28
	76	-0.21	-0.27	-0.34	-0.37	-0.40	-0.41	-0.38
	78	-0.22	-0.28	-0.37	-0.41	-0.44	-0.46	-0.42
	80	-0.28	-0.37	-0.47	-0.52	-0.55	-0.56	-0.53
	82	-0.34	-0.45	-0.57	-0.63	-0.68	-0.69	-0.65
	84	-0.45	-0.58	-0.69	-0.75	-0.80	-0.80	-0.74
	86	-0.56	-0.71	-0.82	-0.89	-0.93	-0.93	-0.87
	88	-0.69	-0.84	-0.96	-1.02	-1.06	-1.05	-0.99
	90	-0.77	-0.94	-1.06	-1.13	-1.17	-1.15	-1.08
	92	-0.91	-1.09	-1.21	-1.27	-1.29	-1.26	-1.18
	94	-1.01	-1.19	-1.31	-1.37	-1.40	-1.38	-1.31
	96	-1.14	-1.33	-1.45	-1.51	-1.54	-1.53	-1.45
	98	-1.19	-1.41	-1.53	-1.60	-1.64	-1.62	-1.53
	100	-1.34	-1.57	-1.70	-1.79	-1.83	-1.81	-1.70
	102	-1.35	-1.59	-1.69	-1.80	-1.87	-1.86	-1.79

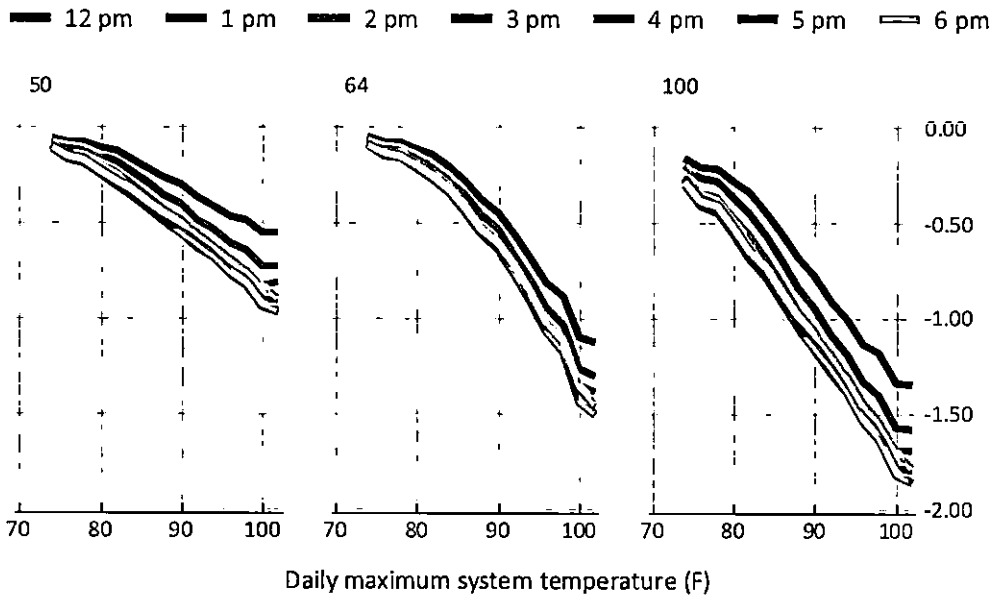
Table 2-2: Non-Emergency Dispatch Per Device Demand Impacts by Temperature and Event Start

True Cycle	Daily Max (F)	Start Time (3 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.07	-0.08	-0.09	-0.10	-0.10	-0.10	-0.10
	76	-0.09	-0.12	-0.14	-0.15	-0.15	-0.14	-0.13
	78	-0.10	-0.13	-0.15	-0.17	-0.17	-0.16	-0.14
	80	-0.13	-0.17	-0.20	-0.22	-0.22	-0.20	-0.18
	82	-0.17	-0.21	-0.25	-0.28	-0.28	-0.26	-0.23
	84	-0.21	-0.27	-0.31	-0.33	-0.33	-0.30	-0.26
	86	-0.27	-0.33	-0.37	-0.39	-0.39	-0.36	-0.31
	88	-0.32	-0.39	-0.43	-0.46	-0.45	-0.41	-0.35
	90	-0.37	-0.44	-0.49	-0.51	-0.50	-0.46	-0.39
	92	-0.44	-0.52	-0.56	-0.58	-0.56	-0.51	-0.43
	94	-0.48	-0.56	-0.61	-0.63	-0.62	-0.57	-0.48
	96	-0.55	-0.64	-0.69	-0.71	-0.70	-0.64	-0.54
	98	-0.58	-0.68	-0.74	-0.76	-0.75	-0.69	-0.58
	100	-0.65	-0.77	-0.84	-0.87	-0.85	-0.76	-0.64
	102	-0.65	-0.76	-0.84	-0.89	-0.88	-0.82	-0.69
64	74	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.09
	76	-0.10	-0.11	-0.13	-0.14	-0.14	-0.13	-0.12
	78	-0.10	-0.12	-0.14	-0.15	-0.15	-0.14	-0.13
	80	-0.14	-0.17	-0.19	-0.20	-0.20	-0.19	-0.18
	82	-0.18	-0.22	-0.24	-0.26	-0.26	-0.25	-0.22
	84	-0.25	-0.29	-0.32	-0.33	-0.33	-0.31	-0.28
	86	-0.33	-0.38	-0.41	-0.43	-0.42	-0.40	-0.36
	88	-0.44	-0.49	-0.52	-0.54	-0.53	-0.51	-0.46
	90	-0.51	-0.57	-0.61	-0.62	-0.62	-0.59	-0.53
	92	-0.64	-0.70	-0.74	-0.75	-0.73	-0.69	-0.63
	94	-0.76	-0.83	-0.87	-0.88	-0.87	-0.83	-0.76
	96	-0.90	-0.98	-1.02	-1.04	-1.03	-0.98	-0.90
	98	-0.99	-1.07	-1.12	-1.14	-1.13	-1.08	-0.98
	100	-1.21	-1.32	-1.38	-1.40	-1.38	-1.31	-1.19
	102	-1.25	-1.36	-1.42	-1.46	-1.46	-1.40	-1.28

*Estimates exclude 30 minute phase in period and reflect the average reduction expected for the event

Figure 2-5 provides a visual summary of the reduction capability for a one hour event by cycling strategy and start time. As expected, reductions are larger with hotter temperatures and more aggressive load control operations. The start time also influences the magnitude of reductions which, generally, are larger during hours when air conditioner loads are highest. Appendix B includes the demand reduction capability for a range of event durations.

Figure 2-5: Per Device Demand Impacts by Cycling Strategy, Temperature Conditions, and Event Start



1 hour events, excluding 30 minute phase in period

2.7 Key Findings

Key findings from the development of the time temperature matrix include:

- While emergency operations are rare and ideally avoided, they represent the full demand reduction capability of Power Manager;
- Not only do Power Manager demand reductions grow on a percentage basis with hotter weather and with deeper cycling, but so do the air conditioner loads available for curtailment;
- If 100% emergency shed becomes necessary on a 102˚F day, Power Manager can deliver 1.87 kW of demand reductions per device or 2.22 kW per household;
- Because there are approximately 250,400 devices, the expected aggregate reductions total 467 MW;
- Reductions are larger with hotter temperatures and more aggressive load control operations; and
- The event start time also influences the magnitude of reductions which, generally, are larger during hours when air conditioner loads are highest.

Summary Form

Duke Energy Carolinas Power Manager® Program

Completed EMV Fact Sheet

The Duke Energy's Power Manager is a voluntary demand response program that provides incentives to residential customers who allow Duke Energy to reduce the use of their central air conditioners' outdoor compressors and fans on summer days with high energy usage. Events are typically called on weekday afternoons to ensure power reliability during high summer peak demand periods.

Date	May 1, 2018
Region(s)	Duke Energy Carolinas
Evaluation Period	DEC: Summer 2017
Total kW Savings	DEC: 1.87 kW of demand reduction or 2.22 kW per household. Because there are approximately 250,400 devices, the expected aggregate reductions total is 467 MW.
Coincident kW Impact (net ex post)	DEC:
Measure Life	N/A
Net-to-Gross Ratio	
Process Evaluation	No
Previous Evaluation(s)	DEC: Duke Energy Carolinas Power Manager Program April 11, 2017

A key objective of the 2016 evaluation was to quantify the relationship between demand reductions, temperature, hour of day, and cycling strategy—referred to as the time-temperature matrix. This tool is leveraged in this study to predict the actual load reductions achieved during the 2017 Power Manager event, as well as the program capability under extreme conditions. In order to develop the time-temperature matrix, the 2016 events were intentionally called for a range of different temperatures, under different cycling strategies and for different dispatch data. The data collected on the weather sensitivity of air conditioner load and the reductions observed for events tested were used to develop estimates of demand reduction for a range of temperatures, including the 102°F conditions that drive resource planning.

Appendix A Regression Models Tested

All regression models were performed and the average customer loads throughout the summer using 15 minute interval data. The same sample of customers was analyzed using whole house interval and air conditioner end use data. The analysis only included days when maximum temperature exceeded 75°F.

For the individual event day impacts (ex post), the regression equation took the general form of Equation 1, which will be estimated using a dataset made up of hourly observations of the average load in the M&V sample. Equation 2 describes the model used to estimate average event impacts for the general population events. The average event impacts were estimated separately to account for the effect of repeated events on confidence intervals.

Equation 1 and Equation 2 represent a within-subjects approach in which the observations on nonevent days are used to predict the counterfactual load for Power Manager customers on event days. A few points are noteworthy. The models were run separately for each 15 minute interval (equivalent to a fully interacted model) to account for occupancy patterns and produce different weather coefficients and constants. The only component that varied across the 10 models tested was how the weather variables were specified. Table A-1 shows the weather variables and explains the underlying concept for each model tested. To improve precision, same-day loads for the pre-event hours of 11am to 1pm were included to capture any differences between event and nonevent days that are not reflected in the model. The pre-event same day load variable functions as a same-day adjustment and is included because customers are not notified of the event in advance.

Equation 1: Ex Post Regression Model Individual Events

$$kW_{t,i} = a_i + \sum_{j=1}^{J} b_{i,j}\text{event}_{t,j} + c \cdot preeventkW_t + d_i \cdot weather_{i,t} + \sum_{k=1}^{7} e_{i,k}\text{dayofweek}_{i,k} + \sum_{l=5}^{10} f_{i,l}\, month_t + \varepsilon_{i,t}$$

Equation 2: Ex Post Regression Model Average Event (General Population Events)

$$kW_{t,i} = a_i + b_i\text{avgevent}_t + c \cdot preeventkW_t + d_i \cdot weather_{i,t} + \sum_{k=1}^{7} b_{i,k}\text{dayofweek}_{i,k} + \sum_{l=5}^{10} f_{i,l}\, month_t + \varepsilon_{i,t}$$

Where:

a	Is the constant or intercept
$b_{i,j}$	Represents the event effect of Power Manager during each interval, i, and each event day, j
c-f	Are other model coefficients
i, k, l	*i, k and l* are indicators that represent individual 15 minute intervals (96 in a day), days of the week, and months of the year
t	Represents each date in the analysis dataset
event	Is a binary variable indicating whether Power Manager was dispatched on that day
preeventKW	Represents the same-day loads for the pre-event hours of 11am to 1pm. The variable functions as a same-day adjustment and is included because customers are not notified of the event in advance
weather	10 different ways to specify if weather was tested. Those are detailed in Table A-1
dayofweek	Are a set of mutually exclusive binary variables to capture day of week effects
month	Are a set of mutually exclusive binary variables to capture monthly or seasonal effects
ε	Represents the error term

Table A-1: Weather Variables by Model Tested

Model	Weather variables	Concept
1	Cooling Degree Hour Base 70°F (CDH)	The same hour temperature drives electricity use but air conditioner loads are only linear when temperatures are above 70°F
2	Cooling Degree Day Base 65°F (CDD)	The overall daily average temperature drives electricity use but air conditioner loads are only linear when average daily temperatures exceed 65°F
3	Daily Maximum Temperature	The daily maximum temperature drives air conditioner electricity use
4	Average temperature over the 24 hours immediately prior	Heat buildup over the 24 hours immediately prior to time period drives electricity use
5	CDH and CDD	Both the daily average temperatures and same hour temperatures drive air conditioner electricity use
6	Same hour CDH and average temperature over the 24 hours immediately prior	Air conditioner use if influenced both by the temperature during that hour and by average temperature over the 24 hours immediately prior
7	Same hour CDH and average CDH over the 6 hours immediately prior	Air conditioner use if influenced both by the temperature during that hour and by heat buildup, as measured by CDH, over the 6 hours immediately prior
8	Same hour CDH and average CDH over the 12 hours immediately prior	Air conditioner use if influenced both by the temperature during that hour and by heat buildup, as measured by CDH, over the 12 hours immediately prior
9	Same hour CDH and average CDH over the 18 hours immediately prior	Air conditioner use if influenced both by the temperature during that hour and by heat buildup, as measured by CDH, over the 18 hours immediately prior
10	Same hour CDH and average CDH over the 24 hours immediately prior	Air conditioner use if influenced both by the temperature during that hour and by heat buildup, as measured by CDH, over the 24 hours immediately prior

Appendix B Per Device Demand Reduction Tables

Table B-1: One Hour Event Per Device Demand Impacts by Cycling Strategy, Temperature, and Event Start

True Cycle	Daily Max (F)	Start Time (1 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.06	-0.08	-0.10	-0.10	-0.11	-0.12	-0.11
	76	-0.08	-0.10	-0.14	-0.15	-0.17	-0.17	-0.15
	78	-0.08	-0.11	-0.15	-0.17	-0.18	-0.19	-0.17
	80	-0.10	-0.15	-0.19	-0.22	-0.24	-0.24	-0.22
	82	-0.13	-0.18	-0.24	-0.28	-0.31	-0.31	-0.29
	84	-0.17	-0.23	-0.30	-0.34	-0.36	-0.36	-0.33
	86	-0.22	-0.29	-0.36	-0.41	-0.43	-0.43	-0.39
	88	-0.27	-0.36	-0.43	-0.47	-0.50	-0.49	-0.46
	90	-0.31	-0.41	-0.49	-0.53	-0.56	-0.55	-0.50
	92	-0.37	-0.49	-0.57	-0.61	-0.63	-0.61	-0.55
	94	-0.41	-0.53	-0.62	-0.66	-0.69	-0.67	-0.62
	96	-0.47	-0.61	-0.69	-0.75	-0.77	-0.76	-0.70
	98	-0.49	-0.65	-0.75	-0.80	-0.83	-0.82	-0.75
	100	-0.56	-0.73	-0.83	-0.91	-0.94	-0.93	-0.83
	102	-0.55	-0.73	-0.82	-0.91	-0.97	-0.96	-0.90
64	74	-0.06	-0.07	-0.08	-0.09	-0.09	-0.10	-0.10
	76	-0.08	-0.10	-0.13	-0.14	-0.15	-0.15	-0.14
	78	-0.08	-0.10	-0.13	-0.15	-0.16	-0.16	-0.15
	80	-0.12	-0.15	-0.18	-0.20	-0.21	-0.22	-0.20
	82	-0.15	-0.19	-0.23	-0.26	-0.27	-0.28	-0.26
	84	-0.21	-0.26	-0.31	-0.33	-0.35	-0.35	-0.33
	86	-0.28	-0.35	-0.40	-0.43	-0.45	-0.45	-0.42
	88	-0.38	-0.46	-0.51	-0.54	-0.56	-0.56	-0.53
	90	-0.45	-0.54	-0.60	-0.63	-0.65	-0.64	-0.61
	92	-0.57	-0.67	-0.73	-0.76	-0.78	-0.76	-0.72
	94	-0.68	-0.79	-0.86	-0.90	-0.91	-0.90	-0.86
	96	-0.82	-0.94	-1.02	-1.06	-1.08	-1.07	-1.02
	98	-0.89	-1.03	-1.11	-1.16	-1.18	-1.17	-1.12
	100	-1.10	-1.27	-1.36	-1.42	-1.45	-1.43	-1.36
	102	-1.13	-1.31	-1.39	-1.46	-1.51	-1.50	-1.45
100	74	-0.16	-0.20	-0.25	-0.26	-0.28	-0.30	-0.28
	76	-0.21	-0.27	-0.34	-0.37	-0.40	-0.41	-0.38
	78	-0.22	-0.28	-0.37	-0.41	-0.44	-0.46	-0.42
	80	-0.28	-0.37	-0.47	-0.52	-0.55	-0.56	-0.53
	82	-0.34	-0.45	-0.57	-0.63	-0.68	-0.69	-0.65
	84	-0.45	-0.58	-0.69	-0.75	-0.80	-0.80	-0.74
	86	-0.56	-0.71	-0.82	-0.89	-0.93	-0.93	-0.87
	88	-0.69	-0.84	-0.96	-1.02	-1.06	-1.05	-0.99
	90	-0.77	-0.94	-1.06	-1.13	-1.17	-1.15	-1.08
	92	-0.91	-1.09	-1.21	-1.27	-1.29	-1.26	-1.18
	94	-1.01	-1.19	-1.31	-1.37	-1.40	-1.38	-1.31
	96	-1.14	-1.33	-1.45	-1.51	-1.54	-1.53	-1.45
	98	-1.19	-1.41	-1.53	-1.60	-1.64	-1.62	-1.53
	100	-1.34	-1.57	-1.70	-1.79	-1.83	-1.81	-1.70
	102	-1.35	-1.59	-1.69	-1.80	-1.87	-1.86	-1.79

*Estimates exclude 30 minute phase in period and reflect the average reduction expected for the event

Table B-2: 2 Hour Event Per Device Demand Impacts by Cycling Strategy, Temperature, and Event Start

True Cycle	Daily Max (F)	Start Time (2 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.06	-0.08	-0.10	-0.10	-0.11	-0.11	-0.10
	76	-0.09	-0.11	-0.14	-0.15	-0.16	-0.16	-0.14
	78	-0.09	-0.12	-0.15	-0.17	-0.18	-0.18	-0.16
	80	-0.12	-0.16	-0.20	-0.22	-0.23	-0.23	-0.20
	82	-0.15	-0.20	-0.25	-0.28	-0.30	-0.29	-0.25
	84	-0.19	-0.26	-0.31	-0.34	-0.35	-0.34	-0.29
	86	-0.24	-0.32	-0.37	-0.40	-0.42	-0.40	-0.35
	88	-0.30	-0.38	-0.44	-0.47	-0.48	-0.46	-0.40
	90	-0.34	-0.43	-0.49	-0.53	-0.54	-0.51	-0.45
	92	-0.41	-0.51	-0.57	-0.60	-0.60	-0.56	-0.49
	94	-0.45	-0.55	-0.62	-0.65	-0.66	-0.62	-0.55
	96	-0.52	-0.63	-0.70	-0.74	-0.74	-0.71	-0.62
	98	-0.55	-0.67	-0.75	-0.79	-0.80	-0.76	-0.67
	100	-0.62	-0.75	-0.84	-0.90	-0.91	-0.85	-0.74
	102	-0.62	-0.75	-0.83	-0.91	-0.93	-0.90	-0.80
64	74	-0.06	-0.08	-0.08	-0.09	-0.10	-0.10	-0.09
	76	-0.09	-0.11	-0.13	-0.14	-0.15	-0.14	-0.13
	78	-0.09	-0.12	-0.14	-0.15	-0.16	-0.15	-0.14
	80	-0.13	-0.16	-0.19	-0.20	-0.21	-0.21	-0.19
	82	-0.16	-0.21	-0.24	-0.26	-0.27	-0.26	-0.24
	84	-0.23	-0.28	-0.31	-0.33	-0.34	-0.33	-0.30
	86	-0.31	-0.37	-0.41	-0.43	-0.44	-0.43	-0.39
	88	-0.41	-0.48	-0.52	-0.54	-0.55	-0.54	-0.50
	90	-0.49	-0.56	-0.61	-0.63	-0.64	-0.62	-0.57
	92	-0.61	-0.69	-0.74	-0.76	-0.76	-0.73	-0.67
	94	-0.73	-0.82	-0.87	-0.89	-0.90	-0.87	-0.82
	96	-0.87	-0.97	-1.02	-1.05	-1.06	-1.03	-0.96
	98	-0.95	-1.06	-1.12	-1.15	-1.16	-1.13	-1.06
	100	-1.17	-1.30	-1.37	-1.42	-1.42	-1.38	-1.28
	102	-1.21	-1.33	-1.41	-1.47	-1.49	-1.46	-1.38
100	74	-0.18	-0.23	-0.25	-0.27	-0.29	-0.29	-0.27
	76	-0.24	-0.30	-0.36	-0.39	-0.41	-0.40	-0.36
	78	-0.25	-0.32	-0.39	-0.43	-0.45	-0.44	-0.40
	80	-0.33	-0.42	-0.49	-0.54	-0.56	-0.55	-0.50
	82	-0.40	-0.51	-0.60	-0.66	-0.69	-0.67	-0.61
	84	-0.51	-0.63	-0.72	-0.77	-0.80	-0.77	-0.70
	86	-0.63	-0.76	-0.86	-0.91	-0.93	-0.90	-0.82
	88	-0.77	-0.90	-0.99	-1.04	-1.05	-1.02	-0.94
	90	-0.86	-1.00	-1.10	-1.15	-1.16	-1.12	-1.02
	92	-1.00	-1.15	-1.24	-1.28	-1.28	-1.22	-1.12
	94	-1.10	-1.25	-1.34	-1.39	-1.39	-1.35	-1.25
	96	-1.23	-1.39	-1.48	-1.53	-1.54	-1.49	-1.38
	98	-1.30	-1.47	-1.57	-1.62	-1.63	-1.58	-1.46
	100	-1.46	-1.63	-1.74	-1.81	-1.82	-1.75	-1.61
	102	-1.47	-1.64	-1.75	-1.83	-1.86	-1.82	-1.70

*Estimates exclude 30 minute phase in period and reflect the average reduction expected for the event

Table B-3: Three Hour Event Per Device Demand Impacts by Cycling Strategy, Temperature, and Event Start

True Cycle	Daily Max (F)	Start Time (3 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.07	-0.08	-0.09	-0.10	-0.10	-0.10	-0.10
	76	-0.09	-0.12	-0.14	-0.15	-0.15	-0.14	-0.13
	78	-0.10	-0.13	-0.15	-0.17	-0.17	-0.16	-0.14
	80	-0.13	-0.17	-0.20	-0.22	-0.22	-0.20	-0.18
	82	-0.17	-0.21	-0.25	-0.28	-0.28	-0.26	-0.23
	84	-0.21	-0.27	-0.31	-0.33	-0.33	-0.30	-0.26
	86	-0.27	-0.33	-0.37	-0.39	-0.39	-0.36	-0.31
	88	-0.32	-0.39	-0.43	-0.46	-0.45	-0.41	-0.35
	90	-0.37	-0.44	-0.49	-0.51	-0.50	-0.46	-0.39
	92	-0.44	-0.52	-0.56	-0.58	-0.56	-0.51	-0.43
	94	-0.48	-0.56	-0.61	-0.63	-0.62	-0.57	-0.48
	96	-0.55	-0.64	-0.69	-0.71	-0.70	-0.64	-0.54
	98	-0.58	-0.68	-0.74	-0.76	-0.75	-0.69	-0.58
	100	-0.65	-0.77	-0.84	-0.87	-0.85	-0.76	-0.64
	102	-0.65	-0.76	-0.84	-0.89	-0.88	-0.82	-0.69
64	74	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.09
	76	-0.10	-0.11	-0.13	-0.14	-0.14	-0.13	-0.12
	78	-0.10	-0.12	-0.14	-0.15	-0.15	-0.14	-0.13
	80	-0.14	-0.17	-0.19	-0.20	-0.20	-0.19	-0.18
	82	-0.18	-0.22	-0.24	-0.26	-0.26	-0.25	-0.22
	84	-0.25	-0.29	-0.32	-0.33	-0.33	-0.31	-0.28
	86	-0.33	-0.38	-0.41	-0.43	-0.42	-0.40	-0.36
	88	-0.44	-0.49	-0.52	-0.54	-0.53	-0.51	-0.46
	90	-0.51	-0.57	-0.61	-0.62	-0.62	-0.59	-0.53
	92	-0.64	-0.70	-0.74	-0.75	-0.73	-0.69	-0.63
	94	-0.76	-0.83	-0.87	-0.88	-0.87	-0.83	-0.76
	96	-0.90	-0.98	-1.02	-1.04	-1.03	-0.98	-0.90
	98	-0.99	-1.07	-1.12	-1.14	-1.13	-1.08	-0.98
	100	-1.21	-1.32	-1.38	-1.40	-1.38	-1.31	-1.19
	102	-1.25	-1.36	-1.42	-1.46	-1.46	-1.40	-1.28
100	74	-0.20	-0.24	-0.26	-0.28	-0.29	-0.28	-0.27
	76	-0.27	-0.33	-0.37	-0.40	-0.40	-0.38	-0.35
	78	-0.29	-0.35	-0.41	-0.44	-0.44	-0.42	-0.38
	80	-0.37	-0.45	-0.51	-0.55	-0.55	-0.52	-0.47
	82	-0.45	-0.55	-0.63	-0.67	-0.67	-0.64	-0.57
	84	-0.57	-0.67	-0.75	-0.78	-0.78	-0.73	-0.65
	86	-0.70	-0.81	-0.88	-0.91	-0.91	-0.85	-0.76
	88	-0.83	-0.94	-1.01	-1.04	-1.03	-0.98	-0.87
	90	-0.93	-1.05	-1.12	-1.15	-1.13	-1.07	-0.96
	92	-1.07	-1.19	-1.26	-1.27	-1.25	-1.16	-1.04
	94	-1.17	-1.29	-1.36	-1.38	-1.37	-1.29	-1.17
	96	-1.30	-1.43	-1.50	-1.53	-1.51	-1.43	-1.29
	98	-1.38	-1.51	-1.59	-1.62	-1.60	-1.51	-1.36
	100	-1.54	-1.69	-1.77	-1.81	-1.78	-1.67	-1.50
	102	-1.54	-1.69	-1.79	-1.84	-1.84	-1.75	-1.59

*Estimates exclude 30 minute phase in period and reflect the average reduction expected for the event

Docket No. E-7, Sub 1192
Per Device Demand Reduction Tables

Table B-4: Four Hour Event Per Device Demand Impacts by Cycling Strategy, Temperature, and Event Start

True Cycle	Daily Max (F)	Start Time (4 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.07	-0.08	-0.09	-0.10	-0.10	-0.10	-0.09
	76	-0.10	-0.12	-0.14	-0.14	-0.14	-0.13	-0.12
	78	-0.11	-0.13	-0.15	-0.16	-0.16	-0.15	-0.13
	80	-0.14	-0.17	-0.20	-0.21	-0.20	-0.18	-0.16
	82	-0.18	-0.22	-0.25	-0.26	-0.26	-0.23	-0.20
	84	-0.23	-0.27	-0.30	-0.31	-0.30	-0.27	-0.23
	86	-0.28	-0.33	-0.36	-0.37	-0.36	-0.32	-0.27
	88	-0.34	-0.39	-0.42	-0.43	-0.41	-0.37	-0.31
	90	-0.38	-0.44	-0.48	-0.48	-0.46	-0.41	-0.35
	92	-0.45	-0.52	-0.55	-0.54	-0.51	-0.45	-0.38
	94	-0.49	-0.56	-0.59	-0.60	-0.57	-0.50	-0.42
	96	-0.56	-0.63	-0.67	-0.67	-0.64	-0.57	-0.47
	98	-0.60	-0.68	-0.72	-0.72	-0.69	-0.61	-0.51
	100	-0.68	-0.77	-0.82	-0.82	-0.77	-0.67	-0.55
	102	-0.67	-0.77	-0.83	-0.85	-0.81	-0.72	-0.60
64	74	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.08
	76	-0.10	-0.12	-0.13	-0.13	-0.13	-0.13	-0.12
	78	-0.11	-0.13	-0.14	-0.14	-0.14	-0.14	-0.12
	80	-0.15	-0.17	-0.19	-0.19	-0.19	-0.18	-0.16
	82	-0.19	-0.22	-0.24	-0.25	-0.25	-0.23	-0.21
	84	-0.26	-0.29	-0.31	-0.32	-0.31	-0.29	-0.26
	86	-0.35	-0.38	-0.41	-0.41	-0.40	-0.37	-0.34
	88	-0.45	-0.49	-0.52	-0.52	-0.51	-0.47	-0.43
	90	-0.53	-0.58	-0.60	-0.61	-0.59	-0.55	-0.50
	92	-0.65	-0.70	-0.73	-0.72	-0.70	-0.65	-0.58
	94	-0.78	-0.83	-0.86	-0.86	-0.84	-0.78	-0.71
	96	-0.92	-0.98	-1.02	-1.02	-0.99	-0.92	-0.84
	98	-1.01	-1.08	-1.12	-1.12	-1.09	-1.01	-0.92
	100	-1.24	-1.33	-1.37	-1.37	-1.33	-1.24	-1.11
	102	-1.28	-1.37	-1.42	-1.44	-1.41	-1.32	-1.20
100	74	-0.22	-0.25	-0.27	-0.28	-0.28	-0.27	-0.26
	76	-0.30	-0.35	-0.38	-0.39	-0.39	-0.37	-0.34
	78	-0.32	-0.37	-0.42	-0.43	-0.42	-0.40	-0.36
	80	-0.41	-0.48	-0.53	-0.54	-0.53	-0.49	-0.44
	82	-0.50	-0.58	-0.64	-0.66	-0.65	-0.60	-0.53
	84	-0.62	-0.70	-0.76	-0.77	-0.75	-0.69	-0.60
	86	-0.74	-0.84	-0.89	-0.90	-0.87	-0.80	-0.71
	88	-0.88	-0.97	-1.02	-1.03	-1.00	-0.92	-0.82
	90	-0.98	-1.08	-1.13	-1.13	-1.09	-1.01	-0.90
	92	-1.12	-1.22	-1.26	-1.25	-1.20	-1.10	-0.98
	94	-1.22	-1.32	-1.37	-1.37	-1.32	-1.22	-1.09
	96	-1.36	-1.46	-1.51	-1.51	-1.46	-1.35	-1.20
	98	-1.43	-1.54	-1.60	-1.60	-1.54	-1.43	-1.27
	100	-1.60	-1.72	-1.78	-1.78	-1.71	-1.58	-1.40
	102	-1.61	-1.74	-1.80	-1.83	-1.78	-1.65	-1.48

*Estimates exclude 30 minute phase in period and reflect the average reduction expected for the event

Table B-5: Five Hour Event Per Device Demand Impacts by Cycling Strategy, Temperature, and Event Start

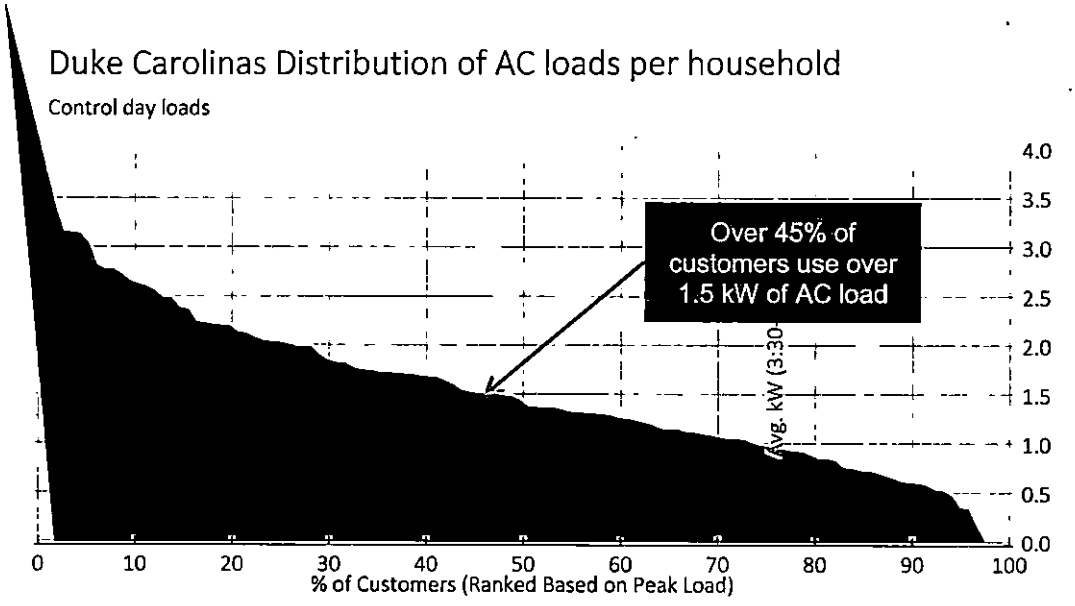
True Cycle	Daily Max (F)	Start Time (5 Hour Event)*						
		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
50	74	-0.07	-0.08	-0.09	-0.09	-0.09	-0.09	-0.09
	76	-0.10	-0.12	-0.13	-0.13	-0.13	-0.12	-0.11
	78	-0.11	-0.13	-0.14	-0.15	-0.14	-0.13	-0.12
	80	-0.15	-0.17	-0.19	-0.19	-0.18	-0.17	-0.14
	82	-0.19	-0.22	-0.24	-0.24	-0.23	-0.21	-0.18
	84	-0.23	-0.27	-0.29	-0.29	-0.27	-0.24	-0.20
	86	-0.29	-0.33	-0.35	-0.34	-0.32	-0.28	-0.24
	88	-0.34	-0.39	-0.41	-0.40	-0.37	-0.33	-0.28
	90	-0.39	-0.44	-0.46	-0.45	-0.41	-0.36	-0.31
	92	-0.46	-0.50	-0.52	-0.50	-0.46	-0.40	-0.33
	94	-0.50	-0.55	-0.57	-0.55	-0.51	-0.45	-0.37
	96	-0.56	-0.62	-0.64	-0.62	-0.57	-0.50	-0.41
	98	-0.60	-0.67	-0.69	-0.67	-0.62	-0.54	-0.44
	100	-0.68	-0.76	-0.78	-0.76	-0.69	-0.59	-0.48
	102	-0.68	-0.76	-0.80	-0.79	-0.73	-0.63	-0.52
64	74	-0.07	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08
	76	-0.11	-0.12	-0.13	-0.13	-0.13	-0.12	-0.11
	78	-0.11	-0.13	-0.14	-0.14	-0.13	-0.13	-0.12
	80	-0.16	-0.17	-0.19	-0.19	-0.18	-0.17	-0.15
	82	-0.20	-0.22	-0.24	-0.24	-0.23	-0.21	-0.19
	84	-0.27	-0.29	-0.31	-0.31	-0.29	-0.27	-0.24
	86	-0.35	-0.38	-0.40	-0.40	-0.38	-0.35	-0.31
	88	-0.46	-0.49	-0.51	-0.50	-0.48	-0.44	-0.40
	90	-0.54	-0.58	-0.59	-0.58	-0.56	-0.51	-0.46
	92	-0.66	-0.70	-0.71	-0.70	-0.66	-0.61	-0.54
	94	-0.79	-0.83	-0.84	-0.83	-0.79	-0.73	-0.66
	96	-0.93	-0.98	-1.00	-0.98	-0.94	-0.87	-0.78
	98	-1.02	-1.08	-1.10	-1.08	-1.03	-0.95	-0.86
	100	-1.26	-1.33	-1.34	-1.32	-1.26	-1.16	-1.04
	102	-1.30	-1.37	-1.40	-1.39	-1.33	-1.24	-1.11
100	74	-0.23	-0.26	-0.27	-0.28	-0.27	-0.27	-0.26
	76	-0.32	-0.36	-0.38	-0.38	-0.38	-0.36	-0.33
	78	-0.34	-0.39	-0.42	-0.42	-0.41	-0.38	-0.34
	80	-0.44	-0.50	-0.53	-0.53	-0.50	-0.47	-0.41
	82	-0.54	-0.61	-0.64	-0.64	-0.61	-0.56	-0.49
	84	-0.65	-0.72	-0.76	-0.75	-0.71	-0.64	-0.56
	86	-0.78	-0.85	-0.89	-0.88	-0.83	-0.75	-0.66
	88	-0.91	-0.99	-1.02	-1.00	-0.95	-0.87	-0.77
	90	-1.02	-1.09	-1.12	-1.10	-1.04	-0.95	-0.84
	92	-1.16	-1.23	-1.24	-1.21	-1.14	-1.03	-0.91
	94	-1.26	-1.33	-1.36	-1.33	-1.26	-1.15	-1.02
	96	-1.39	-1.47	-1.50	-1.47	-1.39	-1.27	-1.13
	98	-1.47	-1.56	-1.58	-1.55	-1.47	-1.34	-1.20
	100	-1.64	-1.74	-1.76	-1.73	-1.63	-1.48	-1.32
	102	-1.66	-1.76	-1.80	-1.78	-1.70	-1.56	-1.38

Appendix C 2016 Power Manager Evaluation

In 2016, a sample of 122 Power Manager participants were selected for inclusion in Nexant's impact evaluation, comprising a total of 144 end use (AC) loggers. Nexant compiled end use data from the 144 loggers and assessed it for quality and completeness. Of the 144 devices installed, 119 loggers returned usable end use data, making up the final impact analysis dataset.

Nexant isolated customers' AC system loads during peak hours (3:30 to 6:00pm) on nonevent days with high average temperatures in order to examine typical AC loads on hot summer days. These are generally analogous to event days and provide a reasonable estimate of what customer AC loads would have been in the absence of a curtailment event. Figure C-1 shows the distribution of average customer loads (kW) during peak hours on nonevent days. Roughly 45% of sampled customers use more than 1.5 kW of AC load under these typical event conditions.

Figure C-1: Distribution of Air Conditioner Peak Period Loads



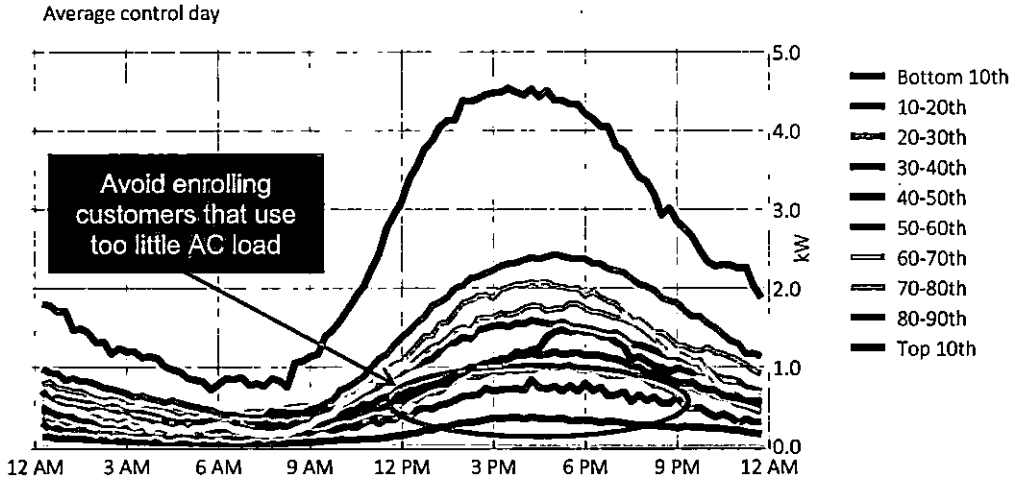
One of the advantages of end use data collection is the ability to assess whether customers use their air conditioners during key hours on hotter days. By design, events were not called on all of the hottest summer days, enabling Nexant to assess typical air conditioner use absent load curtailment events. A total of 47 nonevent days were identified having daily maximum temperatures exceeding 86°F and an average daily maximum temperature of 90°F, compared to an average maximum temperature of 92°F for actual event days.

Figure C-1 shows the distribution of average air conditioner unit demand during peak hours across sampled customers on nonevent days. Nexant isolated the hours 4 to 6pm to generate the distribution as this period aligns with the timing for most Power Manager events. Power Manager participants' air

conditioner use varies substantially, reflecting different occupancy schedules, comfort preferences, and thermostat settings. Roughly 45% of air conditioner loads exceed 1.5 kW during peak hours. As with any program, consumption varies by customer for a variety of reasons. A portion of enrolled customers use little or no air conditioning during late afternoon hours on hotter days. These customers are, in essence, free riders since they receive the participation incentive without providing AC load for curtailment. However, the bulk of the costs for recruitment, equipment, and installation have already been sunk for these customers and, as a result, removing them from the program may not substantially improve cost effectiveness.

Nexant then categorized customers into deciles by average daily loads on nonevent days. This process allows for more targeted consideration of customers that typically use either extremely high or extremely low loads during event-like conditions. Figure C-2 shows average AC load shapes by decile for sampled participants on nonevent days that are comparable to event days. Despite the general size of AC loads, some customers have small AC loads during peak hours. In general, customers that make up these lower deciles are not ideal candidates for program participation due to relatively low potential for load shed impacts.

Figure C-2: Air Conditioner End Use Hourly Loads by Size Decile



In 2016, Duke Energy Carolinas dispatched Power Manager events 14 times. Some of these events involved dispatching all of the customers enrolled in the program, while other events were only called for customers in the research group in order to provide data for this analysis. By design, events included a wide range of dispatch hours, weather conditions, and control levels. Both test events of the 100% emergency shed lasted 20 minutes; and, all systems were affected simultaneously at the outset of the event window. All of the 50% and 64% cycling events were called at 1:30 pm, 2:30 pm, or 3:30 pm and lasted either 2.5 hours or 3.5 hours. Control of affected air conditioning units was phased in at random over the first 30 minutes of each event. Likewise, the last 30 minutes of these events allowed air conditioning units to resume normal operations in the order they were first controlled. The demand

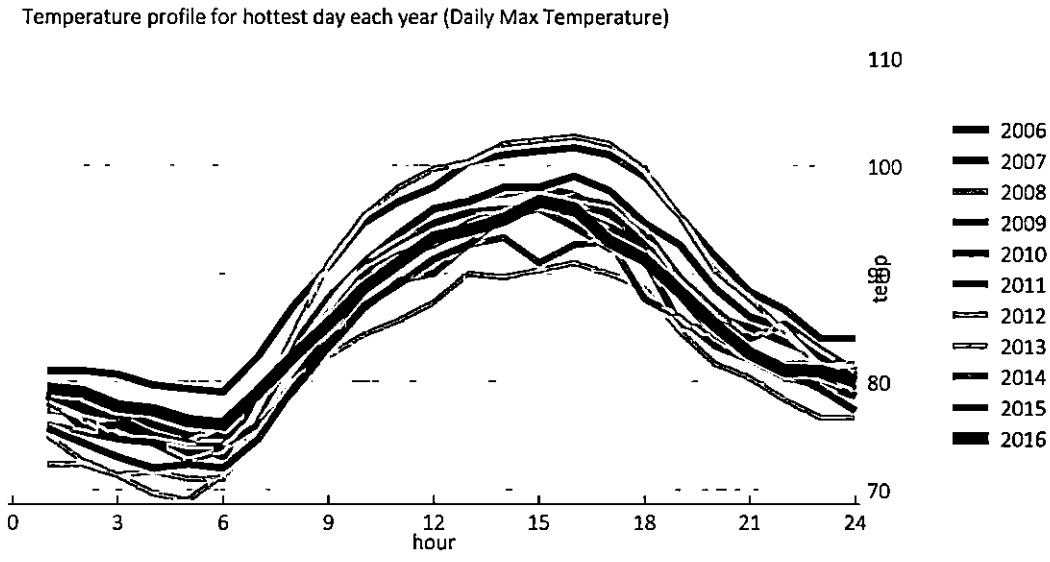
reductions reported in this report for 50% and 64% cycling events exclude the random phase-in and phase-out periods of each event because those periods do not reflect demand reductions when all units are being cycled. Table C-1 lists the events that were called during the summer of 2016.

Table C-1: 2016 Event Operations and Characteristics

TrueCycle Level	Event Date	Start Time	End Time	Temperature	# of Customers
50%	7/20/2016	3:30 PM	6:00 PM	91.0	~120
	9/6/2016	1:30 PM	4:00 PM	90.3	~120
	9/8/2016	3:30 PM	6:00 PM	93.0	189,605
	9/14/2016	3:30 PM	6:00 PM	90.7	~120
64%	6/16/2016	1:30 PM	4:00 PM	94.0	~120
	6/23/2016	2:30 PM	5:00 PM	94.0	185,928
	7/8/2016	3:30 PM	6:00 PM	95.2	~120
	7/14/2016	2:30 PM	6:00 PM	95.7	186,744
	8/12/2016	3:30 PM	6:00 PM	89.7	~120
	8/31/2016	3:30 PM	6:00 PM	90.0	~120
	9/15/2016	1:30 PM	4:00 PM	89.0	~120
	9/19/2016	2:30 PM	6:00 PM	86.7	190,564
100%	8/26/2016	4:00 PM	4:20 PM	93.9	~120
	9/7/2016	5:00 PM	5:20 PM	91.7	~120

In comparison to the immediately prior 10 years, 2016 was neither extremely hot nor cool for DEC territory. Figure C-3 shows how the maximum temperature in 2016 compares to historical hourly temperatures for the weekday with the highest daily maximum temperature. The peak day temperatures, however, fell short of the 102°F used for planning.

Figure C-3: Comparison of 2016 Maximum Temperature to Historical Years (2006-2016)



A key objective of the 2016 evaluation was to quantify the relationship between demand reductions, temperature, hour of day, and cycling strategy—referred to as the time-temperature matrix. By design, a large number of events were called under different weather conditions, for different dispatch windows, using various cycling strategies so that demand reduction capability could be estimated for a wide range of operating and planning conditions. The tool that was created using 2016 event data was then applied to 2017 event conditions to predict load reductions that were achieved during those events.

The tool was also used to predict load reduction capability under extreme weather conditions, defined as a 102°F day. Weather conditions vary substantially from year to year as shown earlier in Figure C-3. Because 2016 conditions did not approach the 102°F conditions Duke Carolinas has previously experienced multiple times, the reductions capability had to be estimated based on the data available.

Figure C-4 illustrates the essential trends and challenges. Not only do Power Manager demand reductions grow on a percentage basis with hotter weather and with deeper cycling, but so do the air conditioner loads available for curtailment. The implication is that larger percent reductions are attainable from larger loads when temperatures are hotter. However, producing estimates of the reduction capability for 102°F, unavoidably requires extrapolation of patterns observed in 2016 to conditions that were hotter than those experienced in 2016.

Figure C-4: Both Air Conditioning Loads and Percent Demand Reductions are Weather Sensitive

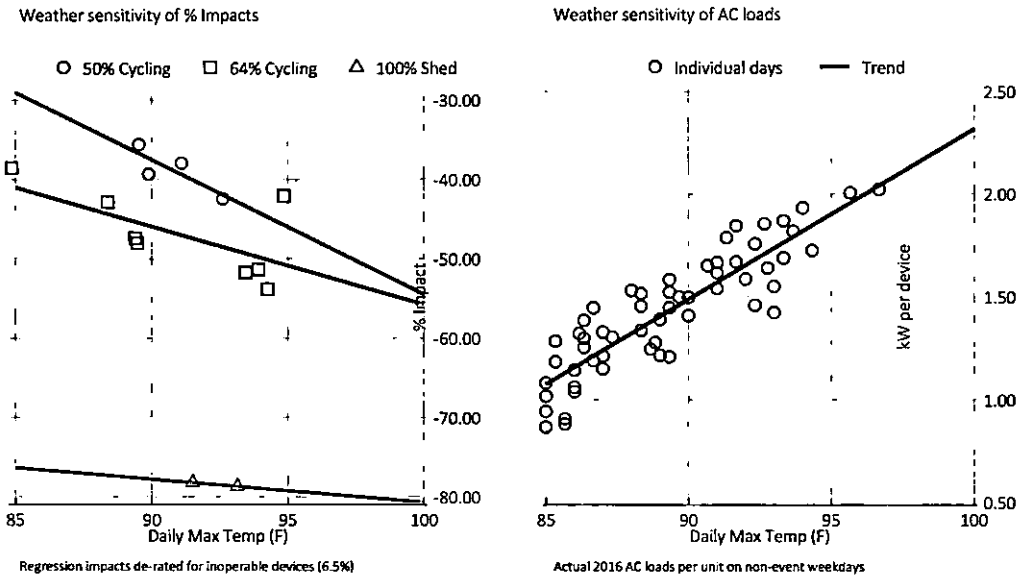


Figure C-5: Time Temperature Matrix Development Process

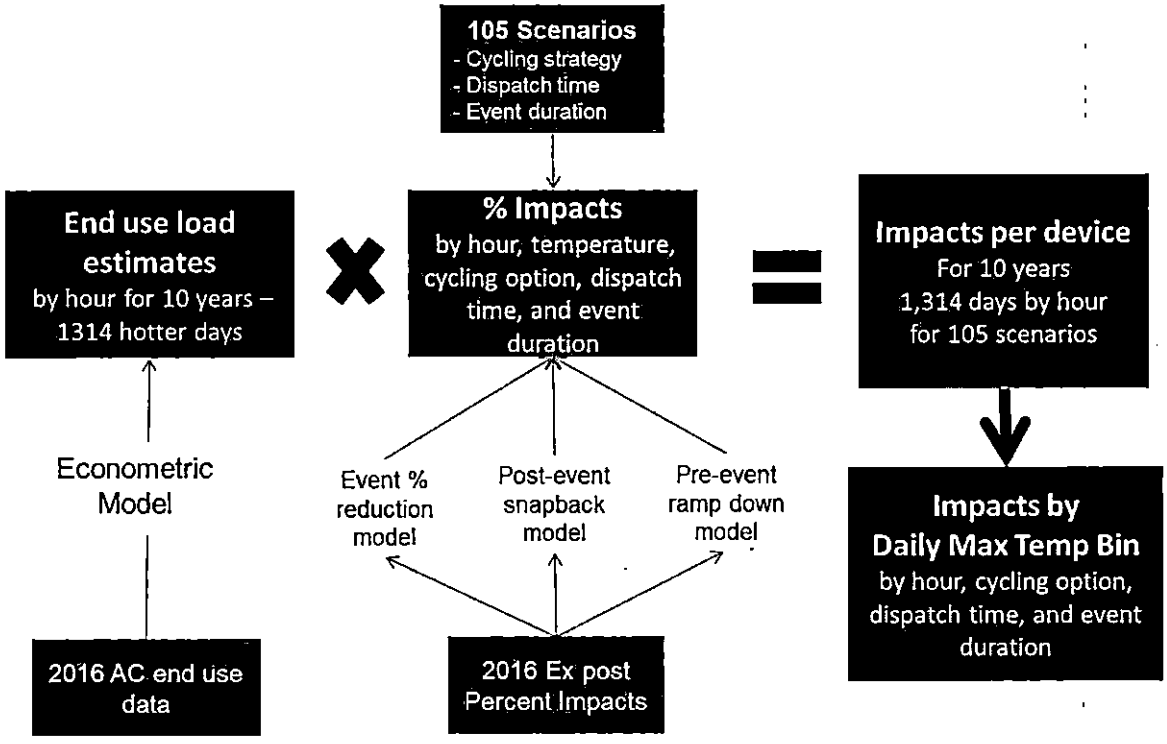


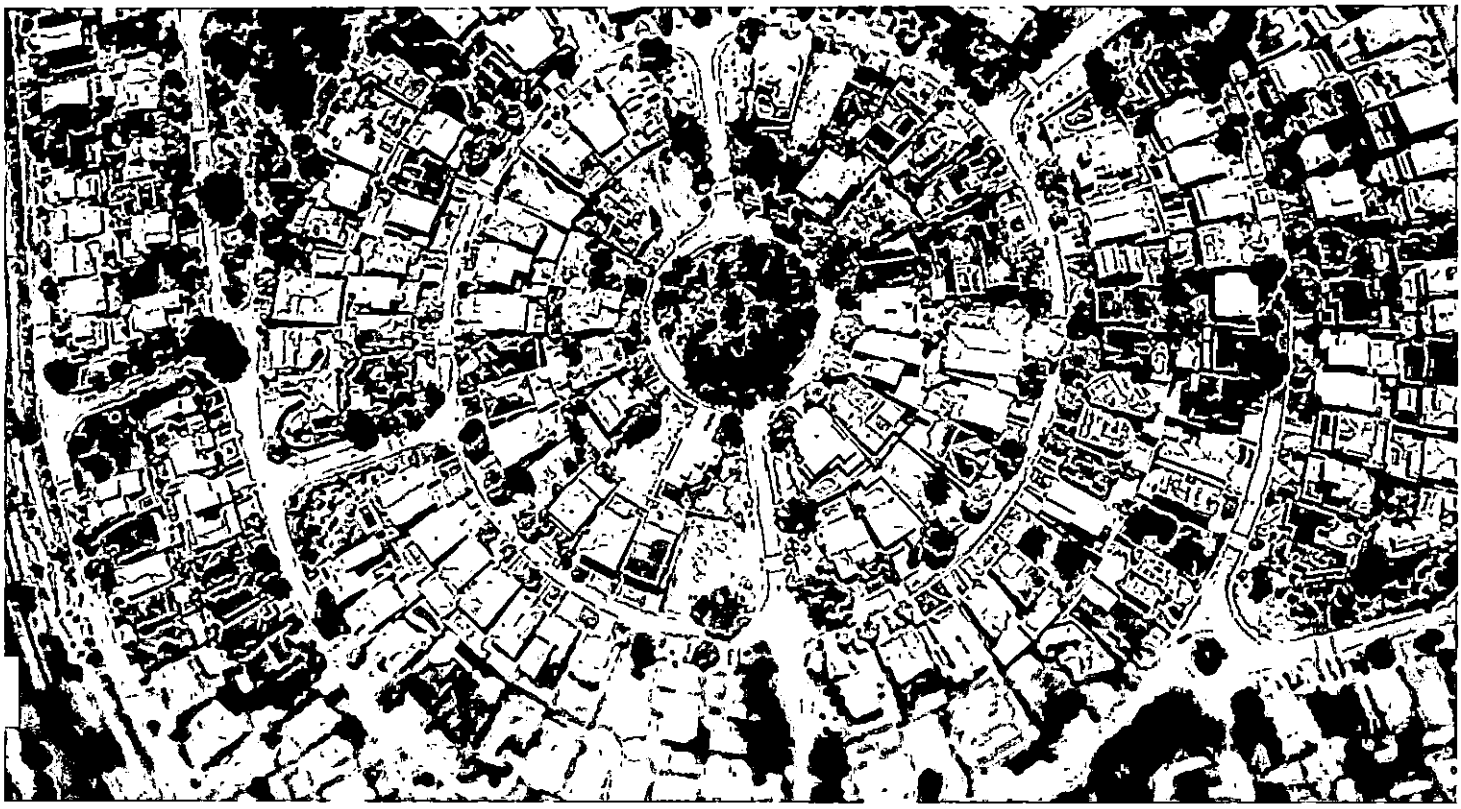
Figure C-5 illustrates the process used to estimate the demand reduction capability under various conditions:

- Estimates of air conditioner loads were developed using the 2016 air conditioner end use data and using the same regression models used to estimate impacts. All weekdays with daily maximum temperatures above 75°F were included in the models. The models were used to estimate air conditioner load patterns for 1,314 days in 10 years. Because the models were based on 2016 data, they reflect current usage patterns and levels of efficiency. The 2016 air conditioner patterns were applied to actual weather patterns experienced in past 10 years and not hypothetical weather patterns.
- Estimates of the percent reductions were based on three distinct econometric models of load control phase in, percent reductions during the event, and post-event snapback. The models were based on the percent impacts and temperatures experienced during 2016 events.
- A total of 105 scenarios were develop to reflect various cycling/control strategies, event dispatch times, and event lengths.
- Estimated impacts per device were produced. This was done by combining the estimated air conditioner loads, estimated percent reductions, and dispatch scenarios. The process produced estimated hourly impacts for each of 1,314 hotter weekdays in 2006-2016 under 105 scenarios each.

- Multiple days in narrow temperature bins were averaged to produce an expected reduction profile. Days with the similar daily maximum temperature can have distinct temperature profiles and the heat buildup influenced the amount of air conditioner load.

Docket No. E-7, Sub 1192
REPORT

Nexant
Reimagine tomorrow.



Smart $aver Evaluation Report — May 1, 2016 – April 30, 2017

Submitted to Duke Energy Carolinas in partnership with Research into Action

May 25, 2018

Principal authors:
Nexant: Patrick Burns, Wyley Hodgson, Andrew Dionne
Research Into Action: Jane Peters, Jordan Folks, Doré Mangan, Anne Weaver

I/A

Docket No. E-7, Sub 1192

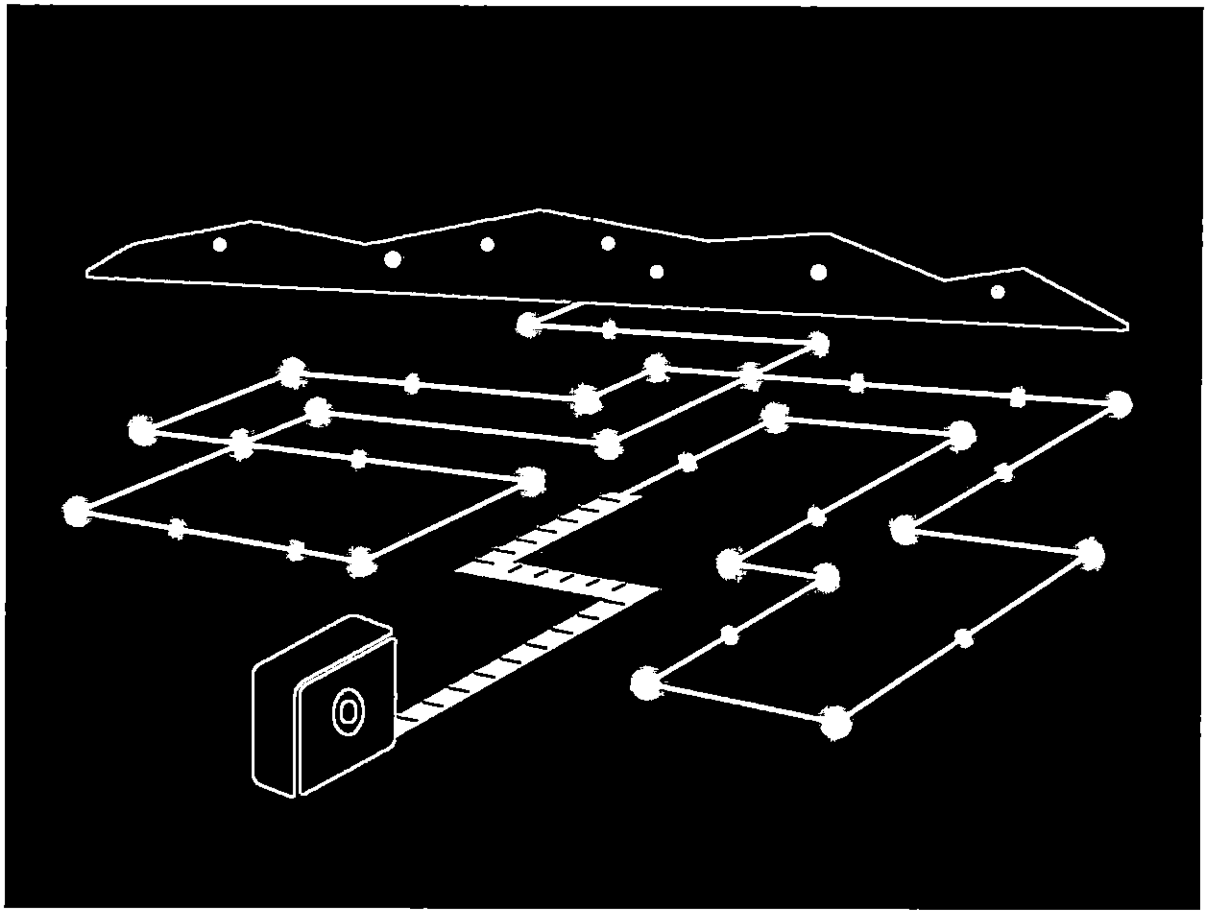
Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

Filed in docket



Duke Energy Carolinas

2015 Low Income Weatherization Program Evaluation Report – Final

June 13, 2018

I/A

Evans Exhibit G
Page 1 of 52

Docket No. E-7, Sub 1192

EM&V Report for the Small Business Energy Saver Program

Duke Energy Progress and Duke Energy Carolinas

Prepared for:

Duke Energy

Submitted by:
Navigant Consulting, Inc.
1375 Walnut Street
Suite 100
Boulder, CO 80302

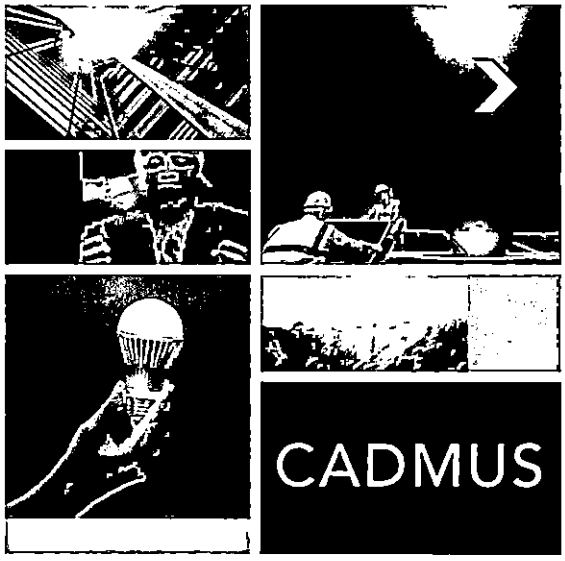
303.728.2500
navigant.com

September 10, 2018

I/A

Evans Exhibit H
Page 1 of 37

Docket No. E-7, Sub 1192



Evaluation of the Smart $aver® Custom Incentive Program in North and South Carolina

September 27, 2018

Deleted: February 13, 2017

Duke Energy
550 South Tryon Street
Charlotte, North Carolina 28202

The Cadmus Group, Inc.
An Employee-Owned Company • www.cadmusgroup.com

CADMUS [redacted]

This page left blank.

CADMUS [redacted]

Prepared by:
Sahar Abbaszadeh
Sara Wist
Christie Amero
M. Sami Khawaja

Cadmus

CADMUS [redacted]

This page left blank.

CADMUS [redacted]

Table of Contents

CADMUS

Executive Summary

Duke Energy Carolinas (DEC) engaged Cadmus, along with NORESCO and BuildingMetrics (the evaluation team), to perform an impact evaluation of the Smart $aver® Custom Incentive Program (Custom Program). The team evaluated 374 program participant applications that were paid an incentive from January 2014 through December 2015.

The evaluation team performed the impact analysis by conducting site measurement and verification (M&V) for a sample of 29 program participant applications. We calculated average electric energy savings and demand reduction realization rates for sampled applications. We used the realization rates to extrapolate the M&V results to the entire population of participants.

The team conducted verification site visits in three phases. TecMarket Works (along with NORESCO and BuildingMetrics) completed phase 1 site visits and prepared M&V reports for eight program participant applications in the winter of 2014. In March 2015, the contract was transferred to Cadmus. Cadmus completed phase 2 site visits at 11 projects during the winter of 2016, and phase 3 site visits at 10 projects during the summer of 2016. This report describes the results of the evaluation based on combined verification efforts.

Impact Evaluation Results

Table 1 shows the program's expected energy savings (those claimed prior to applying the realization rate from the previous Evaluation, Measurement, and Verification study), evaluated gross and net energy savings by project type.

Table 1. Total Program Expected, Evaluated Gross, and Net Energy Savings by Project Type

Project Type	Population Size**	Expected kWh Impact	Realization Rate*	Gross Evaluated kWh Impact	Net-to-Gross Ratio	Net Evaluated kWh Impact
HVAC	41	59,740,357	59%	35,377,874	84%	29,717,414
Lighting	300	75,226,538	101%	75,950,346	91%	69,114,814
Process	36	35,500,097	77%	27,237,074	69%	18,793,581
Total* **	**377**	**170,466,992**	**81%**	**138,565,294**	**85%**	**117,625,810**

* Expected impact multiplied by the realization rate will not equal gross evaluated savings due to rounding.

** The total number of applications evaluated is 374. However, three applications included multiple project types.

*** The row values may not add up to the totals due to rounding.

Table 2 and Table 3 show the expected, evaluated gross, net non-coincident peak (NCP, average annual demand reduction) and summer coincident peak (CP, the average summer peak demand reduction in July, Monday through Friday, 4:00 p.m. to 5:00 p.m.) demand reductions for the program.

Deleted: 59%
Deleted: 35,377,874
Deleted: 88%
Deleted: 31,132,529
Deleted: 100%
Deleted: 74,888,145
Deleted: 93%
Deleted: 69,645,975
Deleted: 77%
Deleted: 27,237,074
Deleted: 73%
Deleted: 19,883,064
Deleted: 81%
Deleted: 137,503,094
Deleted: 88%
Deleted: 120,661,569

CADMUS

Table 2. Total Program Expected, Evaluated Gross, and Net NCP Demand Reduction by Project Type

Project Type	Population Size*	Expected NCP kW Impact	Realization Rate**	Gross Evaluated NCP kW Impact	Net-to-Gross Ratio	Net Evaluated NCP kW Impact
HVAC	40	11,327	57%	6,452	84%	5,420
Lighting	300	9,167	88%	8,075	91%	7,348
Process	36	5,052	94%	4,748	69%	3,276
Total* **	**376**	**25,546**	**75%**	**19,275**	**83%**	**16,044**

* 376 of the 377 projects in the population had expected non-coincident peak demand reduction.

** Expected impact multiplied by the realization rate will not equal gross evaluated savings due to rounding.

*** The row values may not add up to the totals due to rounding.

Table 3. Total Program Expected, Evaluated Gross, and Net CP Demand Reduction by Project Type

Project Type	Population Size*	Expected CP kW Impact	Realization Rate**	Gross Evaluated CP kW Impact	Net-to-Gross Ratio	Net Evaluated CP kW Impact
HVAC	39	5,537	85%	4,713	84%	3,959
Lighting	265	11,897	104%	12,339	91%	11,229
Process	36	4,738	96%	4,533	69%	3,128
Total* **	**340**	**22,172**	**97%**	**21,586**	**85%**	**18,316**

* 340 of the 377 projects in the population had expected coincident peak demand reduction.

** Expected impact multiplied by the realization rate will not equal gross evaluated savings due to rounding.

*** The row values may not add up to the totals due to rounding.

Evaluation Parameters

Table 4 lists the parameters reviewed in this evaluation.

Table 4. Evaluated Parameters with Value, Units, and Achieved Precision and Confidence

Evaluated Parameter	Gross Realization Rates	Confidence/Precision
Energy Saving (kWh)	81%	90%/±9%
Non-Coincident Peak Demand Reduction (kW)	75%	90%/±21%
Coincident Peak Demand Reduction (kW)	97%	90%/±16%

Table 5 lists the sample periods and dates during which the team conducted evaluation activities. We selected the verification samples based on expected project contribution to program energy savings to meet the targeted relative precision of ±15% at a 90% confidence level.

Deleted: 57%
Deleted: 6,452
Deleted: 88%
Deleted: 5,678
Deleted: 87%
Deleted: 8,020
Deleted: 93%
Deleted: 7,459
Deleted: 94%
Deleted: 4,748
Deleted: 73%
Deleted: 3,466
Deleted: 75%
Deleted: 19,220
Deleted: 86%
Deleted: 16,603
Deleted: 85%
Deleted: 4,713
Deleted: 88%
Deleted: 4,148
Deleted: 103%
Deleted: 12,303
Deleted: 93%
Deleted: 11,442
Deleted: 96%
Deleted: 4,533
Deleted: 73%
Deleted: 3,309
Deleted: 97%
Deleted: 21,550
Deleted: 88%
Deleted: 18,899

Table 5. Sample Period Start and End and Dates Evaluation Activities Were Conducted

Evaluation Phase	Component	Sample Period*	Dates Conducted	Total
1	Site Visits (TecMarket Works)	January 2014 – June 2014	September 2014	8
2	Site Visits (Cadmus)	January 2014 – June 2015	January 2016	11
3	Site Visits (Cadmus)	January 2014 – December 2015	July 2016	10

* The sample period is based on the date the incentive was paid to the customer, as recorded in DEC's database.

Impact Evaluation Findings

The evaluation team identified the following key findings through this evaluation.

- The overall energy realization rate across all projects was 81%.
- Lighting projects achieved the highest energy savings as compared to program estimates (realization rate of 100%), whereas HVAC projects achieved the lowest energy savings as compared to program estimates (realization rate of 59%). Industrial process projects had a 77% energy saving realization rate.
- Lighting projects contributed 54% of the total evaluated program energy savings. In general, the discrepancies between expected and verified savings resulted from lower verified hours of use.
- HVAC projects contributed 26% of the total evaluated program savings. In general, control strategies that were suboptimal or not fully implemented contributed to low realization rates. Additionally, the evaluated loads were less than those projected in the program application saving calculations.
- Process projects generated 20% of the evaluated program savings. Though most process projects performed as expected, one large project had a 53% energy realization rate. The evaluation team's review revealed that the installed air compressors were not as efficient as expected in the application saving calculations.
- Twelve percent of the evaluated program savings are associated with freeriders. Spillover was not included in the scope of the evaluation as it was expected to be minimal. Therefore, the program net-to-gross ratio is 88%.

CADMUS

Introduction and Purpose of Study

Description of Program

Through the Custom Program, DEC provides incentives for its nonresidential customers who purchase high-efficiency equipment. The program design is intended to complement the Smart $aver Prescriptive Incentive Program (Prescriptive Program), through which DEC offers incentives on preselected measures. Customers who want to purchase measures that are not eligible for the Prescriptive Program may apply for a rebate through the Custom Program. Custom Program participants must calculate their proposed measures' energy savings and include their estimate on the Custom Program application. DEC provides incentives to approved applicants based on a review of these calculations.

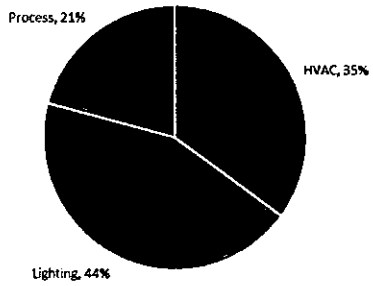
Table 6 lists the number of participants in the evaluation period, which includes program participant applications that were paid an incentive between January 2014 and December 2015. A total of 374 applications were paid during the evaluation period. Three applications included measures in both the lighting and HVAC categories. Since the evaluated energy savings and demand reduction are broken out by technology, these three applications are counted twice in the total shown here.

Table 6. Custom Program Impact Evaluation Participant Application Count

Project Type	Number of Participant Applications in Evaluation Period
HVAC	41
Lighting	300
Process	36
Total	**377**

Figure 1 shows the breakdown of expected energy savings by project type in the program tracking database for the evaluation period. As a category, lighting projects were reported to have the greatest savings, followed by HVAC projects.

Figure 1. Expected Energy Savings by Project Type



n= 170,466,992 kWh

Summary of the Evaluation

For the impact evaluation, the team conducted a tracking system review, sample design and selection, engineering review of Custom Program applications, field M&V of selected projects, data analysis, and reporting.

Evaluation Objectives

The goal of the impact evaluation was to verify energy savings and calculate energy and demand realization rates for a sample of participants in each project type: lighting, HVAC, and process. The evaluation team estimated program-wide savings by applying the average realization rates to the evaluation period population by project type.

Researchable Issues

The evaluation team researched the following issues to complete this study:

- Energy, coincident peak, and non-coincident peak demand reduction for each sampled participant
- Causes for differences between evaluated savings and expected savings
- Energy and demand realization rates for each participant
- Average energy and demand realization rates for lighting, HVAC, and process participants, along with the associated confidence intervals

CADMUS

Methodology

Overview of the Evaluation Approach

Data Collection Methods, Sample Sizes, and Sampling Methodology

The evaluation team assigned participant applications to lighting, HVAC, and process categories. We then stratified all three categories by size and selected participants in each stratum either randomly (for smaller sites) or based on the magnitude of energy savings.

The evaluation team conducted M&V site visits at all sampled HVAC (n=6), lighting (n=16), and process (n=7) projects.

Study Methodology

The evaluation team prepared M&V plans for site visits following the options outlined by the International Performance Measurement and Verification Protocol (IPMVP).[1] We followed IPMVP Option A for all but two of the site M&V plans, which followed Option D. IPMVP Option A evaluates savings based on field measurement of key performance parameters, such as air compressor demand. The evaluation team estimates parameters that cannot be measured or are not selected for field measurement based on historical data, manufacturer's specifications, or engineering judgment. IPMVP Option D evaluated savings are determined through energy model simulations of the whole facility. The model must be calibrated to reflect actual energy use in the facility based on utility data. Option D is most useful when evaluating savings from interactive building systems.

We conducted site visits to verify measures, install metering equipment, and perform interviews about the pre-retrofit equipment and hours of operation with the site contacts. We used metered data or inputs collected on site to calculate evaluated energy savings and engineering analysis and statistical regression modeling for estimating demand reductions.

Number of Completes and Sample Disposition for Each Data Collection Effort

The evaluation team attempted to contact 32 program applicants. One program participant was concerned with the impact of site visits on business operations, one did not respond, and one agreed to be an alternate site. The team completed verifications of 29 projects across the three project types.

Expected and Achieved Precision

The evaluation team designed the sample to achieve 90% confidence with ±15% precision for the energy savings overall. The impact evaluation did not have a targeted precision for demand reduction.

Four of the 29 sampled projects were excluded from the energy saving realization rate and precision calculations as outliers: In one sampled project, DEC had calculated the savings using an incorrect

[1] International Performance Measurement and Verification Protocol. *Concepts and Options for Determining Energy and Water Savings. Volume 1.* January 2012. EVO 10000 – 1:2012. www.evo-world.org.

baseline. Another sampled project was removed from the realization rate calculations due to insufficient data to calculate savings. Two other projects were statistical outliers among the sampled projects with realization rates that were either too high or too low.[2] We achieved 90% confidence with ±9% precision for energy saving based on the projects included in the energy saving realization rate calculations.

Description of Baseline Assumptions, Methods, and Data Sources

The evaluation team used the pre-retrofit equipment as a baseline for the saving calculations. We collected data on baseline equipment from the program incentive application documents and verified the equipment through interviews with the site contact or vendor. We used the post-retrofit schedules or industrial/occupancy demand to develop a pre-retrofit performance assessment equivalent to the post-retrofit conditions.

Use of Technical Reference Manual Values

We used primary data collection, engineering analysis, building energy simulation modeling, and linear regression modeling to calculate evaluated savings. To calculate savings for the sampled lighting participants, we used the saving algorithm outlined in the Indiana Technical Reference Manual for *Lighting Systems (Non-Controls) (Early Replacement, Retrofit),*[3] along with the energy and demand waste heat factors calculated in an earlier study of the Smart $aver Nonresidential Prescriptive Incentive Program.[4] We used the hours of operation data collected on site to estimate the peak demand coincidence factors.

Sample Design

Based on the categories identified in the DEC program tracking database, we grouped the participant applications into similar project types (lighting, HVAC, and process) to provide better accuracy in the overall program results for each category. We separated each technology category into energy savings size-based strata. The definitions for each of the savings size-based strata are provided in Table 7.

---

[2] Statistical outliers are those projects that have realization rates more than two standard deviations above or less than two standards deviations below the statistical mean realization rate for all projects.

[3] Cadmus. *Indiana Technical Reference Manual Version 2.2.* Prepared for the Indiana Demand Side Management Coordination Committee EM&V Subcommittee. July 28, 2015.

[4] TecMarket Works. *Process and Impact Evaluation of the Non-Residential Smart $aver® Prescriptive Program in the Carolina System: Lighting and Occupancy Sensors.* April 2013.

CADMUS

Table 7. Stratum Definition Based on Expected Energy Savings

Group	Stratum	kWh Savings ≥
HVAC	1	3,000,000
	2	0
Lighting	1	2,000,000
	2	490,000
	3	0
Process	1	2,000,000
	2	0

We calculated the required sample size to meet our desired precision using the following equation, which incorporates the finite population correction:

$$n = \left[Z * \frac{CV}{P}\right]^2 * \sqrt{\frac{N-n}{N-1}}$$

Where:

- n = Total sample size required
- Z = z statistic (1.645 at 90% confidence)
- CV = Coefficient of variation (defined as the mean divided by the standard deviation)
- P = Desired precision
- N = Population size

We allocated samples to each stratum using Neyman's Allocation, illustrated below:

$$n_k = n * \frac{N_k * CV_k * kWh_k}{\sum N_k * CV_k * kWh_k}$$

Where:

- n_k = Total sample size required for stratum k
- CV_k = Coefficient of variation for stratum k
- kWh_k = Total expected savings for stratum k

Sample Status

The evaluation team pulled three sets of sampled applications, one for each phase. The original evaluation plan included projections for the number of program participants and expected energy savings during the evaluation period. The original evaluation sampling plan used an energy realization

rate coefficient of variation for each technology type from a 2012 Custom Program evaluation in Ohio.[5] The team used data from the original evaluation plan and the 2012 Ohio Custom Program evaluation to determine the number of applications required to meet the targeted relative precision of ±15% at a 90% confidence level. The team pulled 19 applications for phases 1 and 2, based on this sampling plan.

Prior to selecting the remaining 10 sampled applications for phase 3, Cadmus revised the original sampling plan to incorporate the final number of program participants and expected energy savings during the evaluation period, along with the energy realization rate error ratios resulting from phase 1 and 2 verifications. We then selected the phase 3 verification sample in the lighting and HVAC strata that required additional sample points according to the updated sampling plan.

Table 8 summarizes the recommended and final phase 3 sample count based on Cadmus' update to the original sampling plan.

Table 8. Recommended and Achieved Sample Sizes Based on Phase 3 Sampling Plan Update

Group	Energy (kWh)	CV	Total Participants	Total Recommended Sample Size	Phase 1 and 2 Sampled Application Count	Phase 3 Final Sample Count	Total Evaluation Sample Count
HVAC 1	32,334,294	0.06	6	1	2	-	2
HVAC 2	27,406,066	0.50	35	5	1	3	4
Lighting 1	20,453,249	0.08	5	1	3	-	3
Lighting 2	27,447,709	0.97	31	8	2	4	6
Lighting 3	27,325,580	0.17	264	12	4	3	7
Process 1	21,080,433	0.22	5	1	2	-	2
Process 2	14,419,662	0.25	31	2	5	-	5
Total	170,466,993		377	30	19	10	29

[5] TecMarket Works. *Final Report Evaluation of the 2009 – 2011 Smart Saver Non-Residential Custom Incentive Program in Ohio*. Prepared for Duke Energy. September 2012.

Impact Evaluation Activities

This section includes a description of the review, M&V, and impact calculation activities performed for the selected sample of projects as part of this evaluation.

Documents Review

For all the sampled projects, the evaluation team performed a detailed review of program application documents, which included incentive applications, measure savings input and outputs from DSMore,[5] and supporting documentation or clarifications provided by the customer. We reviewed each application to gain an understanding of the measures included and the expected savings. We collected customer and contractor contact information, then decided on an appropriate M&V approach.

The DEC business relations manager or the key account managers associated with each sampled site contacted customers to secure their participation in the evaluation. Once they had established contact with the customer, the evaluation team followed up with the customer via phone calls and e-mails to gain additional information about the facility, installed measures, and operating schedule and procedures. We scheduled the site visits directly with the site contact.

Measurement and Verification Plan Development

The evaluation team developed an M&V plan for all 29 of the program participant applications we verified via site visits and metering. NORESCO developed M&V plans for phase 1 (as a subcontractor to TecMarket Works) and for phase 2 (as a subcontractor to Cadmus). Cadmus reviewed phase 2 plans and developed phase 3 M&V plans.

Each M&V plan covered the following topic areas:

- ***Introduction:*** a description of the project and the measures installed, including sufficient detail to understand the M&V project scope and methodology, proposed and DEC expected savings by measure, a list of M&V priorities for measures within the project, and baseline assumptions.
- ***Goals and objectives:*** a list of the overall goals and objectives of each M&V activity.
- ***Site location and contacts:*** the names, phone, email and address of site contacts.
- ***M&V option:*** a description of the IPMVP M&V Option appropriate for participant saving verification. We used Option A or Option D for each of the 29 projects verified on site.
- ***Field data points and survey plan:*** a list of specific field data points collected through the M&V plan, which included a combination of survey data, one-time measurements, and time series data collected from data loggers installed for the project or trend data collected from the site energy management system.

[5] DEC uses Demand Side Management Option Risk Evaluator (DSMore), a financial analysis tool, to estimate the costs, benefits, and risks associated with the Custom Program.

- ***Data accuracy:*** a list of meter and sensor accuracy for each field measurement point.
- ***Recording and data exchange format:*** specific values such as kWh savings, coincident and non-coincident kW savings, and therm savings and a list of raw and processed data to be supplied at the conclusion of the study.
- ***Verification and quality control:*** A list of steps taken to validate the accuracy and completeness of the raw field data.

From the M&V plans, the evaluation team created reports for each sampled project (provided in Appendix F. Site Measurement and Verification Reports – Full Customer Detail), which included the following additional topics:

- ***Data analysis:*** a list of the engineering methods and/or equations used to calculate the verified savings and a list of the data sources, which were either measured or stipulated values from secondary data sources.
- ***Conclusion:*** A summary of findings and the final realization rates, including an explanation for verified savings deviations from expected savings.

Measurement and Verification

Metering equipment included a combination of portable data acquisition equipment capable of measuring current and motor status, cellular data loggers capable of transmitting data remotely, true electric power meters, and trend logs from facility control systems. We also interviewed site personnel during meter installation, and configured the metering equipment to collect data for three weeks. Where available, we collected trend logs for one month or more.

Of the 29 sites metered, the evaluation team did not meter three HVAC projects that had permanent power meters on all controlled equipment. These were a data center, a hospital, and a large manufacturing facility. The participants' power meters recorded equipment-level demand (i.e., individual chiller, rooftop unit (RTU), and pumps). The evaluation team visited these sites (similar to others) to record equipment make and model, ensure that the trending periods were set up according to our verification schedules and requirements, and to review the sequence of operation with facility personnel.

For one lighting site, a meat processing plant, we could not install metering equipment due to operational requirements: the areas where lighting retrofits were installed were sprayed down for cleaning daily. Therefore, we inspected the lighting fixture data during our site visit and verified operation hours of use with the site contact.

At one process site, the voltage serving the equipment as listed in the application was greater than 480 volts, which is the maximum voltage we can meter. The evaluation team used the site's power meter, which collected M&V trend data points for the equipment included in the application.

This information is summarized in Table 15 in Appendix C. Sampled Participant Calculation Summary. Appendix F. Site Measurement and Verification Reports – Full Customer Detail describes the specific instrumentation used at each site.

Measurement and Verification Calculations

The evaluation team collected post-retrofit metered and trend data for the 29 verification site visit projects. The team analyzed the data according to the M&V plan developed for each project, except where on-site findings required changes to the original metering plan; for example, we could not install logging equipment due to high-voltage or operational limitations. To conduct data analysis, we compared the original application calculations to post-retrofit monitored data that we extrapolated to annual consumption and demand using simple engineering models or linear regression techniques (as described in the M&V plans).

Appendix C. Sampled Participant Calculation Summary provides a detailed list of all the projects where we conducted on-site visits and metering. This appendix includes a summary of the M&V plan approach, measurements taken, duration of measurement, and the calculations and analysis techniques used to estimate final impact savings and demand reduction results.

Appendix F. Site Measurement and Verification Reports – Full Customer Detail contains detailed site M&V calculations for each project.

Freeridership Calculations

[Redacted]

Table 9 shows the evaluated savings-weighted freeridership scores for 377 projects, along with the original calculated scores, by project type. The projects exhibited 15% freeridership overall across all project types. Spillover questions are not included in the program application. We did not calculate spillover for this program and assumed it to be 0%. We used the following net-to-gross calculation:

$$Net\_to\_Gross = 100\% - Freeridership + Spillover = 100\% - 15\% + 0\% = 85\%$$

Table 9. Custom Program Net-to-Gross Ratio

Project type	Number of Applicants with Calculated Freeridership Score	Energy Savings Weighted Freeridership Score	Net-to-Gross Ratio
HVAC	41	16%	84%
Lighting	300	9%	91%
Process	36	31%	69%
Total	**377**	15%	85%

Deleted: 12

Deleted: 2

Deleted: 8

Deleted: 12%

Deleted: 88%

Deleted: 7%

Deleted: 93%

Deleted: 27%

Deleted: 73%

Deleted: 12%

Deleted: 88%

CADMUS

Impact Evaluation Results

This section provides the evaluation results, which includes annual energy, coincident peak and non-coincident peak demand reductions, and realization rates for each participant.

Annual Savings

Table 10 summarizes annual savings and realization rates (RR) calculated by project type for the evaluation period.

Table 10. Average Annual Gross Savings Realization Rate by Project Type

Project Type	Energy Savings (kWh)			NCP Savings (kW)			CP Savings (kW)		
	Evaluated	Expected	RR	Evaluated	Expected	RR	Evaluated	Expected	RR
HVAC	35,377,874	59,740,357	59%	6,452	11,327	57%	4,713	5,537	85%
Lighting	75,950,346	75,226,538	101%	8,075	9,167	88%	12,339	11,897	104%
Process	27,237,074	35,500,097	77%	4,748	5,052	94%	4,533	4,738	96%
Total	138,565,294	170,466,992	81%	19,275	25,546	75%	21,586	22,172	97%

The evaluation achieved ±9% relative precision at the 90% confidence interval for the energy saving realization rate analysis. We excluded a total of four applications from the energy realization rate analysis:

- Two lighting applications had very low and very high energy realization rates (-11% and 234%) indicating that they were outliers.[7]
- For another lighting application, our evaluated baseline was starkly different from the baseline DEC used in the application saving calculations. The project was part of a major retrofit to change the space usage from a fabric weaving space to a furniture warehouse. The evaluation team excluded this application due to the exceptional circumstances that affected its energy saving and demand reduction realization rates.
- We excluded one HVAC application sampled due to insufficient data available to calculate verified savings.

The evaluation achieved ±21% relative precision at the 90% confidence interval for the non-coincident peak demand reduction realization rate analysis. We excluded four applications from the non-coincident peak realization rate analysis:

- One lighting application had a very high (918%) non-coincident peak demand reduction realization rate indicating that it was an outlier.

[7] Statistical outliers are those projects that have realization rates more than two standard deviations above or less than two standards deviations below the statistical mean realization rate for all projects.

Deleted: 35,377,874
Deleted: 59,740,357
Deleted: 59%
Deleted: 6,452
Deleted: 11,327
Deleted: 57%
Deleted: 4,713
Deleted: 5,537
Deleted: 85%
Deleted: 74,888,145
Deleted: 75,226,538
Deleted: 100%
Deleted: 8,020
Deleted: 9,167
Deleted: 87%
Deleted: 12,303
Deleted: 11,897
Deleted: 103%
Deleted: 27,237,074
Deleted: 35,500,097
Deleted: 77%
Deleted: 4,748
Deleted: 5,052
Deleted: 94%
Deleted: 4,533
Deleted: 4,738
Deleted: 96%
Deleted: 137,503,094
Deleted: 170,466,992
Deleted: 81%
Deleted: 19,220
Deleted: 25,546
Deleted: 75%
Deleted: 21,550
Deleted: 22,172
Deleted: 97%

- We excluded one lighting application sampled from the demand reduction realization rate analysis (similar to the energy saving realization rate analysis), due to the exceptional circumstances that affected its energy saving and demand reduction realization rates.
- One HVAC application was excluded since we attributed its very low non-coincident peak demand reduction realization rate (1%) to a clerical error in DEC's recording of the expected reduction.
- We did not have sufficient data for another HVAC application sampled to calculate verified savings.

The evaluation achieved ±16% relative precision at the 90% confidence interval for the coincident peak demand reduction realization rate analysis. We excluded three applications from the coincident peak demand reduction calculations:

- One HVAC application had a very high realization rate (222%), which indicated it was an outlier.
- We excluded one lighting application sampled from the demand reduction realization rate analysis (similar to the energy saving realization rate analysis), since our evaluated baseline was starkly different from the baseline DEC used in the application saving calculations.
- We did not have sufficient data for one HVAC application sampled to calculate verified savings.

Two other lighting applications sampled had no expected coincident peak demand reduction.

Table 11 through Table 13 list the estimated precision for energy, non-coincident peak demand, and coincident peak demand realization rates, respectively, at 90% confidence. We combined the planned HVAC 1 and HVAC 2 strata into one HVAC stratum for the final realization rate calculations.

Table 11. Energy Savings Realization Rates to Achieve Sampling Precision at 90% Confidence

Stratum	Population Size	Sample Size*	Actual Sample Error Ratio	Relative Precision
HVAC	41	4	0.28	33%
Lighting 1	5	3	0.08	14%
Lighting 2	31	5	0.29	28%
Lighting 3	264	6	0.28	23%
Process 1	5	2	0.27	123%
Process 2	31	5	0.24	23%
Total	**377**	**25**	**0.27**	**9%**

* The evaluation team excluded four sampled applications from the precision analysis as described above.

Deleted: 13%

CADMUS

Table 12. Non-Coincident Peak Realization Rates to Achieve Sampling Precision at 90% Confidence

Stratum	Population Size	Sample Size*	Actual Sample Error Ratio	Relative Precision
HVAC	40	4	0.31	36%
Lighting 1	25	8	0.28	19%
Lighting 2	36	3	0.08	14%
Lighting 3	239	3	3.77	636%
Process 1	22	4	0.79	93%
Process 2	14	3	0.23	39%
Total	**376**	**25**	**0.60**	**21%**

* The evaluation team excluded four sampled applications from the precision analysis as described in detail above.

Deleted: 0.26
Deleted: 18%
Deleted: 0.08
Deleted: 14%
Deleted: 3.60
Deleted: 606%

Table 13. Coincident Peak Realization Rates to Achieve Sampling Precision at 90% Confidence

Stratum	Population Size	Sample Size*	Actual Sample Error Ratio	Relative Precision
HVAC	39	4	0.32	38%
Lighting 1	25	8	0.28	19%
Lighting 2	36	3	0.13	22%
Lighting 3	204	2	0.15	68%
Process 1	22	4	0.80	94%
Process 2	14	3	0.12	20%
Total	**340**	**24**	**0.46**	**16%**

* The evaluation team excluded three sampled applications from the precision analysis as described in detail above.

Deleted: 0.28
Deleted: 19%
Formatted Table
Deleted: 0.13
Deleted: 23%
Deleted: 0.16
Deleted: 73%

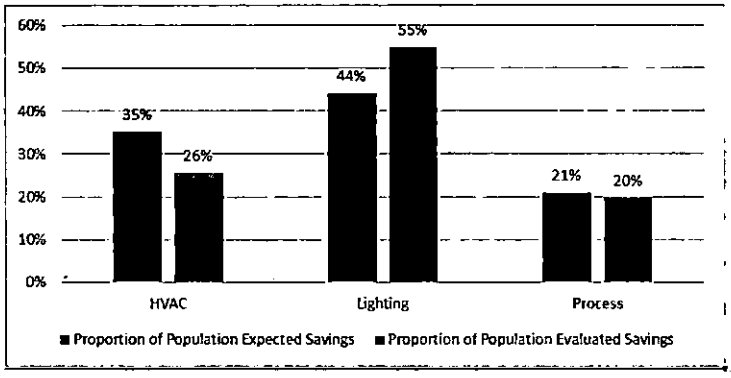
Findings

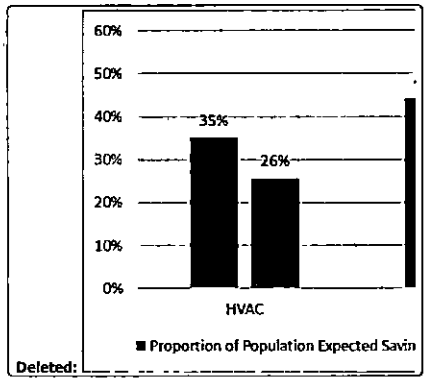
Figure 2 shows the breakdown of evaluated energy savings by project type compared to expected energy savings. Lighting projects contributed the most to the verified total program savings (55%), followed by HVAC project (26%) and process projects (20%).[8]

Deleted: 54

[8] Percentages add up to more than 100% due to rounding.

Figure 2. Contribution of Expected* and Evaluated** Energy Savings by Project Type





Deleted:

*Expected energy savings are 170,466,992 kWh.

** Evaluated energy savings are 138,565,294 kWh.

Deleted: 137,503,094

The evaluation team's summary of findings are provided below and described in detail in Table 17 in Appendix D. Sampled Participant Detailed Results. The overall energy realization rate across all projects was 81%. The team found large variations between evaluated and expected savings in all three strata. Specific examples are provided by project type below.

HVAC

The average realization rate of HVAC projects is 59%, and these projects contributed 26% of the program evaluated savings. These projects included HVAC controls upgrades and retrofits, installation of variable frequency drives (VFDs), and installation of new high-performance HVAC systems.

Low realization rates were generally caused by control strategies that either did not perform as planned or were not fully implemented. In a few cases, the team determined that the evaluated loads were less than those originally expected in the application savings calculations. In one of the sampled applications, submitted for a high-performance HVAC system in a new data center, the expected energy savings and demand reduction would have been fully realized if all data center server racks were filled and the data center had reached design capacity. However, the project's current evaluated HVAC load (which is directly correlated with the server rack load in the data center) is only 17% of the full design load, and the site contact does not anticipate reaching full data center capacity for five to seven years. For this project, the evaluation team calculated projected energy savings and demand reduction at an assumed load growth period of seven years from the date of the evaluation. We calculated the present value savings and demand reduction using an assumed annual discount rate of 7.09%.[9] The overall projected

[9] This value is the weighted average cost of capital for North Carolina cost effectiveness tests according to DEC.

seven-year energy savings realization rate was 69% and the summer peak demand realization rate was 59%.

Lighting

Lighting projects, on average, had the highest realization rate (101%) and they contributed half of the evaluated program savings (55%).

Deleted: 0

Deleted: 4

Variations between evaluated and expected savings were due to differences between the expected lighting hours of use and those verified through site surveys and logging. Additionally, HVAC interactive effects were not included in the application saving calculations.

In one application, the lighting retrofits were part of a major retrofit to change the building's primary functional use from fabric weaving to a furniture warehouse. The project application savings calculations claimed savings resulting from the lighting retrofit, without taking the change in light levels into account. The evaluation team adjusted the pre-retrofit baseline lighting energy use based on the post-retrofit light level requirements and calculated the savings based on equivalent pre- and post-retrofit lighting levels. This resulted in 17% energy savings, 14% coincident peak demand reduction, and 28% non-coincident peak demand reduction realization rates. As noted previously under Annual Savings, the team did not include this project in the program realization rate calculations.

For major retrofit projects such as this, the expected savings should account for the changes in space usage and required light levels. The pre-retrofit baseline lighting system design lumen output in such cases can be adjusted to match the installed lighting design lumen output. Alternatively, the baseline lighting power density can be based on the prevalent building energy code's lighting power density requirement for the new space type, if the energy code is triggered by the retrofit.

Process

Process projects, on average, had a 77% energy realization rate and contributed 20% to the evaluated program energy savings. Only one project had an energy realization rate of less than 80%. The team's evaluation review of this air compressor retrofit project revealed that the application savings analysis contained a few minor errors that greatly impacted the energy use calculations. For example, the performance datasheet submitted as part of the application did not include site-specific inputs, and the post-retrofit installed air compressor energy performance was only slightly better than the performance of pre-retrofit air compressors. Additionally, the pre-retrofit documentation claimed having metered power, while the contractor had only metered the current in one of the three phases, then converted this to power. Also, there was no permanent airflow monitoring on the pre-retrofit or installed air compressors. It is difficult to accurately monitor airflow using a temporary meter, and it is recommended to install a permanent monitoring station. Without the airflow load profile, the team could not calculate the actual plant compressed air load. We based our evaluation calculations on trended power demand provided by the site, equipment performance data, and our best engineering judgement; this resulted in a 53% energy realization rate and 56% coincident peak demand realization rate.

Conclusions and Recommendations

The evaluation team offers the following conclusions and recommendations resulting from our Custom Program evaluation.

- **Conclusion:** Low realization rates caused by sub-optimal or incomplete control strategies indicate that post-retrofit inspections or project commissioning may be effective strategies for realizing the full energy savings available from HVAC control measures.
  - **Recommendation:** Where possible, require post-retrofit commissioning for HVAC projects to realize the full potential of retrofit savings.
- **Conclusion:** Significant permanent changes in occupancy rate or space usage from the pre-retrofit conditions need to be accounted for in the lighting saving calculation baseline.
  - **Recommendation:** For major retrofit projects, calculate the expected savings accounting for any changes in space usage and required light levels.
- **Conclusion:** Projects with completion schedules or periods of load growth longer than one to two years will not be completed in time to be evaluated.
  - **Recommendation:** Calculate savings for projects with longer than one to two-year completion or load growth schedules based on their present value.
- **Conclusion:** HVAC interactive effects were not included in the application saving calculations for lighting projects.
  - **Recommendation:** Include HVAC interactive effects in lighting project expected saving calculations.
- **Conclusion:** DEC can improve the accuracy of its expected saving calculations for process projects by ensuring that pre-retrofit energy use calculations are based on accurate power metered data and the specific industrial process load monitoring points.
  - **Recommendation:** Where feasible, consider using pre- and post-retrofit power measurements and collecting coincident industrial process load data to arrive at accurate realized savings.
  - **Recommendation:** Require permanent airflow monitoring devices be installed on all large (greater than 400 horsepower) compressed air system retrofits to establish accurate pre- and post-retrofit load profiles.

CADMUS

Appendix A. Summary Form

DUKE ENERGY.

Smart $aver Custom Incentive Program

Duke Energy Carolinas
Completed EMV Fact Sheet
2016 Evaluation – Cadmus

Program Description

The Duke Energy Smart $aver Custom Incentive Program supplements the Smart $aver Prescriptive Incentive Program, which provides prescriptive rebates for preselected measures. Customers wishing to install measures not included in the Smart $aver Prescriptive Incentive Program list may apply for a rebate through the Custom Program. Participation requires a pre-approval from the program before measure installation.

Date	February 3, 2017
Region(s)	Carolinas
Evaluation Period	Applications Paid from January 2013 through December 2015
Gross Energy Savings (kWh)	138,565,294
Net Coincident kW Impact (Summer)	18,316
Measure life	Various
Net Energy Savings (kWh)	117,625,810
Process Evaluation	Yes, reported separately.
Previous Evaluation(s)	Yes 2013

Evaluation Methodology

The evaluation team conducted the impact evaluation based on measurement and verification of a sample of 29 participants in HVAC, lighting and process project types. The evaluation team estimated average energy saving and demand reduction realization rates for each project category and projected them onto the full program participant population.

Impact Evaluation Details

- The overall energy realization rate across all projects was 81%.
- Lighting projects achieved the highest energy savings as compared to program estimates (realization rate of 101%), whereas HVAC projects achieved the lowest energy savings as compared to program estimates (realization rate of 59%). Industrial process projects had a 77% energy saving realization rate. Fifteen percent of the evaluated program savings are associated with freeriders. Spillover was not included in the scope of the evaluation as it was expected to be minimal. Therefore, the program net-to-gross ratio is 85%.
- Lighting participants produced 55% of total program evaluated energy savings. HVAC and process participants produced 26% and 20% of the total program evaluated energy savings respectively. Percentages add up to more than 100% due to rounding.

Deleted: 100

Deleted: Twelve

Deleted: 88

Deleted: 137,603,094

Deleted: 54

Deleted: 18,899

Deleted: 120,661,569

CADMUS [redacted]

Appendix B. Required Savings Table

The DEC-required summary parameters resulting from this evaluation are provided in Table 14.

Table 14. DEC-Required Program Evaluation Summary

Measure Name	Gross kWh RR	NCP kW RR	CP kW RR	Effective Useful Life	Net-to-Gross Ratio
Custom	81%	75%	97%	Custom	85%

Deleted: 81%
Deleted: 75%
Deleted: 97%
Deleted: Custom
Deleted: 88%
Formatted Table

CADMUS

Appendix C. Sampled Participant Calculation Summary

Table 15 includes a summary of the evaluation team's M&V approach, measurements taken, and calculations performed for each M&V participant sampled for this evaluation.

Table 15. Measurement and Verification and Impact Calculation Approach Summary

Site ID	Participant	Project Type	M&V Plan Summary	Measurements Taken	Monitoring Duration	Calculations
1	[Redacted]	HVAC	IPMVP Option D	Collected voltage, average current (Amps), average power (kW), and power factor for sampled air-handling unit/heat pump fans and compressors Collected supply air temperature, mixed air temperature, return air temperature, outside air temperature for sampled air-handling unit/heat pumps	Three weeks	Comparison of pre- and post-retrofit models calibrated based on equipment monitoring data
2	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in data suites, hallways, and office areas	Three weeks	Engineering equations with parameters from metered data
3	[Redacted]	Lighting	IPMVP Option A	Monitored light circuits affected by the retrofit	Three weeks	Engineering equations with parameters from metered data
4	[Redacted]	Process	IPMVP Option A	Collected voltage, average (Amps), average power (kW), and power factor for four aeration blower motors	Three weeks	Engineering equations with parameters from metered data
5	[Redacted]	Process	IPMVP Option A	Collected voltage, average (Amps), average power (kW), and power factor for three air compressors	Two weeks	Engineering equations with parameters from metered data

CADMUS [redacted]

Site ID	Participant	Project Type	M&V Plan Summary	Measurements Taken	Monitoring Duration	Calculations
6	[Redacted]	HVAC	IPMVP Option A	Collected trend data for chiller demand (kW), flow rate, supply and return temperatures, condenser water pump and chilled water pump demand (kW), cooling tower entering and leaving water temperatures and fan input demand (kW), and coincident outside air conditions (from the site metering system)	One year	Hourly model with typical meteorological year (TMY3) temperature data and parameters from trend data
7	[Redacted]	Lighting	IPMVP Option A	Monitored light circuits affected by the retrofit	Three weeks	Engineering equations with parameters from metered data
8	[Redacted]	Process	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for one 500-ton injection molding machine	Two weeks	Engineering equations with parameters from metered data
9	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in retail spaces	Three weeks	Engineering equations with parameters from metered data
10	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in warehouse and shop	Two weeks	Engineering equations with parameters from metered data
11	[Redacted]	HVAC	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for sampled RTUs Collected outside air temperature and relative humidity, supply air temperature, mixed air temperature, return air temperature, and supply fan current for sampled RTUs	Three weeks	Regression analysis of monitored data and environmental measurements
12	[Redacted]	HVAC	IPMVP Option A	Collected trend data for total input demand (kW) for 17 RTUs (out of 18), zone temperature for 11 RTUs, discharge and return air temperature for six RTUs, cooling status for seven RTUs, and outside air damper position for eight RTUs (all collected by the site metering system)	One month	Hourly model with TMY3 temperature data and parameters from trend data

CADMUS

Site ID	Participant	Project Type	M&V Plan Summary	Measurements Taken	Monitoring Duration	Calculations
13	[Redacted]	Lighting	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for one lighting circuit	Two weeks	Engineering equations with parameters from metered data
14	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in retail area	Two weeks	Engineering equations with parameters from metered data
15	[Redacted]	Lighting	IPMVP Option A	None (refrigerated spaces were sprayed down every day)	-	Engineering equations with updated fixture counts from site visit
16	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in offices, common areas, and parking garage	Three weeks	Engineering equations with parameters from metered data
17	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in warehouse and storage areas	Three weeks	Engineering equations with parameters from metered data
18	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in retail spaces	Two weeks	Engineering equations with parameters from metered data
19	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in office spaces	Three weeks	Engineering equations with parameters from metered data
20	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in offices, warehouse, and bulk storage areas	Three weeks	Engineering equations with parameters from metered data
21	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in offices and warehouse	Two weeks	Engineering equations with parameters from metered data
22	[Redacted]	Process	IPMVP Option A	Collected true electric power logging of the new injection molding machine	Three weeks	Engineering equations with parameters from metered data
23	[Redacted]	Process	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for the VFD air compressor	Two weeks	Engineering equations with parameters from metered data

CADMUS [redacted]

Site ID	Participant	Project Type	M&V Plan Summary	Measurements Taken	Monitoring Duration	Calculations
24	[Redacted]	HVAC	IPMVP Option A	Collected trend data for chiller flow rate, supply and return temperature, and input demand (kW) Collected chilled water and condenser water pump demand and speed, cooling tower fan demand and speed, and coincident outside air conditions (all collected by the site metering system).	Six months to one year (depending on trending data point)	Hourly model with TMY3 temperature data and parameters from trend data
25	[Redacted]	Process	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for VFD air compressor, two air dryers, and two cooling tower pumps. Collected trend data of total input power (kW) for two 900-hp air compressors (trended on site metering equipment)	Two weeks	Engineering equations with parameters from metered data
26	[Redacted]	Lighting	IPMVP Option A	Monitored light circuits affected by the retrofit (64 loggers total)	Three weeks	Engineering equations with parameters from metered data
27	[Redacted]	Process	IPMVP Option A	Collected voltage, average current (Amps), average power (kW), and power factor for VFD air compressor Collected spot measurements of airflow and temperature for heat recovery duct	Two weeks	Engineering equations with parameters from metered data

CADMUS

Site ID	Participant	Project Type	M&V Plan Summary	Measurements Taken	Monitoring Duration	Calculations
28	[Redacted]	HVAC	IPMVP Options A and D	Collected billing data (monthly kWh and demand) for January 2011 to the present and confirmed trending capability in the energy management System Monitored the operation of supply fans, compressors, economizers, chilled water pumps, carbon dioxide levels, and outdoor air temperature and relative humidity for a sample of buildings	Three weeks	Comparison of pre- and post-retrofit models calibrated based on building/equipment monitoring data
29	[Redacted]	Lighting	IPMVP Option A	Monitored lighting fixture operating hours in offices, manufacturing, and warehouse areas	Three weeks	Engineering equations with parameters from metered data

CADMUS

Appendix D. Sampled Participant Detailed Results

Table 16 lists the average annual realization rates by project type for the sampled participants. Table 17 lists a summary of the specific findings from each project in the sample. Highlighted cells signify calculated or otherwise determined to be outliers for energy, coincident peak or non-coincident peak demand realization rate analyses.

Table 16. Gross Savings and Realization Rate Results by Sampled Participant

Site	Participant*	Project Type	kWh Savings			NCP kW Savings			CP kW Savings		
			Expected	Evaluated	RR	Expected	Evaluated	RR	Expected	Evaluated	RR
1	[Redacted]	HVAC	12,700	29,757	234%	29.20	28.70	98%	28.67	24.80	87%
2	[Redacted]	Lighting	1,454,592	1,523,258	105%	165.96	173.89	105%	166.05	273.15	164%
3	[Redacted]	Lighting	31,575	21,499	68%	10.40	9.52	92%	10.40	9.52	92%
4	[Redacted]	Process	2,885,315	2,670,198	93%	329.22	656.30	199%	329.40	673.60	204%
5	[Redacted]	Process	1,239,992	994,346	80%	141.47	113.50	80%	141.55	99.00	70%
6	[Redacted]	HVAC	2,618,060	2,444,156	93%	511.51	279.01	55%	416.96	414.26	99%
7	[Redacted]	Lighting	1,625,075	2,056,890	127%	185.41	247.80	134%	185.52	243.10	131%
8	[Redacted]	Process	135,308	131,758	97%	22.12	15.00	68%	22.12	20.80	94%
9	[Redacted]	Lighting	1,734,359	1,968,028	113%	106.56	224.66	211%	486.00	611.54	126%
10	[Redacted]	Lighting	1,412,989	715,665	51%	98.65	310.40	315%	310.35	55.90	18%
11	[Redacted]	HVAC	6,299,172	3,187,362	51%	1,339.50	11.30	1%	10.80	11.30	105%
12	[Redacted]	HVAC	1,909,006	812,169	43%	122.70	92.71	76%	2.45	4.87	199%
13	[Redacted]	Lighting	2,369,488	2,633,883	111%	32.75	300.67	918%	-	-	N/A
14	[Redacted]	Lighting	337,186	375,738	111%	55.82	69.02	124%	55.82	69.02	124%
15	[Redacted]	Lighting	490,520	578,518	118%	55.97	66.00	118%	56.00	66.00	118%
16	[Redacted]	Lighting	1,476,280	1,067,046	72%	156.10	121.81	78%	240.88	270.78	112%
17	[Redacted]	Lighting	1,396,127	235,845	17%	96.05	26.92	28%	398.28	57.56	14%
18	[Redacted]	Lighting	21,696	13,750	63%	4.68	5.38	115%	4.68	3.28	70%
19	[Redacted]	Lighting	469,064	(54,834)	-12%	39.11	(6.26)	-16%	-	-	N/A
20	[Redacted]	Lighting	488,514	359,800	74%	38.38	41.07	107%	160.89	80.60	50%
21	[Redacted]	Lighting	2,812,620	3,217,635	114%	361.26	433.86	120%	361.42	395.32	109%

Deleted: 12,700
Deleted: 29,757
Deleted: 234%
Deleted: 29.20
Deleted: 28.70
Deleted: 98%
Deleted: 28.67
Deleted: 24.80
Deleted: 87%
Deleted: 1,454,592
Deleted: 1,523,258
Deleted: 105%
Deleted: 165.96
Deleted: 173.89
Deleted: 105%
Deleted: 166.05
Deleted: 273.15
Deleted: 164%
Deleted: 31,575
Deleted: 21,504
Deleted: 68%
Deleted: 10.40
Deleted: 9.50
Deleted: 91%
Deleted: 10.40
Deleted: 9.50
Deleted: 91%
Deleted: 2,885,315
Deleted: 2,670,198
Deleted: 93%
Deleted: 329.22
Deleted: 656.30
Deleted: 199%
Deleted: 329.40
Deleted: 673.60
Deleted: 204%
Deleted: 1,239,992
Deleted: 994,346
Deleted: 80%
Deleted: 141.47

CADMUS

Site	Participant*	Project Type	kWh Savings			NCP kW Savings			CP kW Savings		
			Expected	Evaluated	RR	Expected	Evaluated	RR	Expected	Evaluated	RR
22	[Redacted]	Process	402,674	412,822	103%	35.90	36.30	101%	47.55	36.30	76%
23	[Redacted]	Process	142,073	123,252	87%	20.80	14.10	68%	20.80	19.40	93%
24	[Redacted]	HVAC	2,914,790	1,996,787	69%	253.20	227.97	90%	233.67	137.09	59%
25	[Redacted]	Process	7,087,680	3,770,573	53%	809.13	430.43	53%	775.46	430.43	56%
26	[Redacted]	Lighting	7,901,837	7,269,128	92%	901.55	958.98	106%	902.05	916.26	102%
27	[Redacted]	Process	494,116	618,587	125%	69.69	78.30	112%	55.71	53.00	95%
28	[Redacted]	HVAC	4,602,694	2,104,233	46%	689.00	309.00	45%	414.35	921.00	222%
29	[Redacted]	Lighting	472,663	627,232	133%	68.31	71.60	105%	76.46	114.45	150%

* Note that participant names will be redacted in the public version of the report.

Highlighted cells signify applications calculated or otherwise determined to be outliers for energy, coincident peak or non-coincident peak demand realization rate analyses.

Table 17. Findings Summary by Sampled Participant

Site	Participant*	Project Type	kWh RR	CP RR	Findings Summary
1	[Redacted]	HVAC	234%	87%	The application calculations had underestimated the savings. Though the evaluated energy savings were greater than initially estimated, the reduction in energy use amounted to less than 2% of the building's annual energy consumption.
2	[Redacted]	Lighting	105%	164%	The evaluated energy savings and demand reduction were close to those originally estimated. One of the installed fixture types had a higher input wattage than expected, but the operating hours with controls were less than expected.
3	[Redacted]	Lighting	68%	92%	While the demand reduction realization rates were close to 100%, the hours of use were not accurately estimated in the application saving calculations, resulting in a reduction in energy savings compared to expected savings.
4	[Redacted]	Process	93%	204%	The evaluated energy savings were close to those expected, and the evaluated demand reduction was close to those proposed in the program participation application (but more than the savings expected by DEC).
5	[Redacted]	Process	80%	70%	The evaluated energy savings were less than those expected because the average metered demand for the compressed air system was 10% higher than expected.

Deleted: 402,674
Deleted: 412,822
Deleted: 103%
Deleted: 35.90
Deleted: 36.30
Deleted: 101%
Deleted: 47.55
Deleted: 36.30
Deleted: 76%
Deleted: 142,073
Deleted: 123,252
Deleted: 87%
Deleted: 20.80
Deleted: 14.10
Deleted: 68%
Deleted: 20.80
Deleted: 19.40
Deleted: 93%
Deleted: 2,914,790
Deleted: 1,996,787
Deleted: 69%
Deleted: 253.20
Deleted: 227.97
Deleted: 90%
Deleted: 233.67
Deleted: 137.09
Deleted: 59%
Deleted: 7,087,680
Deleted: 3,770,573
Deleted: 53%
Deleted: 809.13
Deleted: 430.43
Deleted: 53%
Deleted: 775.46
Deleted: 430.43
Deleted: 56%
Deleted: 7,901,837
Deleted: 7,360,561
Deleted: 93%
Deleted: 901.55

CADMUS [redacted]

Site	Participant*	Project Type	kWh RR	CP RR	Findings Summary
6	[Redacted]	HVAC	93%	99%	The evaluated energy savings were less than originally estimated because the cooling tower fans use more energy than the pre-retrofit case (to provide more area for heat transfer).
7	[Redacted]	Lighting	127%	131%	HVAC interactive effects were not included in the projected and expected saving estimates.
8	[Redacted]	Process	97%	94%	The evaluated energy savings and peak demand reduction were close to those expected because the metered demand data closely matched data collected for the application saving calculations.
9	[Redacted]	Lighting	113%	126%	HVAC interactive effects were not included in the projected and expected saving estimates.
10	[Redacted]	Lighting	51%	18%	The evaluated energy savings were less than those expected because the metered lighting fixture operating hours were less than expected. The peak demand reduction is less than expected because the metered data revealed that the lighting fixtures only operate during a portion of the peak coincident period.
11	[Redacted]	HVAC	51%	105%	The evaluated energy savings realization rates are low due to the fact that many of the monitored units showed no signs of economizing during the logging period. There is an apparent clerical error in the reported non-coincident peak expected demand reduction in the DEC program tracking database, which is much higher than the coincident peak expected savings.
12	[Redacted]	HVAC	43%	199%	The project contacts provided trend data for month of July only and did not permit third party metering. The trend data did not indicate economizer operation, but July is not typically an economizer month. Due to lack of data during economizer season, project was removed from sample.
13	[Redacted]	Lighting	111%	N/A	The evaluated energy savings and demand reduction were higher than expected due to higher operating hours, and because the metered input wattage for one of the fixture types was 5% less than expected in the original study.
14	[Redacted]	Lighting	111%	124%	The evaluated energy savings and demand reduction were higher than originally estimated because HVAC interactive effects were not included in the original savings estimates.

Deleted: 93%
Deleted: 99%
Deleted: 127%
Deleted: 131%
Deleted: 97%
Deleted: 94%
Deleted: 98%
Deleted: 125%
Deleted: 51%
Deleted: 18%
Deleted: 51%
Deleted: 105%
Deleted: 43%
Deleted: 199%
Deleted: 111%
Deleted: N/A
Deleted: 111%
Deleted: 123%

CADMUS [redacted]

Site	Participant*	Project Type	kWh RR	CP RR	Findings Summary
15	[Redacted]	Lighting	118%	118%	The evaluated energy savings and demand reduction were higher than originally estimated because refrigeration system interactive effects were not included in the original savings estimates.
16	[Redacted]	Lighting	72%	112%	The evaluated energy savings were less than originally estimated due to a decrease in projected annual operating hours based on metered data.
17	[Redacted]	Lighting	17%	14%	The evaluated energy savings and peak demand reduction were less than originally estimated due to an inappropriate baseline that was used in the original analysis.
18	[Redacted]	Lighting	63%	70%	The evaluated energy savings and peak demand reduction were less than originally estimated due to a decrease in projected annual operating hours based on metered data.
19	[Redacted]	Lighting	-12%	N/A	The evaluation resulted in an energy penalty because there were more fixtures on emergency circuits than expected, fewer exterior parking lot pole fixtures than expected, higher operating hours for exterior fixtures than expected, and less aggressive zone control schedules than the pre-retrofit system.
20	[Redacted]	Lighting	74%	50%	The evaluated energy savings and peak demand reduction were less than originally estimated because the projected annual operating hours are 26% less than expected based on the metered data.
21	[Redacted]	Lighting	114%	109%	The evaluated energy savings and demand reduction were higher than expected due to higher operating hours than expected.
22	[Redacted]	Process	103%	76%	The evaluated savings were very close to expected savings, while coincident peak demand reduction fell slightly short of the estimate due to the molding machine's metered operating kW being higher than originally estimated.
23	[Redacted]	Process	87%	93%	The evaluated energy savings and demand reduction were less than originally estimated due to fewer annual operating hours than originally expected.
24	[Redacted]	HVAC	69%	59%	The evaluated energy savings and demand reduction were less than originally estimated because the original analysis did not account for load growth. The data center will not reach full capacity for a few years. The evaluation team accounted for the present value energy savings and demand reduction at full capacity by factoring in a discount rate of 7.09%.

Deleted: 118%
Deleted: 118%
Deleted: 69%
Deleted: 111%
Deleted: 17%
Deleted: 14%
Deleted: 63%
Deleted: 68%
Deleted: -11%
Deleted: N/A
Deleted: 74%
Deleted: 50%
Deleted: 113%
Deleted: 110%
Deleted: 103%
Deleted: 76%
Deleted: 87%
Deleted: 93%
Deleted: 69%
Deleted: 59%

CADMUS [redacted]

Site	Participant*	Project Type	kWh RR	CP RR	Findings Summary
25	[Redacted]	Process	53%	56%	The evaluated energy savings and peak demand reduction were less than originally estimated because the installed compressors have a lower performance than originally expected, and the original analysis contained minor errors that had a significant impact on overall savings.
26	[Redacted]	Lighting	92%	102%	The evaluated savings were very close to expected savings.
27	[Redacted]	Process	125%	95%	The evaluated energy savings were higher than originally estimated because the average metered demand was 18% less than expected. The peak demand reduction was slightly less than expected in the original study.
28	[Redacted]	HVAC	46%	222%	The low energy realization rate is mostly due to the fact that the controls energy conservation measure (ECM), which most buildings implemented, does not operate as anticipated to reduce energy use. The high coincident peak demand realization rate is mainly due to the fact that the demand reduction from the VFD ECM is much higher than projected. Typically, a VFD is not expected to reduce peak demand; however, in this case, the air handling unit supply fans appear to be significantly oversized. Even during peak cooling conditions, the fans only need to run at around 60% of full speed. As a result, the peak demand reduction is considerably higher than would normally be expected for the VFD ECM.
29	[Redacted]	Lighting	133%	150%	The evaluated energy savings and demand reduction were higher than originally estimated because the input wattages for the installed fixtures are lower than expected and the original analysis did not account for HVAC interactive effects.

Deleted: 53%
Deleted: 56%
Deleted: 93%
Deleted: 102%
Deleted: 125%
Deleted: 95%
Deleted: 46%
Deleted: 222%
Deleted: 133%
Deleted: 150%

* Note that participant names will be redacted in the public version of the report.
Highlighted cells signify applications calculated or otherwise determined to be outliers for energy, coincident peak or non-coincident peak demand realization rate analyses.

CADMUS [redacted]

Appendix E. Freeridership Questions

[Redacted]

CADMUS

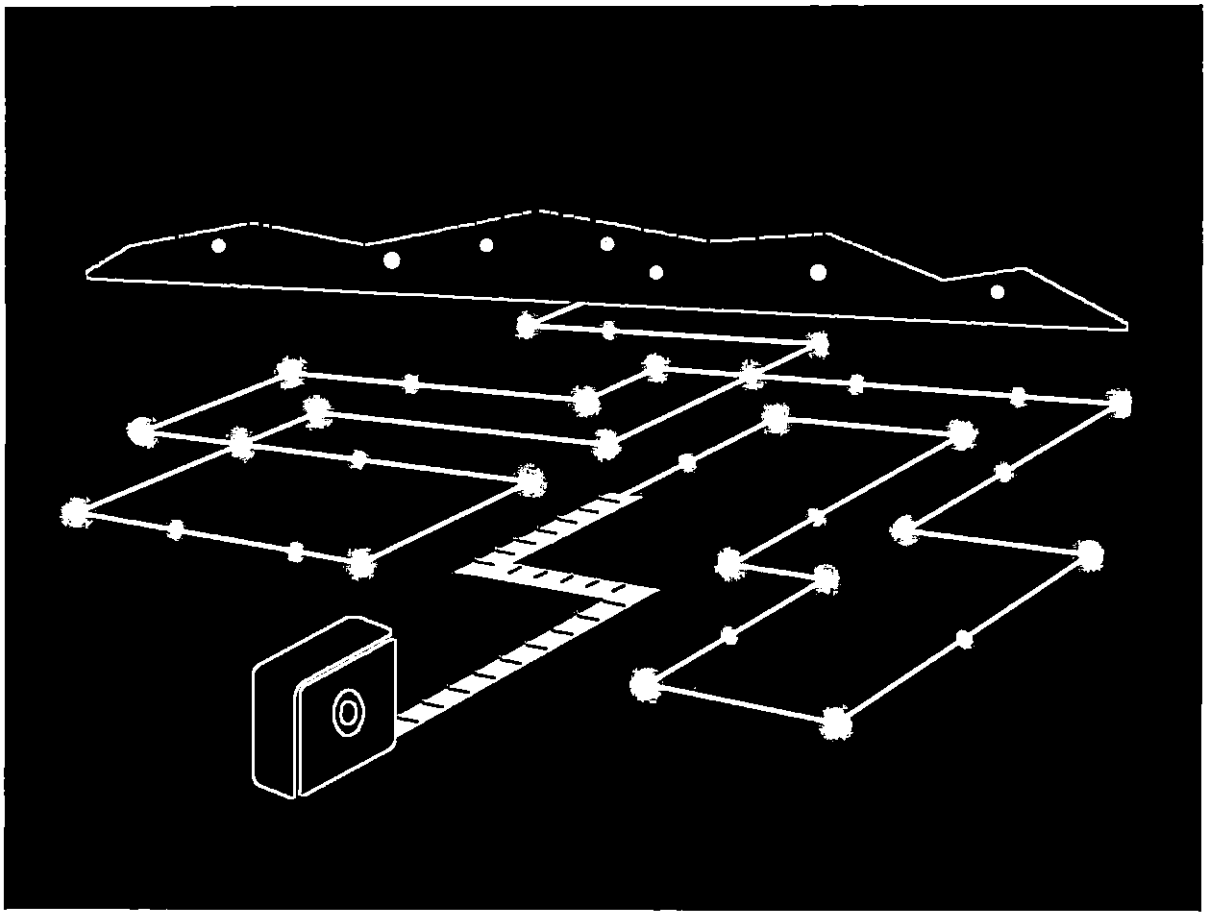
Appendix F. Site Measurement and Verification Reports – Full Customer Detail

Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451



Duke Energy Progress & Duke Energy Carolinas

Energy Efficient Lighting & Retail LED Programs

Evaluation Report – Final

April 6, 2018

I/A

Docket No. E-7, Sub 1192

Evans Exhibit J
Page 1 345

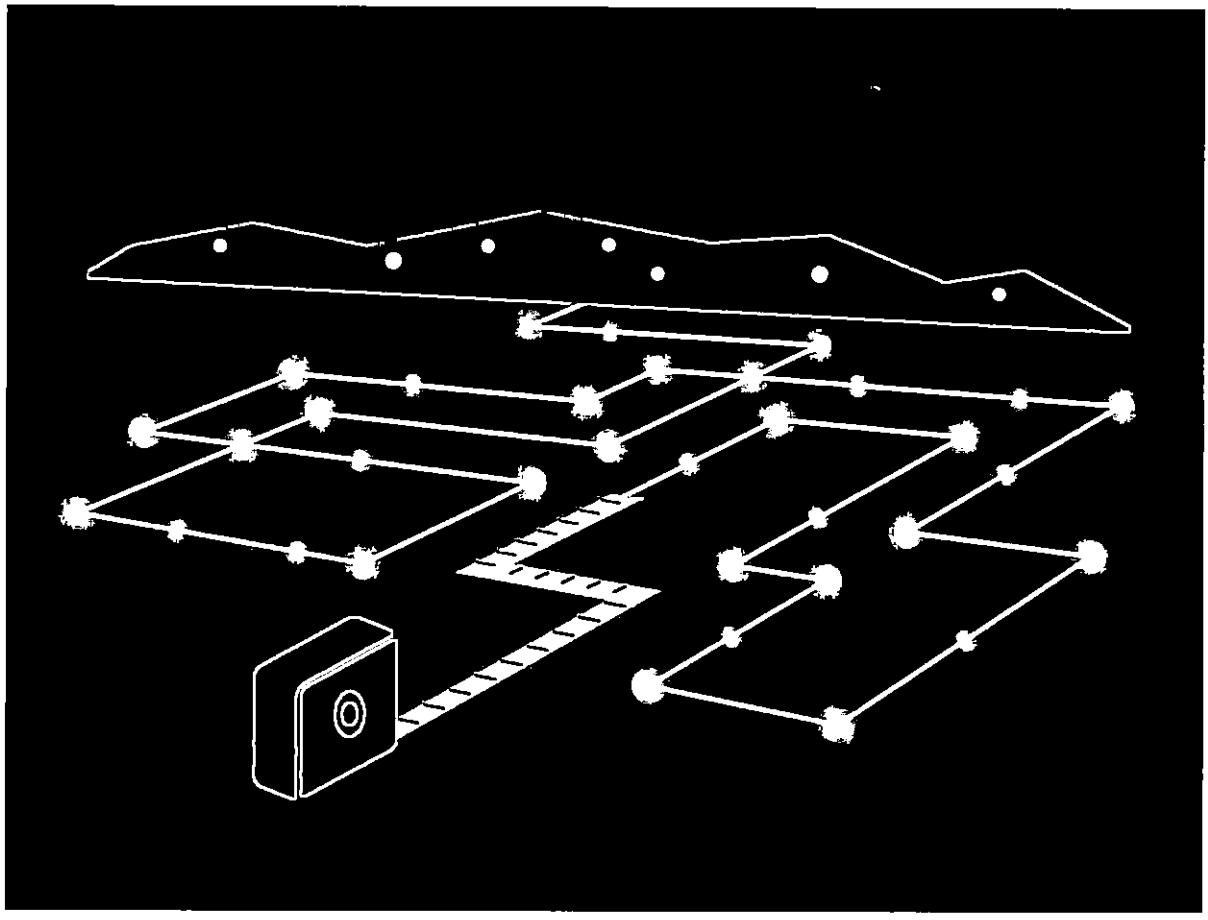
Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

filed in docket



Duke Energy Carolinas

Residential Energy Assessments Program Evaluation Report – Final

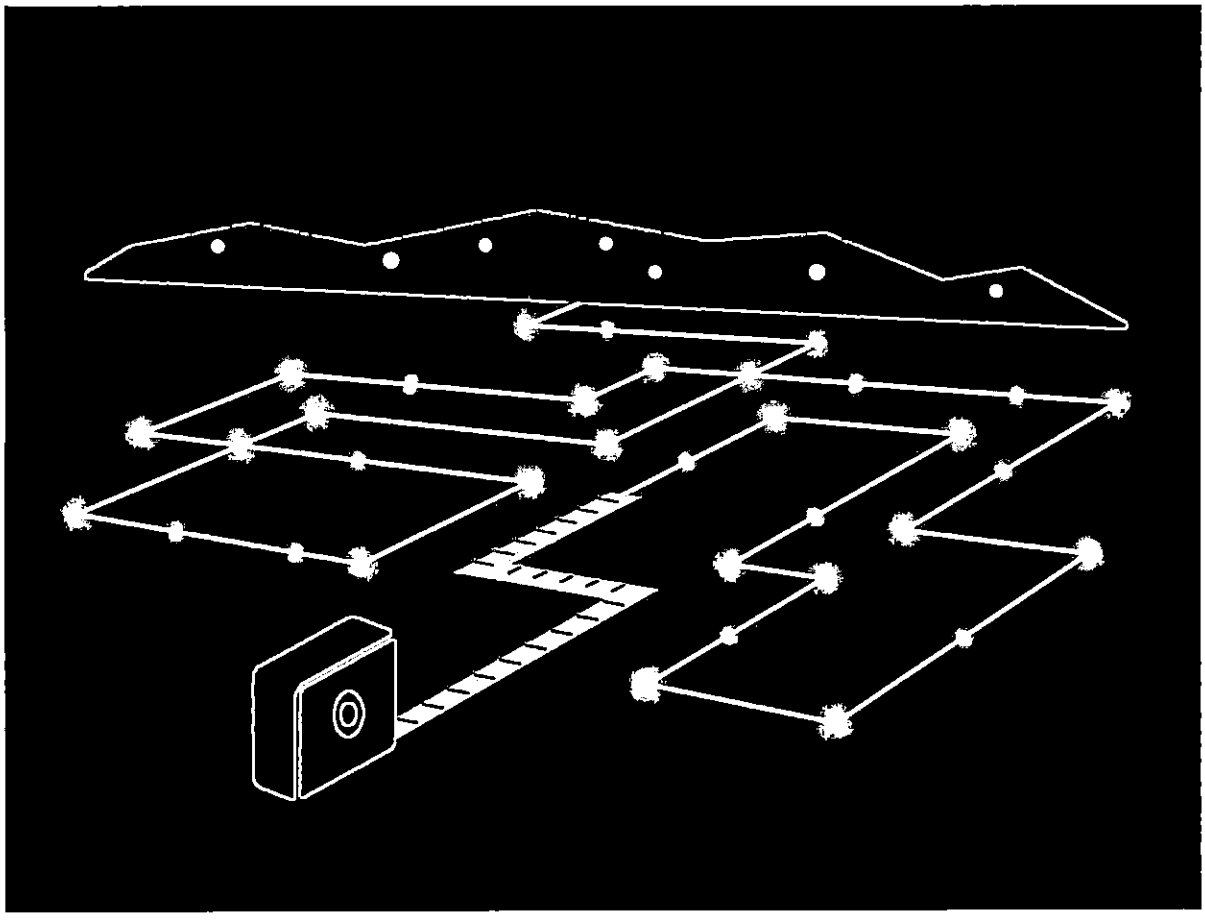
October 12, 2018

Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451



Duke Energy Carolinas and Progress

EnergyWise Business Evaluation Report – Final

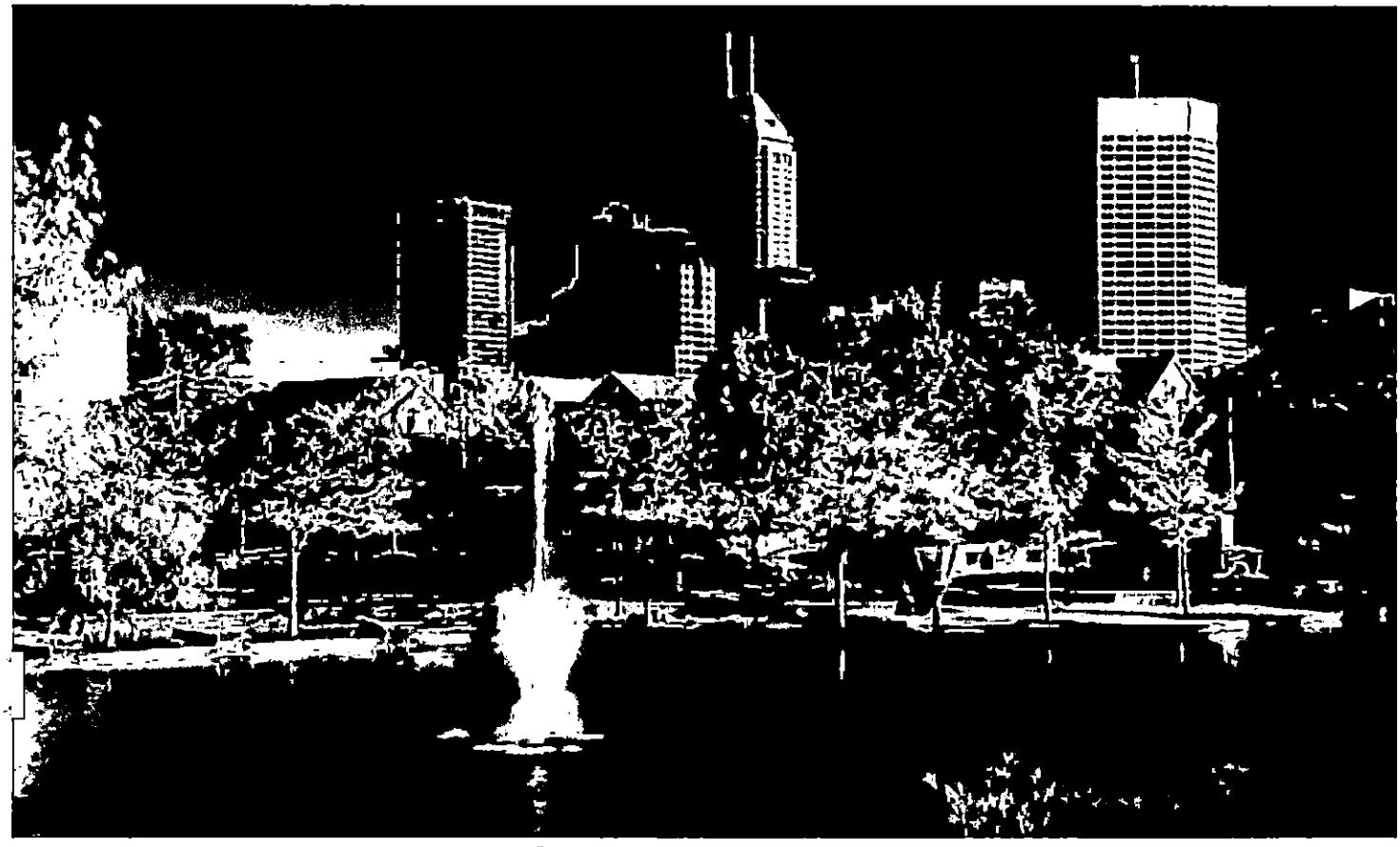
November 9, 2018

Docket No. E-7, Sub 1192

filed w/ docket

Nexant

Reimagine tomorrow.



Smart $aver® Non-Residential Custom Program Years 2016-2017 Evaluation Report

Submitted to Duke Energy Carolinas
in partnership with Tetra Tech

November 29, 2018

Principal Authors:
Patrick Burns, Senior Vice President
Nathanael Benton, Senior Consultant
Carrie Koenig, Dan Belknap, Tetra Tech

I/A

Duke Energy Carolinas, LLC
Vintage 2015 Actual for January 1, 2015 to December 31, 2015
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 1)	NC Residential Revenue Requirement D * E
Residential Programs								
EE Programs								
1 Appliance Recycling Program	748	5,534,546	$ 1,901,321	$ 1,537,241	$ 41,869	$ 1,579,111	72.9564706%	$ 1,152,063
2 Energy Efficiency Education	830	4,417,858	$ 2,498,417	$ 2,054,672	$ 51,031	$ 2,105,702	72.9564706%	$ 1,536,246
3 Energy Efficient Appliances and Devices	14,743	129,350,071	$ 49,525,402	$ 12,050,485	$ 4,309,616	$ 16,360,100	72.9564706%	$ 11,935,752
4 HVAC Energy Efficiency	2,663	4,763,631	$ 6,816,479	$ 5,416,833	$ 160,959	$ 5,577,792	72.9564706%	$ 4,069,360
5 Income Qualified Energy Efficiency and Weatherization Assistance	608	1,125,184	$ 1,854,068	$ 2,238,776	$ -	$ 2,238,776	72.9564706%	$ 1,633,332
6 Multi-Family Energy Efficiency	1,339	13,988,109	$ 7,431,163	$ 2,092,935	$ 613,896	$ 2,706,831	72.9564706%	$ 1,974,808
7 Energy Assessments	1,275	10,793,765	$ 10,115,222	$ 3,086,173	$ 808,341	$ 3,894,514	72.9564706%	$ 2,841,300
8 Subtotal	22,205	171,473,205	$ 80,142,073	$ 28,477,114	$ 5,985,712	$ 34,462,825		$ 25,142,861
9 My Home Energy Report (1)	61,770	228,776,428	$ 16,583,325	$ 9,845,895	$ 774,805	$ 10,620,699	72.9564706%	$ 7,748,487
10 Total for Residential Energy Efficiency Programs	83,975	400,249,633	$ 96,725,398	$ 38,323,008	$ 6,760,516	$ 45,083,525		$ 32,891,348
							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D11* E11
11 Total DSM Programs (2)	871,944	18,374	101,113,558	$ 31,958,782	$ 7,952,799	$ 39,911,582	32.5218612%	$ 12,979,989
12 Total Residential Revenue Requirement								$ 45,871,337

	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 1)	NC Non-Residential Revenue Requirement D * E
Non-Residential Programs								
EE Programs								
13 Non Residential Smart Saver Custom Energy Assessments	87	765,303	$ 321,686	$ 650,420	$ (38,954)	$ 621,465	72.9564706%	$ 453,399
14 Non Residential Smart Saver Custom	11,108	76,142,627	53,882,448	9,937,877	5,054,201	14,987,078	72.9564706%	10,934,043
15 Non Residential Smart Saver Energy Efficient Food Service Products	140	1,671,729	1,099,734	194,415	104,111	298,535	72.9564706%	217,801
16 Non Residential Smart Saver Energy Efficient HVAC Products	1,611	5,405,220	6,221,217	1,142,522	584,050	1,726,572	72.9564706%	1,259,646
17 Non Residential Smart Saver Energy Efficient Lighting Products	11,523	67,083,512	42,227,035	11,335,798	3,552,492	14,888,290	72.9564706%	10,861,971
18 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	423	3,354,574	1,924,058	466,478	167,622	634,100	72.9564706%	462,617
19 Non Residential Smart Saver Energy Efficient IT Products	540	5,196,710	1,130,386	716,542	47,592	764,134	72.9564706%	557,485
20 Non Residential Smart Saver Energy Efficient Process Equipment Products	112	630,154	517,342	88,823	49,280	138,103	72.9564706%	100,755
21 Small Business Energy Saver	14,417	77,515,622	47,989,975	13,968,790	3,912,436	17,881,226	72.9564706%	13,045,511
22 Smart Energy in Offices	3,109	14,938,552	1,666,306	1,463,240	23,353	1,486,592	72.9564706%	1,084,565
23 Business Energy Report	-	-	-	126,404	-	126,404	72.9564706%	92,220
24 Total for Non-Residential Energy Efficiency Programs	43,072	252,704,804	$ 156,980,188	$ 40,096,318	$ 13,456,181	$ 53,552,499		39,070,014
							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D23*E23
25 Total DSM Programs(2)	871,944	18,374	$ 101,113,558	$ 31,958,782	$ 7,952,799	$ 39,911,582	42.4483655%	$ 16,941,814
26 Total Non-Residential Revenue Requirement								$ 56,011,828
							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D28* E28
Total DSM Program Breakdown								
27 Power Manager (Residential)	454,663	-	$ 52,718,688	$ 14,634,279	$ 4,379,707	$ 19,013,986	-	
28 EnergyWise for Business	6	18,374	$ 11,248	$ 1,549,305	$ (176,876)	$ 1,372,428		
29 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
30 Power Share (Non-Residential)	417,276	-	$ 48,383,622	$ 15,779,050	$ 3,749,526	$ 19,528,576		
31 Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, dated 8/25/16)				$ (3,851)	$ 463	$ (3,408)		
32 Total DSM	871,944	18,374	101,113,558	31,958,782	7,952,799	39,911,582	74.9702260%	$ 29,921,803

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2016 Actual for January 1, 2016 to December 31, 2016
Docket Number E-7, Sub 1191
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D = B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 2)	NC Residential Revenue Requirement D * E
EE Programs								
1 Appliance Recycling Program	21	164,720	$ 59,758	$ (97,397)	$ 28,073	$ (79,324)	73.0962827%	$ (57,983)
2 Energy Efficiency Education	1,512	6,441,283	3,695,507	2,126,509	180,435	2,306,944	73.0962827%	1,686,290
3 Energy Efficient Appliances and Devices	14,518	120,226,223	82,262,218	24,069,774	6,692,131	30,761,905	73.0962827%	22,485,809
4 HVAC Energy Efficiency	2,462	6,294,837	7,476,100	7,839,566	(41,799)	7,797,767	73.0962827%	5,699,878
5 Income Qualified Energy Efficiency and Weatherization Assistance	649	4,801,478	2,384,760	4,792,436	-	4,792,436	73.0962827%	3,503,093
6 Multi-Family Energy Efficiency	1,572	15,235,497	8,950,706	2,518,988	739,648	3,258,636	73.0962827%	2,381,941
7 Energy Assessments	1,070	7,389,091	6,822,806	2,678,893	476,550	3,155,443	73.0962827%	2,306,512
8 Subtotal	21,804	160,553,127	$ 112,251,855	$ 43,928,769	$ 8,065,038	$ 51,993,807		$ 38,005,540
9 My Home Energy Report (1)	71,814	283,569,925	20,423,954	10,822,444	1,104,174	11,926,618	73.0962827%	8,717,914
10 Total for Residential Energy Efficiency Programs	93,618	444,123,052	$ 132,675,808	$ 54,751,213	$ 9,169,211	$ 63,920,424		$ 46,723,454
							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D11* E11
11 Total DSM Programs (2)	825,492	718,623	98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	33.7973480%	$ 12,330,491
12 Total Residential Revenue Requirement								$ 59,053,945

Non-Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 2)	NC Non-Residential Revenue Requirement D * E
EE Programs								
13 Non Residential Smart Saver Custom Energy Assessments	1,584	16,953,402	$ 9,572,687	$ 2,034,308	$ 866,914	$ 2,901,222	73.0962827%	$ 2,120,685
14 Non Residential Smart Saver Custom	7,934	52,154,624	39,025,086	7,356,509	3,629,838	10,986,347	73.0962827%	8,030,611
15 Non Residential Smart Saver Energy Efficient Food Service Products	356	3,809,316	2,474,312	324,117	247,272	571,389	73.0962827%	417,664
16 Non Residential Smart Saver Energy Efficient HVAC Products	808	9,316,901	3,344,669	1,473,991	215,128	1,689,119	73.0962827%	1,234,683
17 Non Residential Smart Saver Energy Efficient Lighting Products	29,268	167,342,422	120,392,639	39,622,944	9,288,515	48,911,459	73.0962827%	35,752,458
18 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	368	2,494,340	1,574,965	471,930	126,849	598,779	73.0962827%	437,685
19 Non Residential Smart Saver Energy Efficient IT Products	107	2,462,027	777,601	285,430	56,600	342,030	73.0962827%	250,011
20 Non Residential Smart Saver Energy Efficient Process Equipment Products	50	313,131	279,184	125,947	17,622	143,569	73.0962827%	104,944
21 Non Residential Smart Saver Performance Incentive	-	-	-	35,670	(4,102)	31,568	73.0962827%	23,075
22 Small Business Energy Saver	16,110	85,687,928	55,685,830	15,360,852	4,637,372	19,998,224	73.0962827%	14,617,959
23 Smart Energy in Offices	3,505	16,842,267	1,843,559	1,061,729	89,911	1,151,640	73.0962827%	841,806
24 Business Energy Report	388	5,561,349	302,497	263,169	-	263,169	73.0962827%	192,367
25 Total for Non-Residential Energy Efficiency Programs	60,480	356,937,707	$ 235,273,030	$ 68,416,596	$ 19,171,918	$ 87,588,514		$ 64,023,948
							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D24*E24
26 Total DSM Programs(2)	825,492	718,623	$ 98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	40.8166437%	$ 14,891,384
27 Total Non-Residential Revenue Requirement								$ 78,915,332

Total DSM Program Breakdown							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D29 * E29
28 Power Manager (Residential)	455,393	-	$ 54,179,776	$ 13,644,970	$ 4,661,503	$ 18,306,473		
27 EnergyWise for Business (Non-Residential)	1,199	718,623	$ 574,590	$ 470,304	$ 11,993	$ 482,297		
29 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
30 Power Share (Non-Residential)	368,900	-	$ 43,889,394	$ 14,291,024	$ 3,403,812	$ 17,694,836		
31 Total DSM	825,492	718,623	$ 98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	74.6139917%	$ 27,223,875

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2017 Actual for January 1, 2017 to December 31, 2017
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 3)	NC Residential Revenue Requirement D * E
EE Programs								
1 Appliance Recycling Program	-	-	$ -	$ 5,307	$ (610)	$ 4,697	72.8087506%	$ 3,420
2 Energy Efficiency Education	1,393	5,932,086	3,597,724	2,077,611	174,813	2,252,424	72.8087506%	1,639,962
3 Energy Efficient Appliances and Devices	24,606	137,959,781	105,085,087	30,340,728	8,595,601	38,936,329	72.8087506%	28,349,055
4 Residential – Smart Saver Energy Efficiency Program	1,853	6,954,889	7,428,903	7,403,327	2,941	7,406,269	72.8087506%	5,392,412
5 Income Qualified Energy Efficiency and Weatherization Assistance	771	5,341,624	3,185,867	5,505,992	-	5,505,992	72.8087506%	4,008,844
6 Multi-Family Energy Efficiency	1,918	19,056,155	13,325,932	3,168,422	1,168,114	4,336,535	72.8087506%	3,157,377
7 Energy Assessments	1,040	7,720,549	6,602,466	2,909,098	424,737	3,333,835	72.8087506%	2,427,324
8 Subtotal	31,581	182,965,084	$ 139,225,978	$ 51,410,485	$ 10,365,596	$ 61,776,082		$ 44,978,394
9 My Home Energy Report (1)	79,070	311,368,855	21,728,359	13,812,250	910,354	14,722,603	72.8087506%	10,719,344
10 Total for Residential Energy Efficiency Programs	110,651	494,333,939	$ 160,954,347	$ 65,222,736	$ 11,275,950	$ 76,498,685		$ 55,697,737

							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D11* E11
11 SubTotal DSM Programs (2)	846,941	2,943,906	105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	33.8075104%	$ 13,008,491
12 Total DSM Programs								13,008,491
13 Total Residential Revenue Requirement								$ 68,706,228

Non-Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 3)	NC Non-Residential Revenue Requirement D * E
EE Programs								
14 Non Residential Smart Saver Custom Energy Assessments	1,627	15,791,732	$ 10,272,302	$ 2,139,875	$ 935,229	$ 3,075,104	72.8087506%	$ 2,238,945
15 Non Residential Smart Saver Custom	6,010	40,609,855	34,693,083	7,304,838	3,149,648	10,454,486	72.8087506%	7,611,781
16 Non Residential Smart Saver Energy Efficient Food Service Products	312	1,383,542	959,251	306,488	75,068	381,556	72.8087506%	277,806
17 Non Residential Smart Saver Energy Efficient HVAC Products	894	2,954,877	2,958,336	1,560,769	160,720	1,721,489	72.8087506%	1,253,595
18 Non Residential Smart Saver Energy Efficient Lighting Products	47,322	270,572,885	240,054,511	66,689,770	19,936,945	86,626,715	72.8087506%	63,071,829
19 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	687	4,806,849	3,070,044	528,937	292,227	821,164	72.8087506%	597,879
20 Non Residential Smart Saver Energy Efficient IT Products	-	2,945	523	61,215	(6,980)	54,235	72.8087506%	39,488
21 Non Residential Smart Saver Energy Efficient Process Equipment Products	99	651,289	530,295	162,413	42,306	204,719	72.8087506%	149,054
22 Non Residential Smart Saver Performance Incentive	3	12,373	8,958	320,559	(35,834)	284,725	72.8087506%	207,305
23 Small Business Energy Saver	17,263	90,297,362	63,169,894	17,350,972	5,269,176	22,620,148	72.8087506%	16,469,447
24 Smart Energy in Offices	2,138	10,272,154	1,067,480	891,010	20,294	911,304	72.8087506%	663,509
25 Business Energy Report	3	42,398	696	126,680	-	126,680	72.8087506%	92,234
26 Sub-Total for Non-Residential Energy Efficiency Programs	76,158	437,358,260	$ 356,785,373	$ 97,443,527	$ 29,838,800	$ 127,282,328		$ 92,672,672
27 Total for Non-Residential Energy Efficiency Programs								$ 92,672,672

							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D24*E24
28 Total DSM Programs(2)	846,941	2,943,906	$ 105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	40.0747013%	$ 15,419,988
29 Total Non-Residential DSM Programs								15,419,988
30 Total Non-Residential Revenue Requirement								$ 108,092,661

Total DSM Program Breakdown							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D29* E29
31 Power Manager (Residential)	501,118	-	$ 61,074,105	$ 14,021,500	$ 5,411,050	$ 19,432,549		
32 EnergyWise for Business (Non-Residential)	5,453	2,943,906	$ 2,530,761	$ 2,484,618	$ 5,306	$ 2,489,924		
33 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34 Power Share (Non-Residential)	340,369	-	$ 41,481,644	$ 13,316,535	$ 3,239,103	$ 16,555,638		
35 Total DSM	846,941	2,943,906	$ 105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	73.8822117%	$ 28,428,479

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2018 Actual for January 1, 2018 to December 31, 2018
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Residential Revenue Requirement D * E
Residential Programs								
EE Programs								
1 Appliance Recycling Program	-	-	$ -	$ -	$ -	$ -	72.7130507%	$ -
2 Energy Efficiency Education	1,148	4,889,354	2,713,062	1,391,998	82,522	2,074,520	72.7130507%	1,508,738
3 Energy Efficient Appliances and Devices	32,803	195,316,844	135,264,553	42,681,401	10,647,062	53,328,464	72.7130507%	38,776,793
4 Residential – Smart Saver Energy Efficiency Program	1,644	6,727,882	7,277,653	6,954,193	37,198	6,991,391	72.7130507%	5,083,654
5 Income Qualified Energy Efficiency and Weatherization Assistance	726	5,211,991	3,497,900	6,489,856	-	6,489,856	72.7130507%	4,718,972
6 Multi-Family Energy Efficiency	2,167	21,309,576	13,647,187	3,604,442	1,154,916	4,759,358	72.7130507%	3,460,674
7 Energy Assessments	929	7,716,668	5,753,248	2,835,847	335,501	3,171,348	72.7130507%	2,305,984
8 Subtotal	39,416	241,172,314	$ 168,153,604	$ 64,557,737	$ 12,257,600	$ 76,815,337		$ 55,854,775
9 My Home Energy Report (1)	81,409	320,613,567	21,200,492	13,250,856	914,208	14,165,064	72.7130507%	10,299,850
10 Total for Residential Energy Efficiency Programs	120,825	561,785,881	$ 189,354,096	$ 77,808,593	$ 13,171,808	$ 90,980,401		$ 66,154,625
							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D11* E11
11 SubTotal DSM Programs (2)	876,165	2,498,948	100,354,654	$ 30,406,526	$ 8,044,035	$ 38,450,561	32.1574721%	$ 12,364,728
12 Total DSM Programs								12,364,728
13 Total Residential Revenue Requirement								$ 78,519,353
	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Non-Residential Revenue Requirement D * E
Non-Residential Programs								
EE Programs								
14 Non Residential Smart Saver Custom Energy Assessments	13	83,588	$ 67,270	$ 407,250	$ (39,098)	$ 368,152	72.7130507%	$ 267,655
15 Non Residential Smart Saver Custom	4,054	30,333,040	23,309,478	6,068,378	1,982,738	8,051,016	72.7130507%	5,854,140
16 Non Residential Smart Saver Energy Efficient Food Service Products	106	1,151,114	741,177	235,579	58,144	293,723	72.7130507%	213,575
17 Non Residential Smart Saver Energy Efficient HVAC Products	893	2,908,388	2,808,828	1,620,574	136,649	1,757,223	72.7130507%	1,277,731
18 Non Residential Smart Saver Energy Efficient Lighting Products	31,537	178,360,156	146,522,016	25,869,602	13,875,028	39,744,629	72.7130507%	28,899,532
19 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	421	2,669,016	1,616,886	277,755	154,000	431,755	72.7130507%	313,942
20 Non Residential Smart Saver Energy Efficient IT Products	-	17,639	3,023	36,871	(3,892)	32,978	72.7130507%	23,980
21 Non Residential Smart Saver Energy Efficient Process Equipment Products	75	331,222	226,606	67,502	18,297	85,799	72.7130507%	62,387
22 Non Residential Smart Saver Performance Incentive	168	3,271,186	1,670,847	479,559	136,958	616,557	72.7130507%	448,317
23 Small Business Energy Saver	13,374	76,696,523	46,808,081	15,976,281	3,545,657	19,521,938	72.7130507%	14,194,997
24 Smart Energy in Offices	310	1,488,592	143,209	219,729	(8,800)	210,929	72.7130507%	153,373
25 Business Energy Report	-	-	-	-	-	-	72.7130507%	-
26 Sub-Total for Non-Residential Energy Efficiency Programs	50,950	297,310,461	$ 223,917,419	$ 51,258,981	$ 19,855,720	$ 71,114,701		$ 51,709,669
27 Total for Non-Residential Energy Efficiency Programs								$ 51,709,669
							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D26*E26
28 Total DSM Programs(2)	876,165	2,498,948	$ 100,354,654	$ 30,406,526	$ 8,044,035	$ 38,450,561	41.4712829%	$ 15,945,941
29 Total Non-Residential DSM Programs								15,945,941
30 Total Non-Residential Revenue Requirement								$ 67,655,610
							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D29* E29
Total DSM Program Breakdown								
31 Power Manager (Residential)	535,418	-	$ 62,141,831	$ 14,422,260	$ 5,487,751	$ 19,910,011		
32 EnergyWise for Business (Non-Residential)	8,117	2,498,948	$ 2,234,923	$ 3,062,497	$ (95,171)	$ 2,967,326		
33 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34 Power Share (Non-Residential)	332,631	-	$ 35,977,900	$ 12,931,769	$ 2,651,455	$ 15,573,224		
35 Total DSM	876,165	2,498,948	$ 100,354,654	$ 30,406,526	$ 8,044,035	$ 38,450,561	73.6287551%	$ 28,310,669

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2020 Estimate for January 1, 2020 to December 31, 2020
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Residential Revenue Requirement D * E
EE Programs								
1 Appliance Recycling Program	-	-	$ -	$ -	$ -	$ -	72.71305079%	$ -
2 Energy Efficiency Education	4	7,034,721	3,268,716	2,621,628	74,415	2,696,043	72.71305079%	1,960,375
3 Energy Efficient Appliances and Devices	10,988	47,578,710	28,050,798	9,114,148	2,182,315	11,296,463	72.71305079%	8,214,003
4 Residential - Smart Saver Energy Efficiency Program	2,718	10,603,088	9,458,665	7,663,598	206,433	7,870,031	72.71305079%	5,722,540
5 Income Qualified Energy Efficiency and Weatherization Assistance	653	4,245,993	1,654,957	8,689,280	-	8,689,280	72.71305079%	6,318,240
6 Multi-Family Energy Efficiency	2,034	20,196,677	10,124,235	3,613,126	748,778	4,361,903	72.71305079%	3,171,673
7 Energy Assessments	725	6,119,618	3,579,246	2,795,258	90,159	7,885,417	72.71305079%	2,098,075
8 Subtotal	17,121	95,778,857	$ 56,216,617	$ 34,497,038	$ 3,302,099	$ 37,799,137		$ 27,484,906
9 My Home Energy Report (1)	77,745	306,337,865	20,734,326	11,645,405	1,045,226	12,690,631	72.71305079%	9,227,745
10 Total for Residential Energy Efficiency Programs	94,867	402,116,722	$ 76,950,943	$ 46,142,443	$ 4,347,325	$ 50,489,768		$ 36,712,651
							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D11* E11
11 SubTotal DSM Programs (2)	976,260	2,557,590	124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	32.15747219%	$ 15,433,268
12 Total DSM Programs								15,433,268
13 Total Residential Revenue Requirement								$ 52,145,919

Non-Residential Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Non-Residential Revenue Requirement D * E
EE Programs								
14 Non Residential Smart Saver Custom Energy Assessments	908	7,950,216	$ 4,114,401	$ 1,414,676	$ 310,468	$ 1,725,144	72.71305079%	$ 1,254,405
15 Non Residential Smart Saver Custom	7,658	67,082,262	34,716,460	10,756,254	2,755,424	13,511,678	72.71305079%	9,824,753
16 Non Residential Smart Saver Energy Efficient Food Service Products	288	4,363,034	1,892,593	1,435,926	52,517	1,488,443	72.71305079%	1,082,292
17 Non Residential Smart Saver Energy Efficient HVAC Products	756	2,546,698	2,005,587	1,358,750	74,386	1,433,137	72.71305079%	1,042,077
18 Non Residential Smart Saver Energy Efficient Lighting Products	23,878	131,137,431	87,238,062	21,546,401	7,554,541	29,100,942	72.71305079%	21,160,183
19 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	730	4,603,201	2,264,861	653,139	185,348	838,487	72.71305079%	609,689
20 Non Residential Smart Saver Energy Efficient IT Products	-	323,520	40,508	71,858	(3,605)	68,253	72.71305079%	49,629
21 Non Residential Smart Saver Energy Efficient Process Equipment Products	85	547,055	348,206	172,146	20,247	192,393	72.71305079%	139,895
22 Non Residential Smart Saver Performance Incentive	2,797	22,097,800	11,816,217	3,810,989	920,601	4,731,590	72.71305079%	3,440,484
23 Small Business Energy Saver	8,756	50,048,128	27,132,368	10,638,607	1,896,783	12,535,390	72.71305079%	9,114,864
24 Smart Energy in Offices	-	-	-	-	-	-	72.71305079%	-
25 Business Energy Report	-	-	-	-	-	-	72.71305079%	-
26 Sub-Total for Non-Residential Energy Efficiency Programs	45,855	290,699,344	$ 171,569,263	$ 51,858,747	$ 13,766,709	$ 65,625,456		$ 47,718,371
27 Total for Non-Residential Energy Efficiency Programs								$ 47,718,371
							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D24*E24
28 Total DSM Programs(2)	976,260	2,557,590	$ 124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	41.47128259%	$ 19,903,226
29 Total Non-Residential DSM Programs								19,903,226
30 Total Non-Residential Revenue Requirement								$ 67,621,497
							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D29* E29
Total DSM Program Breakdown								
31 Power Manager (Residential)	616,237	-	$ 77,685,921	$ 19,391,616	$ 6,703,844	$ 26,095,470		
32 EnergyWise for Business (Non-Residential)	17,397	2,557,590	$ 3,451,278	$ 5,098,177	$ (189,393)	$ 4,908,784		
33 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34 Power Share (Non-Residential)	342,625	-	$ 43,192,988	$ 13,583,438	$ 3,405,098	$ 16,988,536		
35 Total DSM	976,260	2,557,590	$ 124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	73.62875519%	$ 35,336,494

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

I/A

Duke Energy Carolinas, LLC
Docket Number E-7, Sub 1192
North Carolina Net Lost Revenue for Vintages 2015 - 2020

Line	Residential	Vintage 2015 2015	2016	2017[a]	2018	2019	2020	Total
1	Residential Energy Assessments	$ 283,798	$ 477,738	$ 473,182	$ 163,880			$ 1,398,597
2	My Home Energy Report	10,047,270	-	-	-			10,047,270
3	Energy Efficient Appliances and Devices	3,690,771	6,159,121	6,116,216	2,163,569			18,139,680
4	HVAC Energy Efficiency	132,089	234,957	232,892	91,744			691,692
5	Appliance Recycle Program	150,786	279,840	277,098	115,671			823,394
6	Income Qualified Energy Efficiency and Weatherization Assistance	69,839	152,201	150,742	68,856			441,638
7	Multi-Family Energy Efficiency	336,658	681,177	676,879	285,091			1,979,805
8	Energy Efficiency Education	89,806	220,572	218,470	89,897			618,746
9	Total Lost Revenues	14,801,010	8,215,618	8,145,479	2,978,708	-	-	-34,140,816
10	Found Residential Revenues *	-	-	-	-			-
11	Net Lost Residential Revenues	$ 14,801,010	$ 8,215,618	$ 8,145,479	$ 2,978,708			$ 34,140,816

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
12	Nonresidential Smart Saver Custom Energy Assessments	$ 5,659	$ 22,194	$ 21,744	$ 12,719			$ 62,316
13	Non Residential Smart Saver Custom	1,432,898	2,477,128	2,416,373	830,053			7,156,453
14	Energy Management Information Services	-	-	-	-			-
15	Non Residential Smart Saver Energy Efficient Food Service Products	33,714	65,479	64,761	25,584			189,538
16	Non Residential Smart Saver Energy Efficient HVAC Products	109,819	196,207	193,346	73,963			573,335
17	Non Residential Smart Saver Energy Efficient Lighting Products	1,439,011	2,400,931	2,289,093	769,611			6,898,646
18	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	51,265	82,153	80,494	25,843			239,755
19	Non Residential Smart Saver Energy Efficient IT Products	58,585	173,258	170,131	83,735			485,709
20	Non Residential Smart Saver Energy Efficient Process Equipment Products	14,723	25,414	24,674	8,676			73,487
21	Smart Business Energy Saver	1,832,775	3,599,216	3,572,716	1,515,918			10,520,625
22	Smart Energy in Offices	178,960	387,139	-	-			566,099
23	EnergyWise for Business	-	-	-	-			-
24	Total Lost Revenues	5,157,409	9,429,119	8,833,331	3,346,104			26,765,963
25	Found Non-Residential Revenues *	-	-	-	-			-
26	Net Lost Non-Residential Revenues	$ 5,157,409	$ 9,429,119	$ 8,833,331	$ 3,346,104			$ 26,765,963

Line	Residential	Vintage 2016 2015	2016	2017[a]	2018	2019	2020	Total
27	Residential Energy Assessments		$ 193,357	$ 336,600	$ 194,978			$ 724,934
28	My Home Energy Report		13,052,806	-	-			13,052,806
29	Energy Efficient Appliances and Devices		2,665,348	5,787,925	3,353,196			11,806,469
30	HVAC Energy Efficiency		132,531	334,414	193,675			660,620
31	Appliance Recycle Program		5,096	8,147	4,719			17,961
32	Income Qualified Energy Efficiency and Weatherization Assistance		115,500	242,117	140,230			497,847
33	Multi-Family Energy Efficiency		347,362	698,540	403,459			1,449,361
34	Energy Efficiency Education		142,689	301,025	174,350			618,064
35	Total Lost Revenues	-	16,654,687	7,708,770	4,464,606			28,828,063
36	Found Residential Revenues *		-	-	-			-
37	Net Lost Residential Revenues	$ -	$ 16,654,687	$ 7,708,770	$ 4,464,606		$	28,828,063

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
38	Nonresidential Smart Saver Custom Energy Assessments		$ 199,079	$ 389,585	$ 318,658		$	907,321
39	Non Residential Smart Saver Custom		914,009	1,703,790	1,398,549			4,016,348
40	Energy Management Information Services		-	-	-			-
41	Non Residential Smart Saver Energy Efficient Food Service Products		24,889	66,328	54,035			145,252
42	Non Residential Smart Saver Energy Efficient HVAC Products		46,952	103,028	83,640			233,620
43	Non Residential Smart Saver Energy Efficient Lighting Products		2,925,514	6,589,455	5,321,493			14,836,462
44	Non Residential Smart Saver Energy Efficient Pumps and Drives Products		38,898	66,558	54,453			159,908
45	Non Residential Smart Saver Energy Efficient IT Products		59,904	75,403	61,613			196,920
46	Non Residential Smart Saver Energy Efficient Process Equipment Products		4,731	10,652	8,811			24,194
47	Small Business Energy Saver		2,145,932	4,346,981	3,511,109			10,004,022
48	Smart Energy in Offices		227,062	418,553	-			645,616
49	Business Energy Report		-	-	-			-
75	EnergyWise for Business		15,922	36,788	29,639			82,349
76	Total Lost Revenues		6,602,893	13,807,121	10,841,999			31,252,013
77	Found Non-Residential Revenues *		-	-	-			-
78	Net Lost Non-Residential Revenues		$ 6,602,893	$ 13,807,121	$ 10,841,999		$	31,252,013

Line	Residential	Vintage 2017 2015	2016	2017[a]	2018	2019	2020	Total
78	Residential Energy Assessments			$ 158,264	$ 274,951	$ 366,739	$ 75,609	$ 915,563
79	My Home Energy Report			14,455,527	-	-	-	14,455,527
80	Energy Efficient Appliances and Devices			3,387,819	5,136,360	6,635,996	1,570,511	16,730,686
81	Residential – Smart Saver Energy Efficiency Program			202,125	274,698	433,059	73,486	983,368
82	Appliance Recycle Program			-	-	-	-	-
83	Income Qualified Energy Efficiency and Weatherization Assistance			143,450	210,612	242,487	63,120	657,669
84	Multi-Family Energy Efficiency			535,630	744,297	946,417	204,951	2,431,295
85	Energy Efficiency Education			165,283	221,302	279,889	57,994	724,468
86	Total Lost Revenues	-	-	19,086,098	6,862,220	8,904,587	2,045,671	36,898,575
87	Lost Revenue Decrement Pending Rate Case Implementation						290,418	290,418
88	Found Residential Revenues *			-	-	-	-	-
89	Net Lost Residential Revenues	$ -	$ -	$ 19,086,098	$ 6,862,220	$ 8,904,587	$ 1,755,253	$ 36,608,157

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
90	Nonresidential Smart Saver Custom Energy Assessments			$ 220,191	$ 358,289	$ 355,020	$ 139,226	$ 1,072,725
91	Non Residential Smart Saver Custom			435,407	871,334	916,764	435,511	2,659,016
92	Energy Management Information Services			-	-	-	-	-
93	Non Residential Smart Saver Energy Efficient Food Service Products			28,410	40,771	69,365	12,596	151,142
94	Non Residential Smart Saver Energy Efficient HVAC Products			61,639	110,253	131,612	48,778	352,284
95	Non Residential Smart Saver Energy Efficient Lighting Products			6,200,869	10,299,304	8,730,546	4,144,248	29,374,967
96	Non Residential Smart Saver Energy Efficient Pumps and Drives Products			58,808	127,509	93,363	68,742	348,421
97	Non Residential Smart Saver Energy Efficient IT Products			82	162	186	81	512
98	Non Residential Smart Saver Energy Efficient Process Equipment Products			8,160	12,172	10,555	4,015	34,902
99	Non Residential Smart Saver Performance Incentive			66	774	818	686	2,344
100	Small Business Energy Saver			2,203,337	3,774,927	4,099,390	1,591,993	11,669,648
101	Smart Energy in Offices			209,310	149,382	-	-	358,692
102	Business Energy Report			-	-	-	-	-
103	EnergyWise for Business			85,268	158,514	162,762	74,100	480,644
104	Total Lost Revenues		-	9,511,547	15,903,393	14,570,381	6,519,975	46,505,296
105	Lost Revenue Decrement Pending Rate Case Implementation						925,623	925,623
106	Found Non-Residential Revenues *			-	-	-	-	-
107	Net Lost Non-Residential Revenues		$ -	$ 9,511,547	$ 15,903,393	$ 14,570,381	$ 5,594,352	$ 45,579,673

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2018 2015	2016	2017[a]	2018	2019	2020	Total
108	Residential Energy Assessments				$ 204,104	$ 353,963	$ 353,514	$ 911,581
109	My Home Energy Report				15,088,601	-	-	15,088,601
110	Energy Efficient Appliances and Devices				4,301,898	4,054,825	9,085,760	17,442,483
111	Residential – Smart Saver Energy Efficiency Program				171,065	213,538	337,373	721,976
112	Appliance Recycle Program				-	-	-	-
113	Income Qualified Energy Efficiency and Weatherization Assistance				130,598	246,384	252,956	629,937
114	Multi-Family Energy Efficiency				500,983	1,165,290	1,087,381	2,753,653
115	Energy Efficiency Education				122,869	260,025	231,584	614,478
116	Total Lost Revenues	-	-	-	20,520,118	6,294,025	11,348,568	38,162,710
117	Lost Revenue Decrement Pending Rate Case Implementation						1,611,124	1,611,124
118	Found Residential Revenues *				-	-	-	-
119	Net Lost Residential Revenues	$ -	$ -	$ -	$ 20,520,118	$ 6,294,025	$ 9,737,443	$ 36,551,586

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
120	Nonresidential Smart Saver Custom Energy Assessments				$ 232	$ 549,855	$ 849	$ 550,916
121	Non Residential Smart Saver Custom				461,343	2,688,812	740,662	3,890,816
122	Energy Management Information Services				-	-	-	-
123	Non Residential Smart Saver Energy Efficient Food Service Products				13,485	26,794	21,497	61,776
124	Non Residential Smart Saver Energy Efficient HVAC Products				50,511	134,931	114,693	300,135
125	Non Residential Smart Saver Energy Efficient Lighting Products				4,078,660	2,987,074	6,538,710	13,604,445
126	Non Residential Smart Saver Energy Efficient Pumps and Drives Products				66,649	49,390	84,066	200,106
127	Non Residential Smart Saver Energy Efficient IT Products				185	117,948	859	118,991
128	Non Residential Smart Saver Energy Efficient Process Equipment Products				6,501	11,082	10,246	27,829
129	Non Residential Smart Saver Performance Incentive				20,243	160,962	82,058	263,263
129	Small Business Energy Saver				1,772,873	3,493,883	3,374,219	8,640,976
130	Smart Energy in Offices				39,733	-	-	39,733
131	Business Energy Report				-	-	-	-
132	EnergyWise for Business				64,755	51,234	113,468	229,458
133	Total Lost Revenues		-	-	6,575,151	10,271,966	11,081,327	27,928,443
134	Lost Revenue Decrement Pending Rate Case Implementation						1,573,185	1,573,185
135	Found Non-Residential Revenues *				-	-	-	-
136	Net Lost Non-Residential Revenues		$ -	$ -	$ 6,575,151	$ 10,271,966	$ 9,508,142	$ 26,355,258

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2019 2015	2016	2017[a]	2018	2019	2020	Total
137	Residential Energy Assessments					$ 178,309	$ 287,735	$ 466,044
138	My Home Energy Report					15,206,604	-	15,206,604
139	Energy Efficient Appliances and Devices					2,553,378	4,303,976	6,857,354
140	Residential – Smart Saver Energy Efficiency Program					129,065	158,904	287,969
141	Appliance Recycle Program					-	-	-
142	Income Qualified Energy Efficiency and Weatherization Assistance					99,398	185,634	285,032
143	Multi-Family Energy Efficiency					496,951	904,718	1,401,669
144	Energy Efficiency Education					119,499	261,545	381,044
145	Total Lost Revenues	-	-	-		18,783,204	6,102,512	24,885,717
146	Lost Revenue Decrement Pending Rate Case Implementation						866,357	866,357
147	Found Residential Revenues *					-	-	-
148	Net Lost Residential Revenues	$ -	$ -	$ -		$ 18,783,204	$ 5,236,156	$ 24,019,360

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
149	Nonresidential Smart Saver Custom Energy Assessments					$ 145,699	$ 300,502	$ 446,201
150	Non Residential Smart Saver Custom					1,059,600	2,335,850	3,395,450
151	Energy Management Information Services					-	-	-
152	Non Residential Smart Saver Energy Efficient Food Service Products					146,435	153,750	300,185
153	Non Residential Smart Saver Energy Efficient HVAC Products					193,528	322,214	515,742
154	Non Residential Smart Saver Energy Efficient Lighting Products					1,921,414	3,497,532	5,418,946
155	Non Residential Smart Saver Energy Efficient Pumps and Drives Products					77,800	214,313	292,113
156	Non Residential Smart Saver Energy Efficient IT Products					77,654	125,792	203,445
157	Non Residential Smart Saver Energy Efficient Process Equipment Products					18,722	39,115	57,837
158	Non Residential Smart Saver Performance Incentive					375,261	656,829	1,032,089
158	Small Business Energy Saver					1,523,101	2,471,538	3,994,639
159	Smart Energy in Offices					-	-	-
160	Business Energy Report					-	-	-
161	EnergyWise for Business					51,234	76,675	127,908
162	Total Lost Revenues		-	-		5,590,446	10,194,109	15,784,556
163	Lost Revenue Decrement Pending Rate Case Implementation						1,447,229	1,447,229
164	Found Non-Residential Revenues *					-	-	-
165	Net Lost Non-Residential Revenues		$ -	$ -		$ 5,590,446	$ 8,746,880	$ 14,337,327

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2020 2015	2016	2017[a]	2018	2019	2020	Total
166	Residential Energy Assessments						161,966	$ 161,966
167	My Home Energy Report						14,686,468	14,686,468
168	Energy Efficient Appliances and Devices						1,238,379	1,238,379
169	Residential – Smart Saver Energy Efficiency Program						271,482	271,482
170	Appliance Recycle Program						-	-
171	Income Qualified Energy Efficiency and Weatherization Assistance						103,534	103,534
172	Multi-Family Energy Efficiency						496,663	496,663
173	Energy Efficiency Education						148,751	148,751
174	Total Lost Revenues	-	-	-		-	17,105,243	17,105,243
175	Lost Revenue Decrement Pending Rate Case Implementation						2,428,384	2,428,384
176	Found Residential Revenues *						-	-
177	Net Lost Residential Revenues	$ -	$ -	$ -		$ -	$ 14,676,859	$ 14,676,859

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
178	Nonresidential Smart Saver Custom Energy Assessments						$ 136,414	$ 136,414
179	Non Residential Smart Saver Custom						1,201,984	1,201,984
180	Energy Management Information Services						-	-
181	Non Residential Smart Saver Energy Efficient Food Service Products						93,624	93,624
182	Non Residential Smart Saver Energy Efficient HVAC Products						61,819	61,819
183	Non Residential Smart Saver Energy Efficient Lighting Products						3,029,908	3,029,908
184	Non Residential Smart Saver Energy Efficient Pumps and Drives Products						94,651	94,651
185	Non Residential Smart Saver Energy Efficient IT Products						6,639	6,639
186	Non Residential Smart Saver Energy Efficient Process Equipment Products						12,061	12,061
187	Non Residential Smart Saver Performance Incentive						402,902	402,902
187	Small Business Energy Saver						955,245	955,245
188	Smart Energy in Offices						-	-
189	Business Energy Report						-	-
190	EnergyWise for Business						46,148	46,148
191	Total Lost Revenues		-	-		-	6,041,394	6,041,394
192	Lost Revenue Decrement Pending Rate Case Implementation						857,680	857,680
193	Found Non-Residential Revenues *						-	-
194	Net Lost Non-Residential Revenues		$ -	$ -		$ -	$ 5,183,714	$ 5,183,714

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

I/A

Evans Exhibit 3

Duke Energy Carolinas, LLC
For the Period January 1, 2018 - December 31, 2018
Docket Number E-7 ,Sub 1192
Actual Program Costs for Vintage Years 2014, 2015, 2016, 2017 and 2018

		Carolinas System - 12 Months Ended 12/31/2014	Carolinas System - 12 months Ended 12/31/2015	Carolinas System - 12 months Ended 12/31/2016	Carolinas System - 12 months Ended 12/31/2017	Carolinas System - 12 months Ended 12/31/2018
1	Residential Energy Assessments	$ 3,605,737	$ 3,086,173	2,678,893	2,909,058	2,835,847
2	My Home Energy Report	8,285,066	9,845,895	10,822,444	13,812,250	13,250,856
3	Energy Efficient Appliances and Devices	14,738,129	12,050,485	24,069,774	30,340,728	42,681,401
4	Residential – Smart Saver Energy Efficiency Program	4,786,807	5,416,833	7,839,566	7,403,327	6,954,193
5	Appliance Recycle Program	1,515,857	1,537,241	(97,397)	5,307	-
6	Income Qualified Energy Efficiency and Weatherization Assistance	1,917,192	2,238,776	4,792,436	5,505,992	6,489,856
7	Multi Family Energy Efficiency	1,442,533	2,092,935	2,518,588	3,168,422	3,604,442
8	Energy Efficiency Education	1,963,153	2,054,672	2,126,509	2,077,611	1,991,988
9	Nonresidential Smart Saver Custom Energy Assessments	1,458,195	660,420	2,034,308	2,139,875	407,250
10	Energy Management Information Systems	74,855	-	-	-	-
11	Non-Residential Smart Saver Custom	8,136,712	9,932,877	7,356,509	7,304,838	6,068,278
12	Non-Residential Smart Saver Performance Incentive			35,670	320,559	479,559
13	Non-Residential Energy Efficient Food Service Products	199,350	194,425	324,117	306,488	235,579
14	Non-Residential Smart Saver Energy Efficient HVAC Products	815,339	1,142,522	1,473,991	1,560,769	1,620,574
15	Non-Residential Smart Saver Energy Efficient Lighting Products	6,727,675	11,335,798	39,822,944	66,689,770	25,869,602
16	Nonresidential Energy Efficient Pumps and Drives Products	584,874	466,478	471,930	528,937	277,755
17	Nonresidential Energy Efficient ITEE	25,730	716,542	285,430	61,215	36,871
18	Nonresidential Energy Efficient Process Equipment Products	89,809	88,823	125,947	162,413	67,502
19	Smart Energy in Offices	1,156,497	1,463,240	1,061,729	891,010	219,729
20	Small Business Energy Saver	1,026,607	13,968,790	15,360,852	17,350,972	15,976,281
21	Business Energy Report	-	126,404	263,169	126,680	-
22	Power Manager	15,662,693	14,634,279	13,644,970	14,021,500	14,422,260
23	EnergyWise for Business	-	1,549,305	470,304	2,484,618	3,067,497
24	Power Share	15,520,492	15,779,050	14,291,024	13,316,535	12,921,768
25	Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, dated 8/25/16)		(3,851)			
26	**Total Energy Efficiency & Demand Side Program Costs**	**$ 89,733,313**	**$ 110,378,109**	**$ 151,574,107**	**$ 192,488,915**	**$ 159,474,100**
27	NC Allocation Factor for EE programs	72.96004736%	72.95647066%	73.09628276%	72.80875066%	72.71305076%
28	NC Allocation Factor for DSM programs-Residential	34.02099806%	32.52186126%	33.29734806%	33.80751046%	32.15747216%
29	NC Allocation Factor for DSM programs-Non-Residential	41.21080216%	42.44836556%	40.81664376%	40.07470136%	41.47128396%
		NC Allocated - 12 Months Ended 12/31/2014	NC Allocated - 12 Months Ended 12/31/2015	NC Allocated - 12 Months Ended 12/31/2016	2	NC Allocated - 12 Months Ended 12/31/2018
30	Residential Energy Assessments	$ 2,630,748	$ 2,251,563	$ 1,958,171	$ 2,118,078	$ 2,064,745
31	My Home Energy Report	6,044,788	7,183,217	7,910,805	10,056,526	9,647,783
32	Energy Efficient Appliances and Devices	10,752,946	8,791,608	17,594,110	22,090,705	31,075,795
33	Residential – Smart Saver Energy Efficiency Program	3,492,457	3,951,930	5,730,431	5,390,270	5,063,261
34	Appliance Recycle Program	1,105,977	1,121,517	(71,194)	3,864	-
35	Income Qualified Energy Efficiency and Weatherization Assistance	1,398,784	1,633,332	3,503,093	4,008,844	4,725,183
36	Multi Family Energy Efficiency	1,052,473	1,526,931	1,841,287	2,306,888	2,624,349
37	Energy Efficiency Education	1,432,317	1,499,016	1,554,399	1,512,683	1,450,349
38	Nonresidential Smart Saver Custom Energy Assessments	1,063,900	481,819	1,487,003	1,558,016	296,513
39	Energy Management Information Systems	54,614	-	-	-	-
40	Non-Residential Smart Saver Custom	5,936,549	7,246,677	5,377,335	5,318,561	4,418,238
41	Non-Residential Smart Saver Performance Incentive			26,073		
42	Non-Residential Energy Efficient Food Service Products	145,446	141,845	236,918	223,150	171,522
43	Non-Residential Smart Saver Energy Efficient HVAC Products	594,872	833,543	1,077,433	1,136,376	1,178,920
44	Non-Residential Smart Saver Energy Efficient Lighting Products	4,908,515	8,270,198	29,062,899	48,555,988	18,835,334
45	Nonresidential Energy Efficient Pumps and Drives Products	426,724	340,326	344,963	385,112	202,230
46	Nonresidential Energy Efficient ITEE	18,773	522,764	208,639	44,570	26,845
47	Nonresidential Energy Efficient Process Equipment Products	65,525	64,802	92,062	118,251	49,147
48	Smart Energy in Offices	843,781	1,067,528	776,084	648,734	159,982
49	Small Business Energy Saver	749,013	10,191,136	11,228,212	12,633,026	11,632,131
50	Business Energy Report	-	92,220	192,366	92,234	-
51	Power Manager	10,608,831	10,354,843	9,600,575	10,082,296	9,777,570
52	EnergyWise for Business		1,213,062	369,407	1,879,262	2,416,002
53	Power Share	12,850,841	12,354,553	11,225,091	10,072,077	10,153,974
54	Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, dated 8/25/16)		(2,887)			
55	**Total Energy Efficiency & Demand Side Program Costs**	**$ 66,177,873**	**$ 81,171,544**	**$ 111,226,163**	**$ 140,235,514**	**$ 116,011,274**

F/A

Evans Exhibit 4

Duke Energy Carolinas, LLC
January 2014 - December 2018 Actuals
January 2019 - December 2020 Estimates
Docket Number E-7, Sub 1192
North Carolina Found Revenues

	Actual/ Reported KWH					Estimated KWH			Decision Tree Node
	2014	2015	2016	2017	2018	2019	2020	Total	
Economic Development	166,234,550	464,610,000	271,322,290	348,693,600	507,965,880	-	-	1,758,826,320	Box 5 - exclude
Plug-in Electric Charging Station Pilot	238,696	-	-	-	-	-	-	238,696	Box 3 - exclude
Lighting								-	
Residential	105,354	90,653	90,608	78,437	62,832	62,832	62,832	553,548	Box 6 - include
Non Residential (Regulated)	95,391	76,081	96,691	102,200	67,443	67,443	67,443	572,692	Box 6 - include
MV to LED Credit - Residential (Regulated)	(156,381)	(171,375)	(189,823)	(172,702)	(150,968)	(685,126)	(217,615)	(1,743,990)	Box 6 - include
MV to LED Credit - Non-Residential (Regulated)	(104,331)	(160,589)	(173,799)	(193,494)	(248,852)	(1,129,345)	(358,711)	(2,369,121)	Box 6 - include
Total KWH	166,413,279	464,444,770	271,145,967	348,508,041	507,696,335	(1,684,197)	(446,050)	1,756,078,145	
Total KWH Included	(59,967)	(165,230)	(176,323)	(185,559)	(269,545)	(1,684,197)	(446,050)	(2,986,871)	
Total KWH Included (net of Free Riders 15%)	(50,972)	(140,446)	(149,875)	(157,725)	(229,113)	(1,431,567)	(379,143)	(2,538,840)	
Annualized Found Revenue - Non Residential	$ (3,700)	$ (37,868)	$ (37,575)	$ (47,791)	$ (96,471)	$ (574,663)	$ (1,640,089)	$ (2,438,156)	
Annualized Found Revenue - Residential	$ (34,952)	$ (55,340)	$ (67,984)	$ (63,987)	$ (59,285)	$ (420,645)	$ (1,297,039)	$ (1,999,232)	

	2014	2015	2016	2017	2018	2019	2020	Total
Vintage 2014 - Non Res	1,474	(3,700)	(3,700)	(5,174)				(11,099)
Vintage 2015 - Non Res		(21,561)	(37,868)	(37,868)	(13,108)			(110,405)
Vintage 2016 - Non Res			(19,734)	(37,575)	(30,884)	(10,217)		(98,410)
Vintage 2017 - Non Res				(19,415)	(47,791)	(47,791)	(28,377)	(143,374)
Vintage 2018 - Non Res					(51,684)	(96,471)	(96,471)	(244,626)
Vintage 2019 - Non Res						(311,276)	(574,663)	(885,939)
Vintage 2020 - Non Res							(85,379)	
Net Negative Found Revenues to Zero*	-	25,261	61,302	100,031	143,468	465,755	784,890	1,580,706
Subtotal - Non Res	$ 1,474	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,474
Vintage 2014 - Res	(12,947)	(34,952)	(34,952)	(22,005)	-			(104,857)
Vintage 2015 - Res		(32,355)	(55,340)	(55,340)	(17,981)	-	-	(161,015)
Vintage 2016 - Res			(38,231)	(67,984)	(39,657)	-	-	(145,873)
Vintage 2017 - Res				(26,862)	(50,953)	(32,706)	(18,976)	(129,498)
Vintage 2018 - Res					(28,318)	(59,285)	(59,285)	(146,888)
Vintage 2019 - Res						(227,850)	(420,645)	(648,495)
Vintage 2020 - Res							(56,673)	(56,673)
Net Negative Found Revenues to Zero*	12,947	67,307	128,523	172,192	136,909	319,841	555,579	1,393,299
Subtotal - Residential	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Found Revenues	$ 1,474	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,474

* Eliminates the inclusion of total negative found revenues at the Residential and Non-Residential level

I/A

Evans Exhibit 5

Duke Energy Carolinas
System Event Based Demand Response January 1, 2018 - December 31, 2018
Docket Number E-7, Sub 1192

Date	State	Program Name	Event Trigger	High / Low System Temp (F)	Customers Notified /Switches Dispatched	MW Reduction
1/2/2018	NC and SC	PowerShare	Emergency, Low Reserves	32/10	163	282.1
1/7/2018	NC and SC	PowerShare	Emergency, Low Reserves	29/12	163	210.0
8/30/2018	NC and SC	Power Manager	Test Event	91 / 72	225,210 / 270,511	184.1

Notes:
- The 'High / Low System Temperature' is the average of the daily high & low temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.

Duke Energy Carolinas, LLC – Executive Summary

A. Description

During the first quarter 2018 Duke Energy Carolinas Collaborative meeting, Duke Energy Carolinas, LLC (the "Company") will provide an update on the performance of its energy efficiency and demand side management programs/pilots for the timeframe of January 2018 through December 2018. The Company's product managers prepared reports on each program describing the offerings and detailing each program's performance. This Executive Summary describes how the Company performed at an aggregate level during the full year of Vintage 2018 in comparison to as-filed information. Program-specific details are provided in the individual reports.

Program reports include:

Program	Category	Customer
Energy Assessments	EE	Residential
Energy Efficient Appliances and Devices	EE	Residential
Energy Efficiency Education Programs	EE	Residential
Residential – Smart $aver Energy Efficiency Program (HVAC EE)	EE	Residential
Income Qualified Energy Efficiency and Weatherization Assistance	EE	Residential
My Home Energy Report	EE	Residential
Multi-Family Energy Efficiency	EE	Residential
Non-Residential Smart $aver Prescriptive	EE	Non-residential
Non-Residential Smart $aver Custom	EE	Non-residential
Non-Residential Smart $aver Custom Assessment	EE	Non-residential
Non-Residential Smart $aver Performance Incentive	EE	Non-residential
Small Business Energy Saver	EE	Non-residential
EnergyWise for Business	EE/DSM	Non-residential
Power Manager	DSM	Residential
PowerShare	DSM	Non-residential

Audience

All retail Duke Energy Carolinas customers who have not opted out.

B &C. Impacts, Participants and Expenses

The tables below include actual results for the full year of Vintage 2018 in comparison to as-filed data for Vintage 2018.

The Company includes the number of units achieved and a percentage comparison to the as filed values. The unit of measure varies by measure as a participant, for example, may be a single LED bulb, a kW, a kWh, a household or a square foot. Due to the multiple measures in a given program or programs, units may appear skewed and are not easily comparable.

Evans Exhibit 7

Duke Energy Carolinas, LLC
Estimate - January 1, 2020 - December 31, 2020
Docket Number E-7, Sub 1192
Projected Program/Portfolio Cost Effectiveness - Vintage 2020

Program	UCT	TRC	RIM	PCT
Residential Programs				
· Energy Education Program for Schools	1.32	1.32	0.54	7.68
· Energy Efficient Appliances & Devices	3.27	3.54	0.70	7.50
· Residential – Smart $aver Energy Efficiency Program	1.31	0.95	0.60	1.84
· Income-Qualified EE Products & Services	0.21	0.35	0.17	2.80
· Multi-Family EE Products & Services	2.97	2.97	0.61	22.81
· My Home Energy Report	1.89	1.89	0.61	
· Power Manager	4.22	8.72	4.22	
· Residential Energy Assessments	1.36	1.34	0.49	30.23
Residential Total	**2.50**	**3.02**	**1.04**	**6.61**
Non-Residential Programs				
· Custom Assessment & Incentive	3.38	1.68	0.84	3.20
· EnergyWise for Business	0.72	1.25	0.61	
· Food Service Products	1.40	0.81	0.51	2.02
· HVAC	1.57	1.24	0.70	2.06
· Lighting	4.29	2.00	0.80	3.75
· Motors, Pumps & VFDs	3.68	2.63	0.86	5.38
· Non Res Information Technology	0.60	0.46	0.31	2.55
· Process Equipment	2.14	1.85	0.70	3.86
· Performance Incentive	3.29	1.06	0.83	1.79
· Small Business Energy Saver	2.70	1.67	0.80	2.93
· PowerShare	3.35	112.28	3.35	
Non-Residential Total	**3.28**	**2.13**	**0.94**	**3.34**
Overall Portfolio Total	**2.90**	**2.43**	**0.98**	**4.00**

I/AT

Exhibit 8

Duke Energy Carolinas
Changes to DSM/EE Cost Recovery Vintage 2018 True Up January 1, 2018 - December 31, 2018
Changes from Prior Filing Due to Application of M&V and Participation
System kWh and kW Impacts Net Free Riders at the Plant

Residential Programs

Program Name	Filed in Docket No. E-7 Sub 1130 kWh	Filed in Docket No. E-7 Sub 1130 kW	Filed in Docket No. E-7 Sub 1192 kWh	Filed in Docket No. E-7 Sub 1192 kW	Overall Variance kWh	Overall Variance kW	E-7 Sub 1130 System Participation	E-7 Sub 1192 System Participation	Delta Participation	Variance attributable to Participation kWh	Variance attributable to Participation kW	Variance attributable to Mix of Measures kWh	Variance attributable to Mix of Measures kW	Variance attributable to EM&V kWh	Variance attributable to EM&V kW	Sum of Variances kWh	Sum of Variances kW
Energy Efficiency Education Program for Schools	9,604,364	1,316	4,883,354	1,148	(715,010)	(168)	3,534,486	10,242,945	6,708,459	(715,010)	(168)	-	-	-	-	(715,010)	(168)
Energy Efficient Appliances and Devices	97,729,211	11,726	195,116,844	12,803	97,587,633	21,077	9,480	25,293	15,813	146,460,831	18,352	7,585,629	14	(56,558,907)	2,711	97,587,553	21,077
Residential – Smart Saver Energy Efficiency Program	9,359,616	1,577	6,727,882	1,644	1,368,266	67	10,426	10,681	255	3,844,491	1,175	(1,277,881)	(581)	(1,198,344)	(527)	1,368,266	67
Income Qualified Energy Efficiency and Weatherization Assistance	5,287,477	820	5,211,991	726	(75,487)	(95)	370,882	430,474	59,592	(557,065)	(80)	-	-	481,578	(15)	(75,487)	(95)
Multi Family Energy Efficiency	22,582,143	2,197	21,309,576	2,157	(1,272,565)	(30)	59,080	55,978	(3,102)	(2,699,719)	(204)	1,427,154	174	-	-	(1,272,565)	(30)
Energy Assessments	7,435,992	1,145	7,719,668	929	280,676	(216)	1,354,138	1,432,263	78,125	984,660	172	-	-	(703,984)	(388)	280,676	(216)
My Home Energy Report	304,986,954	77,277	320,613,567	81,409	15,226,613	4,132	473,837	504,071	30,234	15,226,613	4,132	-	-	-	-	15,226,613	4,132
Power Manager	-	503,304	-	535,418	-	32,114	-	-	-	-	32,114	-	-	-	-	-	32,114
Residential Programs Total	448,385,775	599,352	561,785,881	656,243	113,400,106	56,881	5,811,330	12,701,705	6,890,375	163,544,851	55,493	7,834,912	(591)	(57,979,657)	1,782	113,400,106	56,851

Non-Residential Programs

Program Name	Filed in Docket No. E-7 Sub 1130 kWh	Filed in Docket No. E-7 Sub 1130 kW	Filed in Docket No. E-7 Sub 1192 kWh	Filed in Docket No. E-7 Sub 1192 kW	Overall Variance kWh	Overall Variance kW	E-7 Sub 1130 System Participation	E-7 Sub 1192 System Participation	Delta Participation	Variance attributable to Participation kWh	Variance attributable to Participation kW	Variance attributable to Mix of Measures kWh	Variance attributable to Mix of Measures kW	Variance attributable to EM&V kWh	Variance attributable to EM&V kW	Sum of Variances kWh	Sum of Variances kW
Non Residential Smart Saver Custom Technical Assessments	20,322,215	2,320	83,588	13	(20,238,628)	(2,307)	62,155	23,345	(38,791)	-	-	(20,238,628)	(2,307)	-	-	(20,238,628)	(2,307)
Non Residential Smart Saver Custom	95,315,609	10,881	30,319,040	4,054	(64,982,570)	(6,827)	453	2,910	2,457	-	-	(64,982,570)	(6,827)	-	-	(64,982,570)	(6,827)
Non Residential Smart Saver Energy Efficient Food Service Products	817,199	120	1,151,114	106	333,875	(14)	5,124,564	2,189,324	(2,935,240)	723,121	46	421,245	48	(810,491)	(107)	333,875	(14)
Non Residential Smart Saver Energy Efficient HVAC Products	4,345,576	2,007	2,908,386	693	(1,437,191)	(1,313)	14,535,813	2,854,234	(11,681,579)	23,758	158	(973,128)	(1,102)	(487,822)	(369)	(1,437,191)	(1,313)
Non Residential Smart Saver Energy Efficient Lighting Products	92,350,979	12,416	178,360,156	31,537	86,009,217	19,102	2,750	2,480	(270)	53,261,331	4,160	(2,625,547)	291	35,373,431	14,651	86,009,217	19,102
Non Residential Energy Efficient Pumps and Drives Products	2,057,770	305	2,669,016	421	601,246	115	15,935	280	(15,655)	11,845	(1)	(253,717)	(17)	843,118	133	601,246	115
Non Residential Energy Efficient ITEE	3,821,152	0	17,539	-	(3,803,513)	(0)	1,657	8,319	1,662	(3,128,765)	-	(2,673,638)	(0)	(3,080)	-	(3,805,513)	(0)
Non Residential Energy Efficient Process Equipment Products	314,290	31	331,222	75	14,932	44	6,174,765	118	(6,174,647)	218,900	22	(222,048)	(20)	18,078	42	14,932	44
Non Residential Smart Saver Performance Incentive	5,706,017	651	3,771,186	168	(2,434,832)	(484)	47,462,400	4,194,001	(43,268,397)	-	-	(2,434,832)	(484)	-	-	(2,434,832)	(484)
Smart Energy in Offices	41,339,434	8,604	1,488,592	310	(39,850,843)	(8,294)	79,800,000	73,493,029	(2,306,971)	(10,380,698)	(2,161)	(27,305,728)	(5,683)	(2,164,357)	(450)	(39,850,843)	(8,294)
Small Business Energy Saver	93,125,919	17,124	78,696,523	13,374	(14,429,395)	(3,750)	14,013	-	(14,013)	(2,718,672)	(2,304)	-	-	(11,720,723)	(1,447)	(14,439,395)	(3,750)
Business Energy Report	5,051,658	353	-	-	(5,051,658)	(353)	8,863	11,462	4,598	(5,051,658)	(353)	-	-	-	-	(5,051,658)	(353)
EnergyWise for Business	3,530,072	17,034	2,498,948	8,117	(1,031,124)	(8,917)	365,308	313,157	(52,151)	3,560,876	4,835	-	-	(4,592,000)	(13,752)	(1,031,124)	(8,917)
PowerShare	-	388,025	-	332,631	-	(55,394)	-	-	-	-	(55,394)	-	-	-	-	-	(55,394)
Non-Residential Programs Total	368,121,892	459,890	299,809,409	391,698	(68,312,483)	(68,192)	149,566,656	83,087,680	(66,478,976)	38,520,009	(50,992)	(121,288,645)	(16,100)	14,456,153	(1,100)	(68,312,483)	(68,192)
Total Residential and Non-Residential Programs	816,507,667	1,059,251	861,595,290	1,047,941	45,087,623	(11,310)	155,377,986	95,789,386	(59,588,600)	202,064,860	4,501	(113,453,734)	(16,493)	(43,523,504)	682	45,087,623	(11,310)

NOTE - The actual per unit impacts are reflective of the following EM&V reports:

Program Name As Filed	Docket	Report Reference	Effective Date
Non Residential Smart Saver Energy Efficient Food Service Products	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Non Residential Smart Saver Energy Efficient HVAC Products	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Non Residential Smart Saver Energy Efficient Lighting Products	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Non Residential Energy Efficient Pumps and Drives Products	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Non Residential Energy Efficient ITEE	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Non Residential Energy Efficient Process Equipment Products	E-7, Sub 1192	Exhibit B - Nonresidential Smart Saver® Energy Efficient Products and Assessment – Prescriptive: 2015-2017	1/1/2017
Energy Efficient Appliances and Devices	E-7, Sub 1192	Exhibit C - Residential Energy Efficient Appliances and Devices – Retail Lighting: 2018-2017	4/1/2017
Residential – Smart Saver Energy Efficiency Program	E-7, Sub 1192	Exhibit E - Residential Smart Saver® Energy Efficiency - HVAC: 2015-2017	10/1/2017
Income Qualified EE and Weatherization Program	E-7, Sub 1192	Exhibit F - Income-Qualified Energy Efficiency and Weatherization Assistance: 2015-2016	1/1/2015
Small Business Energy Saver	E-7, Sub 1192	Exhibit G - Small Business Energy Saver: 2015-2017;	7/1/2017
Energy Efficient Appliances and Devices	E-7, Sub 1192	Exhibit I - Residential Energy Efficient Appliances and Devices – Online Savings Store: 2015-2017	2/1/2018
Energy Assessments	E-7, Sub 1192	Exhibit J - Duke Energy Carolinas Residential Energy Assessments Program: 2015-2017	5/1/2017
EnergyWise for Business	E-7, Sub 1192	Exhibit K - EnergyWise for Business: 2017	1/1/2018

I/A

Evans Ex. 9

	Number of Accounts
DSM RIDER OPT OUT YR 2018	5,075
EE RIDER OPT OUT YR 2018	4,515

Customer Bill Name	DSM YR 18 (JAN 1-DEC 31) RIDER OPT OUT	EE YR 18 (JAN 1-DEC 31) RIDER OPT OUT	GRAND TOTAL
101 SOUTH TRYON LP	2	2	4
200 NORTH COLLEGE CHARLOTTE LLC	1		1
301 COLLEGE STREET CENTER LLC	1	1	2
638 BREWING CO, INC	2	2	4
A & T STATE UNIV	13	10	23
A W NORTH CAROLINA INC	6	6	12
ABB MOTORS AND MECHANICAL INC	5	5	10
ABCO AUTOMATION INC	1	1	2
ABERCROMBIE TEXTILES LLC		1	1
ABSS FACILITIES DEPT	7	7	14
ADVANCE STORES CO	1	1	2
ADVANCED DRAINAGE SYSTEMS	2	2	4
ADVANCED MACHINE & FABRICATION, INC.	2	2	4
ADVANCED TECHNOLOGY	2	2	4
AE & T COMPANY INC	1	1	2
AERO ACCESSORIES INC	3	3	6
AERODYN WIND TUNNEL LLC	1	1	2
AFFILIATED COMPUTER SERVICE	2	2	4
AFRO AMERICAN CULTUR	1	1	2
AIR PRODUCTS & CHEMICALS, INC	1	1	2
ALADDIN MANUFACTURING CORPORATION		2	2
ALAMANCE FOODS INC		5	5
ALAMANCE REGIONAL MEDICAL CENTER	2	2	4
ALBEMARLE U. S., INC	1	1	2
ALBEMARLE U. S., INC	1	1	2
ALCAN PACKAGING FOOD AND TOBACCO,INC	2	2	4
ALDERSGATE	11	11	22
ALDI (NC) LLC	1	1	2
ALEVO MANUFACTURING, INC	1	1	2
ALEVO MANUFACTURING, INC.	9	9	18
ALEXANDER COUNTY SCHOOLS	2	1	3
ALEXANDRIA REAL ESTATE EQUITIES INC	5	4	9
ALL GRANITE INC	3	3	6
ALLIED DIE CASTING CO OF NC	2	2	4
ALLTEL MOBILE	1	1	2
ALLVAC, A DIVISION OF TDY INDUSTRIES, INC	1	1	2
ALTEC INDUSTRIES INC	1	1	2
AMERICAN & EFIRD LLC	8	9	17

AMERICAN AIRLINES	7	3	10
AMERICAN CAMPUS LLC	1	1	2
AMERICAN CAMPUS OPERATING CO LLC	3	3	6
AMERICAN CONVERTING, CO. LTD	2	2	4
AMERICAN EXPRESS TRAVEL RELATED SERVIC	1	1	2
AMERICAN FIBER & FINISHING	1	1	2
AMERICAN HEBREW ACADEMY	11	11	22
AMERICAN ROLLER BEARING	1	1	2
AMERICAN ROLLER BEARING CO OF NC	1	1	2
AMERICAN TOBACCO HH LLC	6	6	12
AMERICAN TOBACCO POWER HOUSE LLC	2	2	4
AMERICAN YARNS LLC	3	3	6
AMERICAN ZINC PRODUCTS LLC	1	1	2
AMSTAR SUGAR CORP	1	1	2
ANDALE INC	2	2	4
APPLE INC	1	1	2
AQUA PLASTICS INC	2	2	4
ARCHER-DANIELS-MIDLAND CO	3	3	6
ARDAGH METAL BEVERAGE USA, INC	2	2	4
ARE-NC REGION NO 11, LLC	2	2	4
ARJOBEX AMERICA	2	2	4
ARMACELL LLC	8	6	14
ARROW INTERNATIONAL INC	2	2	4
ASHLEY FURNITURE INDUSTRIES INC	5	5	10
AT&T BELLSOUTH	3	3	6
AT&T MOBILITY LLC	4	4	8
AT&T WIRELESS SERVICE	1	1	2
ATLANTIC SWEETNER CO	2	2	4
ATRIUM WINDOWS & DOORS	7	7	14
AUTOMATED SOLUTIONS LLC	2	2	4
AVAGO TECHNOLOGIES WIRELESS(USA) MAN	1	1	2
B & E WOODTURNING INC	1	1	2
B V HEDRICK GRAVEL & SAND COMPANY	10	10	20
B&G FOODS SNACKS, INC		1	1
B/E AEROSPACE, INC	13	17	30
BAKER INTERIORS FURNITURE COMPANY	9	9	18
BAKERY FEEDS INC	2	2	4
BANK NOTE CORP	3	3	6
BANK OF AMERICA	5	3	8
BARNHARDT MANUFACTURING COMPANY IN	4		4
BARRDAY CORP	3	3	6
BARTIMAEUS BY DESIGN INC	3	3	6
BASF CORPORATION	4	4	8
BAY STATE MILLING	4	4	8
BB&T	9	5	14

BEAL MANUFACTURING CORP	1	1	2
BECO MANAGEMENT	2	2	4
BED,BATH & BEYOND	2	2	4
BELK	6		6
BELL SOUTH MOBILITY	1	1	2
BELLSOUTH	10	10	20
BELLSOUTH BSC	14	14	28
BELLSOUTH COMMUNICATIONS, LLC	1	1	2
BEMIS MANUFACTURING CO	2	2	4
BENJAMIN THOMAS COOPER		1	1
BEOCARE INC	2	3	5
BERNHARDT FURNITURE COMPANY	8	8	16
BERRY TRI PLASTICS		1	1
BESTCO	4	4	8
BESTREADS INC	2	2	4
BEVERLY KNITS INC	5	5	10
BIC CORPORATION	5	5	10
BILLY GRAHAM EVANGELISTIC	6	6	12
BI-LO, LLC	58	58	116
BIOMERIEUX, INC	4	4	8
BISHOP MCGUINNESS	3	2	5
BISSELL CO	1		1
BISSELL COMPANIES	23	3	26
BJ'S WHOLESALE CLUB	3	3	6
BLACKSTONE CHARLOTTE, LLC	1	1	2
BLUE RIDGE COMMUNITY COLLEGE	16	14	30
BLUE RIDGE HEALTH CARE	1	1	2
BLUM, INC	1		1
BONSET AMERICA CORP	1	1	2
BORAL COMPOSITES INC.	4	2	6
BOSTON GEAR LLC	1	1	2
BOWMAN DAIRY	1	1	2
BOXBOARD PROD INC	2	2	4
BRASS CRAFT MFG CO		1	1
BRAXTON SAWMILL INC	3	3	6
BREVARD COLLEGE	19	19	38
BRF-A1,LLC	1	1	2
BRIDGESTONE AIRCRAFT TIRE USA INC	3	3	6
BRIGHT ENTERPRISES INC	2	2	4
BRIT CHARLOTTE LLC	1	1	2
BRIT-CHARLOTTE HOLDING LLC	3	3	6
BROAD RIVER WATER AUTHORITY	1		1
BSN MEDICAL INC	1		1
BUD ANTLE, INC	1	1	2
BURKE COUNTY SCHOOLS	27	22	49

BURLINGTON COAT FACTORY	3	2	5
BURLINGTON TECHNOLOGIES INC	3	3	6
CABARRUS COUNTY SCHOOLS	63	63	126
CALICO TECHNOLOGIES INC	3	3	6
CAMBRIDGE CC HOLDING COMPANY	1	1	2
CAMBRO MANUFACTURING CO	2	2	4
CAMCO MANUFACTURING, INC	5	5	10
CAMFIL USA INC	2	2	4
CANDLE CORPORATION OF AMERICA	2	2	4
CAP YARNS LLC		2	2
CAPITAL BROADCASTING COMPANY	9	9	18
CAPITOL TOWERS LLC	5	5	10
CARAUSTAR INC	4	2	6
CARAUSTAR INDUSTRIES	3	2	5
CARDINAL FLOAT GLASS	1	1	2
CARDINAL HEALTH	1	1	2
CARDINAL HEALTH 200, LLC	1	1	2
CARDINAL HEALTH INC	2	2	4
CAREFUSION MANUFACTURING, LLC	1	1	2
CARGILL, INCORPORATED	3	3	6
CARLISLE FOOD SERVIC	3	3	6
CARMEL COUNTRY CLUB	27	27	54
CARMEL CTRY CLUB	1	1	2
CARMIKE CINEMAS, INC	4	4	8
CAROLINA BEVERAGE GROUP, LLC	4	4	8
CAROLINA CONTAINER	5	5	10
CAROLINA GLOVE COMPANY	6	6	12
CAROLINA GRAPHIC SERVICES LLC	1	1	2
CAROLINA INVESMENT PROPERTIES	1	1	2
CAROLINA LASER CUTTING INC	1	1	2
CAROLINA PERLITE CO	1	1	2
CAROLINA PRECISION COMPONENTS, INC.	1	1	2
CAROLINA PRECISION PLASTICS LLC	6	6	12
CAROLINA STALITE CO	11	11	22
CAROLINA SUNROCK CORP	10	10	20
CAROLINA TRACTOR & EQUIPMENT COMPAN	4	4	8
CAROLINA VILLAGE	4	4	8
CAROLINA YARN	2	2	4
CAROLINAS HEALTHCARE SYSTEM	20	9	29
CARPENTER COMPANY	4	4	8
CASCADE DIE CASTING GRP INC		2	2
CASE FARMS	3	3	6
CASTLE & COOKE NORTH CAROLINA LLC	4	4	8
CATAWBA COLLEGE	1		1
CATAWBA COUNTY SCHOOLS	23	20	43

CATAWBA VALLEY MEDICAL CENTER	1	1	2
CB RICHARD ELLI	12	12	24
CBL ASSOCIATES MANAGEMENT, INC	1	1	2
CCC DEVELOPMENT PARTNERS, LLC	1	1	2
CEDAR FAIR SOUTHWEST, INC	3	3	6
CELGARD, LLC	4	1	5
CENTRAL CAROLINA PLASTICS INC	2	2	4
CENTRAL CAROLINA PRODUCTS	1	1	2
CENTRAL REGIONAL HOSPITAL		5	5
CENTRILOGIC, INC	1	1	2
CENTURY FURNITURE, LLC	7	13	20
CERTAINTEED CORP	1	3	4
CHAPEL HILL/ CARRBORO SCHO	59		59
CHARLOTTE COUNTRY DAY SCHOOL	10		10
CHARLOTTE DOUGLAS INTERNATIONAL AIRP	1		1
CHARLOTTE GATEWAY VILLAGE	2	2	4
CHARLOTTE LATIN SCHOOLS, INC	13	13	26
CHARLOTTE OBSERVER PUBLISHING COMPAI	1	1	2
CHARLOTTE PIPE & FOUNDRY	13	13	26
CHARTER COMMUNICATION	1	1	2
CHEROKEE BOYS CLUB	3	3	6
CHEROKEE INDIAN HOSPITAL	1	1	2
CHESAPEAKE TREATMENT COMPANY, LLC	1	1	2
CINEBARRE, LLC	2	2	4
CISCO SYSTEMS INC	1	1	2
CITY OF ASHEVILLE	1	2	3
CITY OF BELMONT	1	1	2
CITY OF BURLINGTON	5	3	8
CITY OF CHARLOTTE	88	101	189
CITY OF CHARLOTTE REGIONAL VISITORS AUT	4	4	8
CITY OF DURHAM	4	4	8
CITY OF EDEN		2	2
CITY OF GASTONIA	3	3	6
CITY OF GRAHAM	2	2	4
CITY OF GREENSBORO	27	29	56
CITY OF HENDERSONVILLE	4	4	8
CITY OF HICKORY	4	4	8
CITY OF KANNAPOLIS		1	1
CITY OF MARION	2	2	4
CITY OF MEBANE	1	1	2
CITY OF REIDSVILLE	2	2	4
CITY OF SALISBURY	10	10	20
CITY OF WINSTON SALEM	26	31	57
CK THREE TOWER CENTER,LLC	1	1	2
CKA LAKEPOINTE ONE OWNER LLC	1	1	2

CKA LAKEPOINTE TWO OWNER LLC	1	1	2
CKS PACKAGING INC	4	4	8
CLAPPS NURSING HOME CENTER	1	1	2
CLARIANT CORPORATION	11	10	21
CLEARWATER PAPER CORPORATION	4	4	8
CLEMENT PAPPAS NC, INC	4	3	7
CLEVELAND COUNTY SCHOOLS	64	56	120
CMBE	181		181
CMC-NORTHEAST INC	8	4	12
CMHA	8	5	13
COATS AMERICAN	2	2	4
COCA COLA BOTTLING CO CON	5	5	10
COLONIAL PIPELINE		5	5
COLUMBIA PLYWOOD CORPORATION	7	7	14
COMMONWEALTH BRANDS	2	2	4
COMMONWEALTH HOSIERY	3	3	6
COMMSCOPE, INC.	10	10	20
CONCRETE SUPPLY	3	3	6
CONCRETE SUPPLY CO	7	7	14
CONCRETE SUPPLY COMPANY LLC	1	1	2
CONOVER LUMBER CO	2	2	4
CONRAD HILL FEED &	1	1	2
CONSOLIDATED CONTAINER COMPANY	7	7	14
CONSOLIDATED METCO INC		1	1
CONTINENTAL AUTOMOTIVE SYSTEMS, INC	2	2	4
CONTINENTAL STRUCTURAL PLASTICS	4	3	7
CONVATEC INC	2	2	4
COPLAND FABRICS INC		1	1
CORE SCIENTIFIC INC		1	1
CORMETECH INC	1	1	2
CORNERSTONE CHARTER ACADEMY INC	2	2	4
CORNING CABLE SYSTEMS	5	5	10
CORNING INC	6	6	12
COSTCO WHOLESALE INC	5	5	10
COUSINS PROP INC	1	1	2
COUSINS PROPERTIES LP	4	4	8
COVERIS ADVANCED COATINGS US LLC	5	5	10
COVERIS FLEXIBLES (THOMASVILLE) US LLC	6	6	12
CPCC	47	38	85
CPP INTERNATIONAL LLC	1	1	2
CREE INC	12	12	24
CRONLAND LUMBER CO	6	6	12
CROWN CONVERTING	4	4	8
CS CAROLINA INC	1	1	2
CSHV 615 COLLEGE LLC	2	2	4

CSHV SOUTHPARK 6100 FAIRVIEW, LLC	1	1	2
CSHV SOUTHPARK, LLC	1	1	2
CULP HOME FASHIONS	1	1	2
CULP INC	2	2	4
CURTISS-WRIGHT CONTROLS INC	4	3	7
CV PRODUCTS CONSOLIDATED LLC	2	2	4
CYRUSONE-NC LLC	3	3	6
DAIMLER TRUCKS NORTH AMERICA, LLC	5	5	10
DAIRY FRESH	3	3	6
DALCO NONWOVENS, LLC	2	2	4
DANNY TERRELL	2	2	4
DATACHAMBERS, LLC	2	2	4
DAVIDSON COLLEGE	15	15	30
DAVIDSON COUNTY COMMUNITY COLLEGE	3	3	6
DAVIDSON WATER INC		1	1
DAVIS AMBULATORY SURGICAL CENTER	2	2	4
DE FEET INTERNATIONA	3	3	6
DEBOTECH INC	1	1	2
DEERE HITACHI CONST MACH	15	15	30
DELTA PHOENIX, INC.	1	1	2
DIAMOND VIEW I LLC	2	2	4
DIAMOND VIEW II	2	2	4
DILLARDS DEPARTMENT STORE	7	7	14
DISCOVERY PLACE INC	2	2	4
DISNEY WORLDWIDE SERVICES INC	1	1	2
DIZE AWNING TENT CO	1	1	2
DIZE COMPANY	3	3	6
DOOSAN INFRACORE PORTABLE POWER - A D	2	2	4
DOUGHTON MFG CO	3	3	6
DOVER FOUNDATION YMCA	2	1	3
DOW CORNING CORP		11	11
DUKE UNIVERSITY	12	12	24
DURHAM ACADEMY	10	10	20
DURHAM BULLS	2	2	4
DURHAM COCA COLA	4	4	8
DURHAM COUNTY HOSPITAL CORPORATION	1	1	2
DURHAM PUBLIC SCHLS	107		107
DURHAM TECH COMM COL	2		2
DYNAYARN USA, L.L.C.	1	1	2
E I DUPONT CO	1	1	2
E J VICTOR INC	1	1	2
EARTH FARE INC	3	3	6
EAST COAST LUMBER CO	1	1	2
EAST DECK INC	1	1	2
EASTERN BAND OF CHEROKEE INDIANS	3	3	6

ECMD INC	4	4	8
ECOFLO INC	3	3	6
EDS PALLETT WORLD INC	4	4	8
ELASTIC FABRICS OF AMERICA	2	1	3
ELECTRIC GLASS FIBER AMERICA,LLC	3	4	7
ELITE COMFORT SOLUTIONS LLC	1	1	2
ELLIS LUMBER CO	3	3	6
ELON UNIVERSITY	68	68	136
EMC CORPORATION	2	2	4
EMERGEORTHO, P.A	1	1	2
ENDURA PRODUCTS INC	5	5	10
ENGINEERED CONTROLS INTERNATIONAL INC	4	4	8
ENGINEERED RECYCLING COMPANY, LLC	4	4	8
ESSENTRA PACKAGING US, INC	1	4	5
ETHAN ALLEN OPERATIONS INC	2	2	4
EVANS,JAMES R	1	1	2
FAIRYSTONE FABRICS	4	4	8
FAMILY DOLLAR STORES OF NORTH CAROLIN	4	4	8
FERGUSON SUPPLY & BOX	1	1	2
FFNC INC	5	5	10
FIBER & YARN PRODUCTS, INC	1	2	3
FIBER COMPOSITES CORPORATION	2	4	6
FIBRIX, LLC	2	2	4
FIDELITY REAL ESTATE COMPANY, LLC	6	6	12
FIDELITY REAL ESTATE LLC	1	1	2
FILTRONA GREENSBORO, INC	3	3	6
FIRESTONE FIBERS & TEXTILES COMPANY, LLC	2	2	4
FISERV SOLUTIONS INC	1	1	2
FLEXTRONICS AMERICA, LLC	3	3	6
FLINT TRADING CO	2	2	4
FLOWERS BAKERY OF WINSTON SALEM LLC	4	4	8
FLOWERS BAKING COMPANY	2	2	4
FMC-LITHIUM CORP	5	5	10
FOCKE & CO, INC	1		1
FOOD LION	224	218	442
FORESTVIEW HIGH SCHOOL PTA	1		1
FORSYTH TECHNICAL COLLEGE	10	7	17
FOSS AUTO RECYCLING INC	5	5	10
FREUDENBERG IT LP	2	4	6
FREUDENBERG PERFORMANCE MATERIALS LI	3	3	6
FRITO-LAY, INC	1	1	2
FRONTIER SPINNING MILLS, INC		2	2
FRYE REGIONAL MEDICAL CENTER	6	5	11
FUJITSU AMERICA INC	1	1	2
FULLSTEAM BREWERY, LLC	1		1

FURNITURELAND SOUTH	8	8	16
GALENOR DESIGNS, LLC	1	1	2
GARDNER WEBB UNIV	1	1	2
GASTON CO SCHOOLS	37	35	72
GASTON COLLEGE	7	6	13
GATEWAY UNIVERSITY RESEARCH PARK	4	4	8
GBORO NEWS & RECORD	2	2	4
GE LIGHTING SOLUTIONS LLC	6	6	12
GENERAL ELECTRIC	2	2	4
GENPAK LLC	3	3	6
GENUINE PARTS COMPANY	2		2
GEORGIA-PACIFIC MT HOLLY LLC	1	1	2
GERDAU AMERISTEEL US INC	2	2	4
GETRAG GEARS OF NA	2	2	4
GF LINAMAR LLC	1	1	2
GIBSON ACCUMULATOR, LLC	3	3	6
GIGA DATA CENTER - 1 LLC	2	2	4
GILBARCO INC	1	1	2
GILDAN ACTIVEWEAR (EDEN) INC	3		3
GILDAN YARNS, LLC		1	1
GKN DRIVELINE NORTH AMERICA, INC	1	1	2
GLEN HIGH SCHOOL	1	1	2
GLEN RAVEN INC	2	2	4
GLOBAL TEXTILE ALLIANCE INC	5	5	10
GOLDING FARMS FOODS	2	2	4
GRANDEUR MFG	1	1	2
GRANGES AMERICAS INC	1	1	2
GRASS AMERICA INC	4	3	7
GRAY MANUFACTURING TECHNOLOGIES LLC	2	2	4
GREENE STREET HOLDINGS	2	2	4
GREENSBORO COLLEGE	13	13	26
GRIFFIN INDUSTRIES	2	2	4
GRIFOLS THERAPEUTICS INC	1	1	2
GUILFORD COLLEGE	42	30	72
GUILFORD COUNTY	8	8	16
GUILFORD COUNTY SCHOOLS	238	236	474
GUILFORD CTY SCH	1		1
GUILFORD TECH COMM COLL	19	19	38
H B D INC	1	1	2
HALYARD NORTH CAROLINA, INC		1	1
HAN FENG INC		1	1
HANCOCK & MOORE, INC		7	7
HANES COMPANIES INC	2	2	4
HANES DYE & FINISHING	1	1	2
HANSON BRICK EAST LLC	3	3	6

HANWHA L&C ALABAMA LLC	1	1	2
HARRIS TEETER INC	64	15	79
HASHMASTER TECH, LLC	2	2	4
HENDERSON COUNTY GOVERNMENT	3	4	7
HENDERSON COUNTY SCHOOLS	14	15	29
HENDERSONVILLE HEALTH & REHAB	1	1	2
HENKEL CORPORATION	6	6	12
HERBALIFE INTERNATIONAL OF AMERICA INC	1	1	2
HERITAGE HOME GROUP LLC	5	12	17
HERRON TEST LAB INC	1	1	2
HICKORY CITY SCHOOLS	13	13	26
HICKORY PRINTING SOLUTIONS, LLC	2	2	4
HICKORY SPRINGS MANUFACTURING COMPA	24	25	49
HIGH ASSOCIATES, LTD	2	2	4
HIGH COUNTRY LUMBER AND MULCH LLC		2	2
HIGHLAND INDUSTRIES INC	4	4	8
HIGHWOODS PROPERTIES	51	8	59
HIGHWOODS REALTY LIMITED PARTNERSHIP	1		1
HIGHWOODS REALTY LTP	1		1
HINES GLOBAL REIT HOCK PLAZA I LLC	1	1	2
HITACHI METALS NC LTD	1	1	2
HOME DEPOT	18	18	36
HONDA POWER EQUIPMENT	1	2	3
HOUSE OF RAEFORD FARMS INC	2	2	4
HTA-MOREHEAD MOB, LLC	1	1	2
HUGH CHATHAM MEM HOSPITAL	39	39	78
HUITT MILLS,INC	2	2	4
HUNTSMAN INTERNATIONAL LLC	2	2	4
IAC OLD FORT II LLC	1		1
IAC OLD FORT, LLC	2	2	4
IBM CORPORATION	1	1	2
IGM RESINS USA INC		1	1
IMAGES OF AMERICA	2	2	4
IMC-METALSAMERICA, LLC	1	1	2
INCHEM CORPORATION	2	2	4
INDEPENDENT BEVERAGE CORPORATION	4	4	8
INDUSTRIAL WOOD PROD	3	3	6
INDUSTRIAL WOOD PRODUCTS	3	3	6
INFO-GEL, LLC	3	3	6
ING CLARION REALTY SERVICES LLC	1		1
INGLES MARKETS, INC.	57	57	114
INGREDION INCORPORATED	1	1	2
INSTEEL INDUSTRIES, INC	2	2	4
INSTITUTION FOOD HOUSE, INC	7	7	14
INTELLIGENT IMPLANT SYSTEMS	1	1	2

INTERNATIONAL PAPER COMPANY	6	5	11
INTERNATIONAL TEXTILE GROUP INC	1	2	3
IPEX USA, INC	2	1	3
IQE INC	2	2	4
ISOTHERMAL COMMUNITY COLLEGE	5	5	10
ITG BRANDS LLC	2	2	4
ITL LLC	2	2	4
J C PENNEY CO	5	5	10
J E HERNDON CO	1	1	2
JACKSON BOE	7	7	14
JACKSON CREEK MFG INC	2	2	4
JACKSON PAPER MFG CO	1	1	2
JAMES M PLEASANTS CO	1		1
JAMESTOWN YMCA	1	1	2
JDL CASTLE CORP	1	1	2
JOHN JENKINS CO	1	1	2
JOHN UMSTEAD HOSPITAL		5	5
JOHNSON & WALES UNIVERSITY	3	3	6
JOHNSON CONTROLS BATTERY GROUP, INC	1	1	2
JOHNSON CONTROLS INC	2		2
JOWAT CORPORATION	6	6	12
KAYSER ROTH CORPORATION	2	2	4
KBSIII CARILLON LLC	1	1	2
KEATING GRAVURE USA, LLC	1	1	2
KEN SMITH YARN CO	1	1	2
KENDRION-SHELBY	2	2	4
KERRS HICKORY READY MIXED CONCRETE CO	2	2	4
KEYSTONE FOODS LLC	2	2	4
KIMBERLY CLARK	5	5	10
KINCAID FURNITURE	12	12	24
KINDER MORGAN SOUTHEAST TERMINAL	3	3	6
KINDER MORGAN TRANSMIX GROUP	1	1	2
KOHLER COMPANY	1	1	2
KOHLS DEPARTMENT STORES		1	1
KOOPMAN DAIRIES INC	2	2	4
KOURY CORPORATION	53	53	106
KOURY VENTURES	5	5	10
KROGER CO	5	5	10
KROGER LIMITED PARTNERSHIP I	1	1	2
KSM CASTINGS USA INC	2	2	4
KURZ TRANSFER PRODUCTS LP	4	4	8
KYOCERA INDUSTRIAL	1	1	2
L B PLASTICS INC	6	6	12
L S STARRETT CO	2	4	6
LAB CORP	8	7	15

LABELTECH INCORPORATED		2	2	4
LABORATORY CORPORATION OF AMERICA H(		1	1	2
LAKE HICKORY COUNTRY CLUB		6	6	12
LANXESS CORP			3	3
LANXESS SOLUTIONS US INC		1	1	2
LEE INDUSTRIES	Evans Exhibit 9A	3	3	6
LEESONA CORP		1	1	2
LEMCO MILLS INC		2	2	4
LENNY BOY LLC		1	1	2
LENOVO (UNITED STATES) INC		1	1	2
LEXINGTON FURNITURE IND		2	3	5
LIBERTY COMMONS NURSING AND REHABILI		1	1	2
LIBERTY HARDWARE		3	3	6
LIBERTY HEALTHCARE PROPERTIES OF BALLAI		2	2	4
LIBERTY HEALTHCARE PROPERTIES OF MECKL		1	1	2
LIDL US OPERATIONS LLC		1	1	2
LIGGETT GROUP INC		1	1	2
LINCOLN COMM HEALTH		1	1	2
LINDE LLC		1	1	2
LINDYS HOMEMADE, LLC		1	1	2
LOUISIANA-PACIFIC CORPORATION		1	1	2
LOWES FOODS		43	42	85
LOWE'S HOME CENTERS, INC		90	89	179
LOWES OF FRANKLIN #717		2	2	4
LOWE'S OF FRANKLIN #717		1	1	2
LSC COMMUNICATIONS US, LLC		4	5	9
LYDALL THERMAL ACOUSTICAL INC		4	1	5
MACK CONSOLIDATED CENTER LLC		3	3	6
MAGNOLIA CASTLE LLC		1	1	2
MANN+HUMMEL FILTRATION TECHNOLOGY		2	1	3
MANNINGTON WOOD FLOORS		1		1
MANUAL WOODWORKERS & WEAVERS INC		2	2	4
MARKET AMERICA		3	3	6
MARTIN MARIETTA MATERIALS INC		68	71	139
MARVEL-SCHEBLER AIRCRAFT CARBORATORS		2	2	4
MARVES INDUSTRIES, LLC		1	1	2
MASONIC & EASTERN STAR HOME		3	3	6
MAUSER CORP			4	4
MAY DEPT STORE		5	5	10
MCCREARY MODERN INC		8	6	14
MCDOWELL HOSPITAL INC		1		1
MCLEOD LEATHR & BELT		1	1	2
MCMICHAEL MILLS INC		4	4	8
MDI MANAGEMENT		1		1
MEAT AND SEAFOOD SOLUTIONS LLC			7	7

MECK AREA CATH SCHLS		3	3
MECK CNTY JAIL CENTRAL	1	1	2
MECKLENBURG COUNTY	20	5	25
MEDI MFG INC	1	1	2
MEDIA GENERAL OPERATIONS INC	1	1	2
MERCHANTS DISTRIBUTORS , LLC	1	1	2
MERCK SHARP & DOHME CORP	4	4	8
MERCY HOSPITAL, INC	1	1	2
MEREDITH WEBB PRINT	3	3	6
MERIDIAN HOSPITALITY HOLDINGS LLC	1	1	2
MERIDIAN LABORATORY INC	2	2	4
MERITOR HEAVY VEHICLE SYSTEMS	1	1	2
MERITOR HEAVY VEHICLE SYSTEMS LLC	1	1	2
METROLINA GREENHOUSES INC	20	19	39
METROMONT CORPORATION	2	2	4
MICHELIN AIRCRAFT TIRE CO	1	1	2
MICHELIN NORTH AMERICA	10	10	20
MILES TALBOTT	2	2	4
MILLERCOORS LLC	1	1	2
MILLIKEN & COMPANY	2	2	4
MINNESOTA MINING & MFG CO	2	2	4
MINT MUSEUM OF CRAFT & DESIGN	1	1	2
MITCHELL GOLD CO	4	2	6
MODERN DENSIFYING		2	2
MOM BRANDS COMPANY, LLC	1	1	2
MOORE WALLACE NORTH AMERICA INC	1	1	2
MOORESVILLE CITY SCHOOLS	8	8	16
MOORESVILLE ICE CREAM COMPANY LLC	1	1	2
MORINAGA AMERICA FOODS INC		1	1
MORRISETTE PAPER COMPANY INC	2	2	4
MORTON CUSTOM PLASTICS, LLC	2	2	4
MOSES CONE HEALTH SYS	16	16	32
MOUNT VERNON MILLS INC	1	1	2
MULTI SHIFTER INC	1	1	2
NATIONAL GENERAL MANAGMENT CORP.	7	8	15
NATIONAL GYPSUM CO	1	1	2
NATIONAL PIPE & PLASTICS	2	2	4
NC A&T UNIV FOUNDATION	1	1	2
NC BAPTIST HOSPITAL	9	8	17
NC BLUMENTHAL PAC	2	2	4
NC CENTER FOR PUBLIC TV	8	8	16
NC DEPT OF HEALTH & HUMAN SERVICES	24	24	48
NC DEPT OF PUBLIC SAFETY	23	23	46
NC OWNER LLC	1		1
NC STATE UNIVERSITY	1	1	2

NCFLA II OWNER LLC	3		3
NETAPP, INC	2	2	4
NEW EXCELSIOR, INC		1	1
NEW GENERATION YARNS		2	2
NEW SOUTH LUMBER COMPANY INC	3	3	6
NGK CERAMICS USA	2	2	4
NIAGARA BOTTLING LLC	1	1	2
NORAFIN AMERICAS INC	2	2	4
NORDFAB	5	5	10
NORDIC WAREHOUSE INC	1	1	2
NORDSTROM INC	2	1	3
NORFOLK SOUTHERN	2	2	4
NORTH STATE FLEXIBLES, LLC	3	3	6
NORTHERN HOSP OF SURRY CO	2	2	4
NORTHROP GRUMMAN GUIDANCE & ELECTR	2	2	4
NOVANT HEALTH INC	27	24	51
NOVOZYMES NORTH AMERICAN INC	1	1	2
NR CHARLOTTE LLC	1	1	2
NW BALLANTYNE ONE LP	1	1	2
NW BALLANTYNE THREE LP	1	1	2
NW BALLANTYNE TWO LP	1	1	2
NW BETSILL BUILDING LP	1	1	2
NW BOYLE BUILDINGS LP	2	2	4
NW BRIGHAM BUILDING LP	1	1	2
NW BRIXHAM GREEN ONE LP	1	1	2
NW BRIXHAM GREEN THREE LP	1	1	2
NW BRIXHAM GREEN TWO LP	1	1	2
NW CALHOUN BUILDING LP	1	1	2
NW CHANDLER BUILDING LP	1	1	2
NW CRAWFORD BUILDING LP	1	1	2
NW CULLMAN PARK LP	1	1	2
NW EVERETT BUILDING LP	1	1	2
NW FRENETTE BUILDING LP	1	1	2
NW GIBSON BUILDING LP	1	1	2
NW GRAGG BUILDING LP	1	1	2
NW HALL BUILDING LP	1	1	2
NW HAYES BUILDING LP	1	1	2
NW HIXON BUILDING LP	1	1	2
NW IRBY BUILDING LP	1	1	2
NW JJH BUILDING LP	2	2	4
NW MEDICAL TWO LP	1	1	2
NW RICHARDSON BUILDING LP	1	1	2
NW SIMMONS BUILDING LP	1	1	2
NW WINSLOW BUILDING LP	1	1	2
NW WOODWARD BUILDING LP	1	1	2

NWBH 1 LP	2	2	4
O T SPORTS IND INC	1	1	2
OAK FOREST HEALTH AND REHABILITATION C	1	1	2
O'MARA, INC.	1	1	2
OMNISOURCE SOUTHEAST	5	9	14
OMNOVA SOLUTIONS		1	1
ONEAL STEEL INC	4	4	8
OPTICAL EXPERTS MANUFACTURING	1	1	2
ORACLE FLEXIBLE PACKAGING	5	5	10
OWASA	6	6	12
OWENS & MINOR MEDICA	1	1	2
OWENS ILLINOIS, INC	2	2	4
P G MACHINE SHOP	1	1	2
PACKRITE LLC	5	4	9
PACTIV LLC		3	3
PALLETONE OF NC	6	6	12
PANTHER STADIUM, LLC	1		1
PAPER STOCK DEALERS	1	1	2
PARDEE MEMORIAL HOSPITAL	7	7	14
PARK RIDGE HOSPITAL	8	9	17
PARKDALE AMERICA LLC	10	10	20
PARKDALE MILLS, INC	2	3	5
PARKER HANNIFIN CORPORATION	9	9	18
PARMER RTP, LLC	3	3	6
PARTON LUMBER CO	5	7	12
PBM GRAPHICS INC	6	6	12
PEAK 10 INC.	2	2	4
PENN ENG & MANF CORP	2	1	3
PEPSI BOTTLING VENTURES, LLC	5	5	10
PERFORMANCE LIVESTOCK & FEED CO, INC.	1	1	2
PERMA TECH INC	1	1	2
PET DAIRY	2	2	4
PHARR YARNS, LLC	4	4	8
PIEDMONT CHEMICAL	2	2	4
PIEDMONT PUBLISHING	1	1	2
PIEDMONT ROW DRIVE, LLC	1		1
PIEDMONT TOWN CENTER ONE, LLC	1		1
PIEDMONT TRIAD REG WATER AUTH		4	4
PIERRE FOODS	7	7	14
PINE HALL BRICK COMPANY, INC	2	2	4
PINE NEEDLE LNG COMPANY	1	1	2
PIONEER COMMUNITY HOSPITAL OF STOKES	1		1
PIONEER DIVERSITIES CO	1	1	2
PITTSBURGH GLASS WORKS LLC	1	1	2
PLANTATION PIPE LINE	3	3	6

PLASTIC REVOLUTIONS	1	1	2
PLYCEM USA, INC	1	1	2
PNEUMAFIL CORPORATION	6	6	12
POLK COUNTY SCHOOLS	6	6	12
POLY PLASTIC PRODUCTS OF NC INC	4	4	8
POLYMER GROUP, INC	1	1	2
POPPELMANN PLASTICS USA LLC	1	1	2
PPG INDUSTRIES INC	2	2	4
PRECISION FABRICS GROUP INC	2	2	4
PRECOR MANUFACTURING LLC	1	1	2
PRESBYTERIAN HOMES,INC	9	9	18
PRESBYTERIAN HOSPITAL	11	11	22
PRESBYTERIAN MEDICAL CARE CORP	1	1	2
PRINCE MANUFACTURING CORP	1	1	2
PRINTCRAFT INCORP	1	1	2
PRINTPACK INC	1	1	2
PROCTER & GAMBLE MANUFACTURING COM	5	5	10
PRYSMIAN CABLE AND SYSTEMS USA, LLC	1	1	2
PUBLIC LIBRARY MECK CO	2	2	4
PUBLIX NORTH CAROLINA LP	17	17	34
PUROLATOR FACET INC	3	2	5
QORVO US , INC	1	1	2
QORVO US INC	4	4	8
QUALICAPS INC	3	3	6
R & R POWDER COATING INC	1	1	2
RACK ROOM SHOES	1	1	2
RALEIGH RC GREEN LLC	3	3	6
RALPH LAUREN CORPORATION	3	3	6
RANDOLPH CO BD OF ED	34	34	68
RANDY D MILLER	1	1	2
RD AMERICA LLC	1	1	2
REEP-OFC WATER RIDGE NC HOLDCO LLC	5	5	10
REGAL CINEMAS INC	5	5	10
REMATTR, INC	2	2	4
RENWOOD MILLS LLC		1	1
REPLACEMENTS LTD	7	7	14
RESEARCH TRIANGLE INSTITUTE		1	1
REYNOLDA MANUFACTURING SOLUTIONS, IN	4	4	8
RH MANUFACTURING LLC	2	2	4
RICHA INC	5	5	10
RITZ CARLTON CHARLOTTE	1	1	2
RJ REYNOLDS TOBACCO CO	5	5	10
ROCKINGHAM COMM COLLEGE	1	1	2
ROCKINGHAM COUNTY GOVERNMENT	2	2	4
ROCK-TENN CONVERTING COMPANY	1	1	2

ROGER MARK PENDLETON	4	4	8
RONNIE D MILES	1	1	2
ROUNDPOINT FINANCIAL GROUP	1		1
ROUSH & YATES RACING ENGINES, LLC	4	4	8
ROWAN COUNTY	4	3	7
ROWAN SALISBURY SCHOOLS	5		5
RUTHERFORD COUNTY SCHOOLS	3	2	5
RUTHERFORD HOSPITAL INC	6	6	12
SALEM ACADEMY & COLLEGE	14	14	28
SALISBURY MACHINERY	1	1	2
SAMS EAST INC	19	19	38
SANDVIK CORP	2	1	3
SANDY RDG GOLF CLUB	3	3	6
SANS TECHNICAL FIBERS, LLC	4	4	8
SAP ACQUISITION,LLC	5	5	10
SAPA BURLINGTON LLC	3		3
SCA PACKAGING NORTH AMERICA	2	2	4
SCHAEFER SYSTEMS	8		8
SCHNEIDER MILLS, INC	1	1	2
SCM METAL PRODUCTS INC	4	4	8
SEALED AIR CORPORATION	1	1	2
SEALED AIR CORPORATION (US)	2	2	4
SEALED AIR CORPORATION US	1	1	2
SECURITY NATIONAL PROPERTIES HOLDINGS	17	17	34
SELEE CORP	2	2	4
SENTINEL NC-1,LLC	3	3	6
SGL CARBON, LLC	1	1	2
SHAMROCK CORPORATION	4		4
SHAW INDUSTRIES GROUP, INC	4	4	8
SHEETZ DISTRIBUTION SERVICES LLC	1	1	2
SHERATON IMPERIAL	3	3	6
SHERRILL FURNITURE	4	5	9
SHERWIN WILLIAMS COMPANY	5	5	10
SHUFORD YARNS,LLC	2	2	4
SHURTAPE TECHNOLOGIES	7	7	14
SIEMENS ENERGY INC	2	3	5
SIEMENS ENERGY, INC	2	2	4
SIERRA NEVADA BREWING CO	1	1	2
S-L SNACKS NATIONAL , LLC	1	1	2
SLANE HOSIERY MILLS INC		1	1
SNIDER TIRE,INC	2	2	4
SOCIAL SECURITY ADMINISTRATION	1	1	2
SONESTA INTERNATIONAL HOTELS CORPORA	1		1
SONOCO CORRFLEX D & P LLC	2	2	4
SONOCO CRELLIN INC	2	2	4

SONOCO PRODUCTS COMPANY	2	2	4
SOUTH COLLEGE STREET LLC	1	1	2
SOUTH FORK INDUSTRIES	2	2	4
SOUTH GRANVILLE WATER AND SEWER AUTH	3	3	6
SOUTHCORR PACKAGING	1	1	2
SOUTHEASTERN CONTAINER INC		2	2
SOUTHERN CAST	3	3	6
SOUTHERN FURNITURE	4	2	6
SOUTHERN METALS CO	7	3	10
SOUTHERN PIPE INC	1	1	2
SOUTHERN PRECISION SPRING CO INC	2	2	4
SOUTHWESTERN COMMUNITY COLLEGE	12	12	24
SPECIALIZED PACKAGING FLEXO	1	1	2
SPECIALTY MANUFACTURING INC	1	1	2
SPENCERS INCORPORATED OF MOUNT AIRY,	1		1
SPORTS MENAGERIE	2	2	4
SPORTS SOLUTIONS INC	2	2	4
SPRINT	1	1	2
SPX FLOW INC.	1	1	2
SRPF A/300 SOUTH BREVARD LLC		1	1
ST LUKES HOSPITAL	1	1	2
STAMPSOURCE	1	1	2
STANDARD TOOLS AND EQUIPMENT	2	2	4
STANLEY TOTAL LIVING CENTER	1	1	2
STAR PAPER TUBE INC	1		1
STARPORT I,LLC	1	1	2
STEEL SPECIALTIES	2	2	4
STEFANO FOODS	3	3	6
STEWART SUPERABSORBENTS, LLC	1	1	2
STONEFIELD CELLARS WINERY LLC	1	1	2
STONEVILLE LUMBER CO	2	2	4
STURM RUGER & CO INC	2	2	4
SUMITOMO ELECTRIC ESC, INC	1	1	2
SUNCOM WIRELESS PCS, INC		3	3
SUNSET HILL INVESTMENTS LLC	1	1	2
SV CENTER LLC	2	2	4
SWAIN COUNTY SCHOOLS	6		6
SYCAMORE BREWING LLC	1	1	2
SYNERGY RECYCLING LLC		2	2
SYNGENTA CROP PROTECTION, LLC	1		1
SYNTEC SEATING SOLUTIONS LLC	1	1	2
SYNTHETICS FINISHING	10	9	19
T5@KINGS MOUNTAIN II, LLC	1	1	2
T5@KINGS MOUNTAIN VII LLC	2	2	4
TALBERT BUILDING SUPPLY INC	1	1	2

TARGET STORES	23	6	29
TAYLOR BROS	7	7	14
TAYLOR INVESTMENT PROPERTIES, LLC	3	3	6
TAYLOR KING FURNITUR	2	1	3
TCG OF THE CAROLINAS	1	1	2
TE CONNECTIVITY CORPORATION	15	15	30
TEAM INDUSTRIES	1	1	2
TECHNIBILT LTD	3	3	6
TECHNICAL PRECISION PLASTICS	8	8	16
TECHNIMARK INC	13	13	26
TELERX MARKETING INC	1	1	2
TERRA-MULCH PRODUCTS, LLC	3	4	7
THE CHARLOTTE-MECKLENBURG HOSPITAL A	2	2	4
THE CLEARING HOUSE PAYMENTS COMPANY	1	1	2
THE CYPRESS OF CHARLOTTE CLUB, INC	11	11	22
THE DAVID H MURDOCK CORE LABORATORY	1	1	2
THE FRESH MARKET	1	1	2
THE GC NET LEASE (CHARLOTTE) INVESTORS I	1		1
THE INSPIRATIONAL NETWORK INC	2	2	4
THE LINCOLN NATIONAL LIFE INSURANCE COI	2	2	4
THE NC A&T UNIVERSITY	1	1	2
THE NC AT UNIVERSITY A&T FOUNDATION LL	1	1	2
THE NC OFFICE OF INFORMATION TECHNOLC	3	3	6
THE POLYMERS CENTER OF EXCELLENCE	2	2	4
THE TIMKEN COMPANY	3	3	6
THIEMAN MANUFACTURING TECHNOLOGIES	1	1	2
THOMAS BUILT BUSES	3	3	6
THOMASVILLE,CITY OF	3	3	6
TICONA POLYMERS, INC	1	1	2
TIERPOINT, LLC	4	4	8
TIGHT LINES PARTNERS LLC	1	1	2
TIMCO AEROSYSTEMS, LLC	9	9	18
TIME WARNER CABLE SE LLC	15	15	30
TIME WARNER CABLE, INC.	1	1	2
TIMKENSTEEL CORPORATION	1	1	2
TJX COMPANIES	3	3	6
TKC MANAGEMENT SERVICES	1	1	2
TOSAF USA, INC	1	1	2
TOWN OF CHAPEL HILL		2	2
TOWN OF MOORESVILLE		2	2
TOWN OF VALDESE	3	3	6
TR 121 W TRADE LLC	1		1
TRANSCONTINENTAL GAS	1	2	3
TRANSYLVANIA COMMUNITY HOSPITAL	1		1
TRANSYLVANIA COUNTY SCHOOLS	11	11	22

TRELLEBORG COATED SYSTEMS US, INC	1	1	2
TREND OFFSET PRINTING	4	4	8
TREND OFFSET PRINTING SERVICES INC	1	1	2
TRIAD HOSPITALITY CORPORATION	1	1	2
TRIAD WINDOW DES & I	1	1	2
TRIBAL CASINO GAMING ENTERPRISES HARR/	1		1
TROPICAL NUT & FRUIT CO	1	1	2
TRUE TEXTILES, INC		1	1
TURBOCOATING CORP	1	1	2
TYSON FARMS INC	21	21	42
U S POSTAL SERVICE	5	5	10
U.S. COTTON, LLC	3	3	6
ULTIMATE TEXTILE INC	2	2	4
UNC - CHAPEL HILL	11	11	22
UNC GREENSBORO	23	23	46
UNC SCHOOL OF THE ARTS	37	37	74
UNCC	16	16	32
UNDERWRITERS LABORATORIES	1	1	2
UNIFI INC	1	1	2
UNIFI MANUFACTURING, INC	3	5	8
UNILIN FLOORING NC LLC	3	3	6
UNILIN NORTH AMERICA, LLC	1	1	2
UNION COUNTY PUBLIC SCHOOLS	2	2	4
UNIQUETEX	1	1	2
UNITED PARCEL SERV	2	2	4
UNITED STATES COLD STORAGE	1	1	2
UNIVERSAL FOREST PRODUCTS	2	2	4
UNIVERSITY OF NC HOSPITALS	9	9	18
UPM - RAFLATAC, INC	1	1	2
US FOODS, INC	1	1	2
US NATIONAL WHITEWATER CENTER, INC	13	13	26
VALASSIS COMMUNICATIONS	1	1	2
VALDESE WEAVERS	6	5	11
VALLEY HILLS MALL	9	9	18
VANGUARD FURNITURE INC	8	8	16
VERIZON WIRELESS	5	5	10
VIC INC	1	1	2
VULCAN CONSTRUCTION MATERIALS, L P	49	48	97
W S FORSYTH COUNTY SCHOOLS	94	70	164
W&G ASSOCIATES	1	1	2
WAGER,ROBERT CO,INC	4	4	8
WAKE FOREST UNIVERSITY	4	4	8
WAKE FOREST UNIVERSITY HEALTH SCIENCES	11	11	22
WAL-MART STORES EAST,LP	83	84	167
WALNUT CIRCLE PRESS	2	2	4

WATTS REGULATOR COMPANY	7	7	14
WAYNE FARMS LLC	8	8	16
WBTV LLC	2	2	4
WEIL MCLAIN	2	2	4
WELDING UNLIMITED IN	1	1	2
WELL SPRING RET	5	5	10
WELLS FARGO BANK NA	8	7	15
WELLSPRING RETIREMNT COMM INC	5	5	10
WESTERN CAROLINA UNIVERSITY	1	1	2
WESTROCK COMPANY	4	4	8
WESTROCK CONVERTING COMPANY	31	31	62
WEYERHAEUSER COMPANY	1	1	2
WFMY TV INC	2	2	4
WHOLE FOODS MARKET	5	5	10
WIELAND COPPER PRODUCTS LLC	1	1	2
WILSON COOK MEDICAL	7	7	14
WINDWARD PRINT STAR INC	1	1	2
WINGATE UNIVERSITY	19	19	38
WINSTON SALEM STATE UNIVERSITY	22	22	44
WINSTON TOWER MAIN LLC	1	1	2
WOODGRAIN MILLWORK INC	2	1	3
WORLD MEDIA ENTERPRISES, INC	1	1	2
WSOC TELEVISION INC	4	4	8
WXII TELEVISION	2	1	3
YMCA GREENSBORO	7	7	14
YMCA OF NORTHWEST NORTH CAROLINA	3	3	6
ZINK IMAGING INC	1	1	2
Grand Total	5,075	4,515	9,590

DSM RIDER OPT IN YR 2018
EE RIDER OPT IN YR 2018

Customer Bill Name	Number of Accounts	
	EE Rider	DSM Rider
ALEXANDER COUNTY SCHOOLS	2	
BB&T	2	
BEMIS MANUFACTURING	2	2
BSN MEDICAL INC	1	
CITY OF CHARLOTTE	1	
CPCC	1	
DEERE HITACHI	1	
DEERE HITACHI CONST MACH	1	
DUKE UNIVERSITY	1	
FOCKE & CO, INC	1	
FOOD LION	5	
FREUDENBERG IT LP	0	2
GUILFORD COUNTY SCHOOLS	1	
GUILFORD TECH COMM COLLEGE	1	
HIGHWOODS PROPERTIES	8	
HIGHWOODS REALTY LIMITED PARTNERSHIP	1	
HIGHWOODS REALTY LTP	1	
JPS COMPOSITE MATERIALS CORP	1	
LOWES FOODS	2	1
LSC COMMMUNICATIONS	1	
PARKER HANNIFIN CORPORATION	2	1
RENWOOD MILLS LLC	1	
SOUTHERN FURNITURE	1	
TIME WARNER CABLE SE LLC	6	
VALDESE WEAVERS	1	
PARKER HANNIFIN CORPORATION	2	
HIGHWOODS REALTY LTP	1	
PARKER HANNIFIN CORPORATION	4	
HIGHWOODS PROPERTIES	2	
LOWES FOODS	1	
Grand Total	55	6

I/A

Evans Exhibit 10

Duke Energy Carolinas, LLC
Shared Savings Incentive Calculation
Docket Number E-7, Sub 1192
Estimate January 1, 2020 - December 31, 2020

			System
NPV of AC - Res EE[1]		$	75,255,986
NPV of AC - Non Res EE			171,569,263
NPV of AC - DSM			124,330,187
Total NPV of Avoided Costs	**A**	**$**	**371,155,436**
Program Costs - Res EE[1]		$	37,453,164
Program Costs - Non Res EE			51,858,747
Program Costs - DSM			38,073,241
Total Program Costs	**B**	**$**	**127,385,152**
Net Savings	**C=A-B**	**$**	**243,770,285**
Sharing Percentage	**D**		**11.50%**
Shared Savings - Res EE		$	4,347,325
Shared Savings - Non Res EE			13,766,709
Shared Savings - DSM			9,919,549
Total Shared Savings	**E=(A-B)*D**	**$**	**28,033,583**

1) Excludes AC and Program Costs associated with Income Qualified Energy Efficiency and Weatherization Assistance, which is deemed to be cost recovery only.

I/A

EM&V Activities

Planned Evaluation, Measurement and Verification (EM&V) Activities through the rate period (Dec. 31, 2019)

Evaluation is a term adopted by Duke Energy Carolinas (DEC), and refers generally to the systematic process of gathering information on program activities, quantifying energy and demand impacts, and reporting overall effectiveness of program efforts. Within evaluation, the activity of measurement and verification (M&V) refers to the collection and analysis of data at a participating facility/project. Together this is referred to as "EM&V."

Refer to the accompanying Evans Exhibit 12 chart for a schedule of process and impact evaluation analysis and reports that are currently scheduled.

Energy Efficiency Portfolio Evaluation

DEC has contracted with independent, third-party evaluation consultants to provide the appropriate EM&V support, including the development and implementation of an evaluation plan designed to measure the energy and demand impacts of the residential and non-residential energy efficiency programs.

Typical EM&V activities:

- Develop evaluation action plan
- Process evaluation interviews
- Collect program data
- Verify measure installation and performance through surveys and/or on-site visits
- Program database review
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future program improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides energy and demand savings resulting from the program. Impact analysis may involve engineering analysis (formulas/algorithms), billing analysis, statistically adjusted engineering methods, and/or building simulation models, depending on the program and the nature of the impacts. Data collection may involve surveys and/or site visits. A statistically representative sample of participants is selected for the analysis. Duke Energy Carolinas intends to follow industry-accepted methodologies for all measurement and

verification activities, consistent with International Performance Measurement Verification Protocol (IPMVP) Options A, C or D depending on the measure.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEC will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

Demand Response Program Evaluation

DEC has contracted with independent, third-party evaluation consultants to provide an independent review of the evaluation plan designed to measure the demand impacts of the residential and non-residential demand response programs and the final results of that evaluation.

Typical EM&V activities:

- Collect program data
- Process evaluation interviews
- Verify operability and performance through on-sitevisits
- Collect interval data
- Program database review
- Benchmarking research
- Dispatch optimization modeling
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides demand savings resulting from the program. Impact analysis for Power Manager involves a simulation model to calculate the duty cycle reduction, and then an overall load reduction. Impact analysis for PowerShare involves statistical modeling of an M&V baseline load shape for a customer, then modeling the event period baseline load shape and comparing to the actual load curve of the customer during the event period.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEC will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

Evans Exhibit 12

EM&V EFFECTIVE DATE TIMELINE

This chart contains the expected timeline with end of customer data sample period for impact evaluation and when the impact evaluation report is expected to be completed.
Unless otherwise noted, original impact estimates are replaced with the first impact evaluation results, after which time subsequent impact evaluation results are applied prospectively.

Program	Program/Measure	2015 Quarter 1	2015 Quarter 2	2015 Quarter 3	2015 Quarter 4	2016 Quarter 1	2016 Quarter 2	2016 Quarter 3	2016 Quarter 4
Appliance Recycling	Refrigerator, Freezer			2nd EM&V	Report				
Energy Efficiency Education (K12 Curriculum)	Energy Efficiency Education (K12 Curriculum)			3rd EM&V	Report				
Energy Efficient Appliance and Devices	Lighting - Smart Saver RCFL			3rd EM&V	Report				
	Lighting - Specialty Bulbs								
	SF Water EE Products			1st EM&V	Report				
	HP Water Heater & Pool Pumps								
HVAC Energy Efficiency	Residential Smart Saver AC and HP								
	Tune & Seal Measures								
Income-Qualified Energy Efficiency	Weatherization								
	Refrigerator Replacement								
	Low Income Neighborhood							3rd EM&V	Report
Multi-Family Energy Efficiency	MF Water EE Products			1st EM&V	Report			2nd EM&V	Report
	Lighting (CFL Property Manager)								3rd EM&V
My Home Energy Report	MyHER								
Residential Energy Assessments	Home Energy House Call								
Non-Residential Smart Saver Energy Efficiency Custom	Non-Res SmartSaver Custom Rebate								
Non-Residential Smart Saver Energy Efficiency Food Service	Non-Res Smart Saver Energy Efficiency Food Service				2nd EM&V				2nd EM&V
Non-Residential Smart Saver Energy Efficiency HVAC Products	Non-Res Smart Saver Energy Efficiency HVAC Products				2nd EM&V	Repog			
Non-Residential Smart Saver Energy Efficiency Lighting	Non Re Smart Saver Prescriptive Lighting								
	Non Res Smart Saver Prescriptive Other							1st EM&V	Report
Non-Residential Smart Saver Energy Efficiency Motors Pumps Drives	Non-Res SmartSaver Prescriptive (VFDs or other)				2nd EM&V				
Non-Residential Smart Saver Energy Efficiency Process Equipment	Non-Res Smart Saver Energy Efficiency Process Equip				2nd EM&V				
Small Business Energy Saver	SBES								
Smart Energy in Offices	SEIO								

Key
- Original Estimate
- 1st EM&V
- 2nd EM&V
- 3rd EM&V
- 4th EM&V
- 5th EM&V

Program	Program/Measure	2017 Quarter 1	2017 Quarter 2	2017 Quarter 3	2017 Quarter 4	2018 Quarter 1	2018 Quarter 2	2018 Quarter 3	2018 Quarter 4	2019 Quarter 1	2019 Quarter 2	2019 Quarter 3	2019 Quarter 4	2020 Quarter 1	2020 Quarter 2	2020 Quarter 3	2020 Quarter 4
~~Appliance Recycling~~	~~Refrigerator, Freezer~~																
Energy Efficiency Education (K12 Curriculum)	Energy Efficiency Education (K12 Curriculum)								4th EM&V	Report							5th EM&V
Energy Efficient Appliance and Devices	Lighting - Smart Saver RLED (Free LED)			1st EM&V	Report												
	Lighting - Smart Saver Retail					1st EM&V	Report										
	Lighting - Specialty Bulbs							2nd EM&V	Report								3rd EM&V
	SF Water EE Products			2nd EM&V	Report							3rd EM&V	3rd EM&V	Report			
	HP Water Heater & Pool Pumps					1st EM&V	Report										
HVAC Energy Efficiency	Referral and Non-Referral HVAC Measures					2nd EM&V	Repog								2nd EM&V	Report	
Income-Qualified Energy Efficiency	Weatherization					1st EM&V	Report								2nd EM&V	Report	
	Refrigerator Replacement					1st EM&V	Report										
	Low Income Neighborhood											3rd EM&V	Report				
Multi-Family Energy Efficiency	Lighting & Water EE Products									3rd EM&V	Report						5th EM&V
My Home Energy Report	MyHER	Report								4th EM&V	Report						
Residential Energy Assessments	Home Energy House Call							3rd EM&V	Report							4th EM&V	Report
~~Non-Res Energy Reports~~	~~BER~~				~~3rd EM&V~~	Report				Report							
EnergyWise Business	EnergyWise Business (EE measure)	1st EM&V	Report				2nd EM&V	Repog									
Non-Residential Smart Saver Energy Efficiency Custom	Custom Rebate & Custom Assessment	Report						3rd EM&V	Report							4th EM&V	Report
Non-Residential Smart Saver Prescriptive	All Prescriptive Technologies					3rd EM&V	Report									4th EM&V	Report
Non-Residential Energy Assessment			1st EM&V	Report													
Small Business Energy Saver	SBES						2nd EM&V	Repog							3rd EM&V	Report	
Smart Energy in Offices	SEIO			1st EM&V	Report												

Note: Residential Smart Saver AC and HP and Non-Residential Prescriptive Lighting measures have completed a additional EM&V report in the past. Future reports combine measures for the respective programs.

Duke Energy Carolinas, LLC
DSM/EE Cost Recovery Rider 11
Docket Number E-7, Sub 1192
Exhibit Summary for Rider EE Exhibits and Factors

Residential Billing Factors

Residential Billing Factor for Rider 11 True-up (EMF) Components

Line			Adjusted
1	Year 2015 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1 Line 15	524,656
2	Year 2016 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 2 Line 15	967,614
3	Year 2017 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 43Line 15	3,318,165
4	Year 2018 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg 4 Line 15	15,734,405
5	Total True-up (EMF) Revenue Requirement	Sum Lines 1-4	$ 20,544,840
6	Projected NC Residential Sales (kWh) for rate period	Miller Exhibit 6 pg. 1, Line 1	21,487,301,475
7	*EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh)*	Line 5 / Line 6 * 100	0.0956

Residential Billing Factor for Rider 11 Prospective Components

8	Vintage 2017 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 4, Line 1	1,755,253
9	Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 5, Line 1	9,737,443
10	Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 11	5,236,156
11	Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement		66,895,887
12	Total Prospective Revenue Requirement	Sum Lines 8-11	$ 83,624,738
13	Projected NC Residential Sales (kWh) for rate period	Miller Exhibit 6 pg. 1, Line 1	21,487,301,475
14	*EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh)*	Line 12 / Line 13 * 100	0.3892
	Total Revenue Requirements in Rider 11 from Residential Customers		
15	Total True-up (EMF) Revenue Requirement	Line 5	$ 20,544,840
16	Total Prospective Revenue Requirement	Line 12	83,624,738
17	***Total EE/DSM Revenue Requirement for Residential Rider EE***	Line 15 + Line 16	$ 104,169,578
18	***Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh)***	Line 7 + Line 14	0.4848

Non-Residential Billing Factors for Rider 11 True-up (EMF) Components

19	Vintage Year 2015 EE True-up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1, Line 25	$ 1,171,685
20	Projected Year 2015 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 4	18,371,972,219
21	*EE Revenue Requirement Year 2015 EMF Non-Residential Rider EE (cents per kWh)*	Line 25/Line 26 * 100	0.0064
22	Vintage Year 2015 DSM True-up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1, Line 35	$ 19,262
23	Projected Year 2015 DSM Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 5	18,413,235,012
24	*DSM Revenue Requirement Year 2015 EMF Non-Residential Rider EE (cents per kWh)*	Line 28/Line 29 * 100	0.0001
25	*Vintage Year 2016 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 2, Line 25	$ 9,273,079
26	*Projected Year 2016 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 6	18,126,497,772
27	*EE Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)*	Line 31/Line 32 * 100	0.0512
28	*Vintage Year 2016 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 2, Line 35	$ 14,674
29	*Projected Year 2016 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 7	18,166,831,506
30	*DSM Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)*	Line 34/Line 35 * 100	0.0001
31	*Vintage Year 2017 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 3, Line 25	$ 11,550,961
32	*Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 8	17,918,240,840
33	*EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)*	Line 37/Line 38 * 100	0.0645
34	*Vintage Year 2017 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 3, Line 35	$ 1,084
35	*Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 9	18,135,782,680
36	*DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)*	Line 40/Line 41 * 100	-

37	*Vintage Year 2018 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 4, Line 25	$	4,807,118
38	*Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 10		17,320,957,422
39	*EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)*	Line 37/Line 38 * 100		0.0278
40	*Vintage Year 2018 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 4, Line 35	$	1,396,399
41	*Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 11		18,056,545,344
42	*DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)*	Line 40/Line 41 * 100		0.0077

Non-Residential Billing Factors for Rider 11 Prospective Components

43	Vintage Year 2017 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 3, Line 25	$	5,594,352
44	Projected Program Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 8		17,918,240,840
45	*EE Revenue Requirement Vintage 2017 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 43/Line 44 * 100		0.0312
46	Vintage Year 2018 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 4, Line 25	$	9,508,142
47	Projected Vintage 2018 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 10		17,320,957,422
48	*EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 46/Line 47 * 100		0.0549
49	Vintage Year 2019 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 5, Line 4	$	8,746,880
50	Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 12		17,184,515,812
51	*EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 49/Line 50 * 100		0.0509
52	Vintage Year 2020 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 18	$	52,968,887
53	Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 14		17,184,515,812
54	*EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 52/Line 53 * 100		0.3082
55	Vintage Year 2020 DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 25	$	19,931,130
56	Projected Vintage 2020 DSM Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 15		18,099,339,344
57	*DSM Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 55/Line 56 * 100		0.1101
	Total EMF Rate			**0.1578**
	Total Prospective Rate			**0.5553**

Total Revenue Requirements in Rider 11 from Non-Residential Customers

58	Vintage Year 2015 EE True-up (EMF) Revenue Requirement	Line 19	1,171,685
59	Vintage Year 2015 DSM True-up (EMF) Revenue Requirement	Line 22	19,262
60	Vintage Year 2016 EE True-up (EMF) Revenue Requirement	Line 25	9,273,079
61	Vintage Year 2016 DSM True-up (EMF) Revenue Requirement	Line 28	14,674
62	Vintage Year 2017 EE True-up (EMF) Revenue Requirement	Line 31	11,550,961
63	Vintage Year 2017 DSM True-up (EMF) Revenue Requirement	Line 34	1,084
64	Vintage Year 2018 EE True-up (EMF) Revenue Requirement	Line 37	4,807,118
65	Vintage Year 2018 DSM True-up (EMF) Revenue Requirement	Line 40	1,396,399
64	Vintage Year 2017 EE Prospective Amounts Revenue Requirement	Line 43	5,594,352
65	Vintage Year 2018 EE Prospective Amounts Revenue Requirement	Line 46	9,508,142
66	Vintage Year 2019 EE Prospective Amounts Revenue Requirement	Line 49	8,746,880
67	Vintage Year 2020 EE Prospective Amounts Revenue Requirement	Line 52	52,968,887
68	Vintage Year 2020 DSM Prospective Amounts Revenue Requirement	Line 55	19,931,130
	Total Non-Residential Revenue Requirement in Rider 11	Sum (Lines 58-68)	$ 124,983,652

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
True Up of Year 1, 2, 3 and 4 of Vintage Year 2015

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	E-7 Sub 1050 Rider 6 Original Estimate	E-7 Sub 1073 Rider 7 Year 2 Lost Revenues	E-7 Sub 1105 Rider 8 True up of Year 1	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Rider 9 True up of Lost Revenues & EM&V	E-7 Sub 1130 Rider 9 Year 4 LR Estimate	E-7 Sub 1164 Rider 10 True up	E-7 Sub 1192 Rider 11 True up	Year 2015
1	Residential EE Program Cost	Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor	$ 30,685,449		$ (2,726,335)		$ -		$ -		$ 27,959,114
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor	2,574,641		2,431,922		125,671		-		4,932,234
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 1			49,064		77,792		35,939	(5,811)	156,984
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3	33,060,090		(245,348)		203,463		35,939	(5,811)	33,048,332
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor	12,532,432		(2,137,589)		(1,252)		(0)		10,393,591
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor	3,275,217		(678,007)		(12,280)		(532)		2,586,398
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 2			(10,786)		23,451		13,838	304	24,807
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7	15,807,649		(2,824,381)		9,919		13,306	304	13,004,796
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8	48,867,739		(3,069,730)		213,382		47,245	(5,507)	46,053,129
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7	1.001417		1.001402		1.001402		1.001402	1.001402	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10	48,936,985		(3,074,034)		213,681		47,310	(5,515)	46,118,427
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 1	9,169,840	4,071,955	5,563,184	8,090,365	4,191,232	3,431,636	(1,336,510)	959,134	34,140,836
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	58,106,825	4,071,955	2,489,151	8,090,365	4,404,913	3,431,636	(1,289,200)	953,599	80,259,263
14	Total Collected for Vintage Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 2									79,734,588
15	Total Residential EE/DSM Revenue Requirement	Line 13 - Line 14									$ 524,656

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	E-7 Sub 1050 Rider 6 Original Estimate	E-7 Sub 1073 Rider 7 Year 2 Lost Revenues	E-7 Sub 1105 Rider 8 True up of Year 1	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Rider 9 True up of Lost Revenues & EM&V	E-7 Sub 1130 Year 2015 Year 4 LR Estimate	E-7 Sub 1164 Rider 10 True Up	E-7 Sub 1192 Rider 11 True up	Year 2015
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 1, Line 24 * NC Alloc. Factor	17,348,807		11,904,051		0		-		29,252,858
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 24 * NC Alloc. Factor	6,214,226		3,351,028		846,899		(594,998)		9,817,155
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 3			457,891		838,299		448,315	67,378	1,811,881
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18	23,563,033		15,712,970		1,685,198		(145,683)	67,378	40,881,894
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001417		1.001402		1.001402		1.001402	1.001402	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20	23,596,422		15,735,000		1,687,561		(146,889)	67,470	40,939,564
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 1	2,523,480	8,194,003	2,547,914	9,483,428	2,426,543	4,183,188	(3,671,147)	1,078,554	26,765,963
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	26,119,902	8,194,003	18,282,914	9,483,428	4,114,104	4,183,188	(3,818,036)	1,146,025	67,705,528
24	Total Collected for Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 7									66,533,843
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24									1,171,685
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 4									18,371,972,219
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100									0.0064

DSM Programs

		Reference	E-7 Sub 1050 Rider 6 Original Estimate	E-7 Sub 1005 Rider 8 Original True Up	E-7 Sub 1130 Rider 9 True Up	E-7 Sub 1164 Rider 10 True Up	E-7 Sub 1192 Rider 11 True up	Year 2015
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 1 Line 25 * NC Alloc. Factor	16,493,488	(2,925,873)	(1,635)			13,565,981
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 1 Line 25 * NC Alloc. Factor	4,310,397	(917,841)	(16,029)	(693)		3,375,833
30	Return on overcollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 4		(107,297)	(203,069)	(128,531)	(12,427)	(451,324)
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30	20,803,885	(3,951,011)	(220,733)	(129,224)	(12,427)	16,490,490
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001417	1.001402	1.001402	1.001402	1.001402	
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32	20,833,364	(3,956,550)	(221,042)	(129,405)	(12,445)	16,513,922
34	Total Revenue Collected for Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 12						16,494,660
35	Non-Residential DSM Revenue Requirement True-up Amount	Line 33- Line 34						19,262
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 Line 5						18,413,235,012
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100						0.0001

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
True Up of Year 1, 2 and 3 for Vintage Year 2016

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Rider 9 True up (Year 1)	E-7 Sub 1130 Year 2016 Yr 3 LR Estimate	E-7 Sub 1164 Rider 10 True up (Year 2)	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
1	Residential EE Program Cost	Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor	$ 31,056,079		$ 8,965,024		$ (2)		$ 40,021,101
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor	2,392,652		4,361,799		(52,098)		6,702,353
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 5			272,476		710,786	430,926	1,414,188
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3	33,448,731		13,599,299		658,686	430,926	48,137,642
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor	10,613,015		(1,012,441)		0		9,600,575
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor	2,887,418		(129,612)		(27,890)		2,729,916
7	Return on overcollection of Residential DSM Program Costs	Miller Exhibit 3 pg 6			(26,322)		(46,199)	(39,872)	(112,393)
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7	13,500,434		(1,168,375)		(74,089)	(39,872)	12,218,099
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8	46,949,165		12,430,924		584,597	391,055	60,355,741
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7	1.001442		1.001402		1.001402	1.001402	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10	47,016,856		12,448,352		585,417	391,603	60,442,238
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	11,873,767	5,723,916	4,795,359	7,765,323	(3,299,616)	1,969,313	28,828,063
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	58,890,633	5,723,916	17,243,711	7,765,323	(2,714,199)	2,360,916	89,270,300
14	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 2							88,302,686
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12							$ 967,614

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Year 1 True up	E-7 Sub 1130 Year 2016 Yr 3 LR Estimate	E-7 Sub 1164 Rider 10 True up (Year 2)	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor	36,494,811		13,515,376		1		50,009,988
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor	10,105,721		4,281,607		(353,368)		14,033,960
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 7			378,393		1,051,375	731,576	2,161,244
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18	46,600,332		18,155,276		698,008	731,576	66,185,192
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001442		1.001402		1.001402	1.001402	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20	46,667,530		18,180,730		698,987	732,602	66,279,848
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	4,745,315	8,309,444	2,524,047	13,375,187	(4,085,026)	6,383,045	31,252,013
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	51,412,845	8,309,444	20,704,776	13,375,187	(3,386,039)	7,115,648	97,531,860
24	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 8							88,258,782
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24							9,273,079
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 6							18,126,497,772
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100							0.0512

DSM Programs

		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1130 Rider 9 True up	E-7 Sub 1164 Rider 10 True Up	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor	12,853,910	(1,261,413)	0		11,594,497
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor	3,497,628	(167,059)	(33,683)		3,296,886
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 8		1,759	3,420	(6,087)	(908)
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30	16,353,538	(1,426,713)	(30,262)	(6,087)	14,890,476
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001442	1.001402	1.001402	1.001402	
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32	16,377,120	(1,428,713)	(30,305)	(6,095)	14,912,007
34	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 13					14,897,332
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34					14,674
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6, Line 7					18,166,831,506
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100					0.0001

* Year 4 Projected Lost Revenue is not being requested in this filing because lost revenue through the test period of Docket E7 Sub XXXX was requested as part of base rates.

** Actual regulatory fee rate in effect in year of collection. - May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 4 Lost Revenue and True Up of Year 1 and 2 for Vintage Year 2017

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	Year 2017 Yr 4 LR Estimate	E-7 Sub 1105 Rider 8 Year 1 Estimate	E-7 Sub 1130 Year 2017 Yr 2 LR Estimate	E-7 Sub 1164 Rider 10 True up	E-7 Sub 1164 Year 2017 Year 3 Estimate	E-7 Sub 1192 Rider 11 True Up	Year 2017
1	Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor		$ 33,488,974		$ 13,998,885		$ -	$ 47,487,859
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor		4,149,244		4,340,033		(279,399)	8,209,878
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 9				522,611		1,226,138	1,748,749
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + Line 3		37,638,218		18,861,529		946,739	57,446,685
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor		10,258,751		(176,455)		-	10,082,296
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor		2,837,134		89,061		-	2,926,195
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 10				15,015		12,882	27,897
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7		13,095,885		(72,379)		12,882	13,036,388
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8		50,734,103		18,789,150		959,621	70,482,874
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7		1.001482		1.001402		1.001402	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10		50,809,291		18,815,493		960,966	70,585,750
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	$ 1,755,253	12,699,119	4,202,002	6,456,129	8,904,587	2,591,067	34,852,904
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	1,755,253	63,508,411	4,202,002	25,271,622	8,904,587	3,552,033	105,438,654
14	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 3							102,120,490
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	$ 1,755,253						$ 3,318,165

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	Year 2017 Yr 3 LR Estimate	E-7 Sub 1105 Rider 8 Year 1 Estimate	E-7 Sub 1130 Year 2017 Yr 2 LR Estimate	E-7 Sub 1164 Rider 10 True up	E-7 Sub 1164 Year 2017 Year 3 Estimate	E-7 Sub 1192 Rider 11 True Up	Year 2017
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor		38,791,601		32,155,814		-	70,947,415
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor		9,347,504		9,073,243		3,304,511	21,725,258
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 7				1,588,185		2,709,383	4,297,568
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18		48,139,105		42,817,242		6,013,893	96,970,240
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7		1.001482		1.001402		1.001402	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20		48,210,447		42,877,271		6,022,325	97,110,043
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	5,594,352	6,039,892	9,466,867	2,627,210	14,570,381	7,280,971	39,985,321
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	5,594,352	54,250,339	9,466,867	45,504,481	14,570,381	13,303,295	137,095,364
24	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 9							125,544,403
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24	5,594,352						11,550,961
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 8	17,918,240,840						17,918,240,840
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100	0.0312						0.0645

DSM Programs

		Reference	E-7 Sub 1105 Rider 8 Year 1 Estimate		E-7 Sub 1164 Rider 10 True Up		E-7 Sub 1192 Rider 11 True Up	Year 2017
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor	13,389,985		(1,438,646)			11,951,339
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor	3,703,101		(234,452)			3,468,649
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 12	-		4,761		4,266	9,027
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30	17,093,086		(1,668,337)		4,266	15,429,016
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001482		1.001402		1.001402	
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32	17,118,418		(1,670,676)		4,272	15,447,742
34	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 14						15,446,658
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34						1,084
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 pg. 1, Line 9						18,135,787,680
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100						-

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 3 Lost Revenue and True Up of Year 1 for Vintage Year 2018

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	Year 2018 Yr 3 LR Estimate	E-7 Sub 1130 Rider 9 Year 1 Estimate	E-7 Sub 1164 Year 2018 Yr 2 LR Estimate	E-7 Sub 1192 Rider 11 True up	Year 2018
1	Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor		$ 41,623,609		$ 14,953,392	$ 56,577,001
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor		5,511,264		4,066,359	9,577,623
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 13		-		245,029	245,029
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + Line 3		47,134,873		19,264,781	66,399,654
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor		9,903,130		(125,160)	9,777,970
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor		2,569,925		18,833	2,588,758
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 14		-		(78,632)	(78,632)
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7		12,473,055		(136,958)	12,336,097
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8		59,607,928		19,127,823	78,735,751
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7		1.001402		1.001402	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10		59,691,498		19,154,640	78,846,138
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3	$ 9,737,443	19,613,717	6,794,025	907,401	26,814,143
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	9,737,443	79,304,216	6,794,025	20,062,041	105,660,281
14	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 4					89,925,876
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	$ 9,737,443				$ 15,734,405

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	Year 2018 Yr 3 LR Estimate	E-7 Sub 1105 Rider 9 Year 1 Estimate	E-7 Sub 1130 Year 2018 Yr 2 LR Estimate	E-7 Sub 1193 Rider 11 True up	Year 2018
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor		40,592,949		(3,320,980)	37,271,969
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor		11,623,199		2,814,501	14,437,700
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 15		-		461,035	461,035
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18		52,216,148		(45,445)	52,170,703
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7		1.001402		1.001402	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20		52,289,355		(45,509)	52,243,847
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3	9,508,142	5,167,253	8,746,880	2,932,983	16,847,117
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	9,508,142	57,456,608	8,746,880	2,887,475	69,090,963
24	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 10					64,283,845
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24	9,508,142				4,807,118
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 10	17,320,957,422				17,320,957,422
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100	0.0549				0.0278

DSM Programs

		Reference	E-7 Sub 1105 Rider 9 Year 1 Estimate		E-7 Sub 1193 Rider 11 True Up	Year 2018
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor	11,959,889		650,088	12,609,977
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor	3,103,667		232,297	3,335,964
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 16	-		37,735	37,735
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30	15,063,556		920,120	15,983,676
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402		1.001402	
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32	15,084,675		921,410	16,006,085
34	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 15				14,609,687
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34				1,396,399
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 Line 11				18,056,545,344
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100				0.0077

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 2 Lost Revenues for Vintage Year 2019

RESIDENTIAL

Line		Reference	2019
1	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 148	5,236,156
2	Projected NC Residential Sales (kWh)	Miller Exhibit 6	$ 21,487,301,475
3	**NC Residential EE Billing Factor (Cents/kWh)**	Line 1/Line 2*100	**0.0244**

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	2019
4	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 165	8,746,880
5	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6	17,184,515,812
6	**NC Non-Residential EE billing factor (Cents/kWh)**	Line 4/Line 5*100	**0.0509**

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2020

RESIDENTIAL

Line		Reference	2020
1	Residential EE Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 33,551,578
2	Residential EE Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	3,161,072
3	Total EE Program Cost and Incentive Components	Line 1 + Line 2, Evans Exhibit 1, Line 10	36,712,651
4	Residential DSM Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	12,243,392
5	Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	3,189,876
6	Total DSM Program Cost and Incentive Components	Line 4 + Line 5, Evans Exhibit 1, Line 12	15,433,268
7	Total EE/DSM Program Cost and Incentive Components	Line 3 + Line 6	52,145,919
8	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
9	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 7 * Line 8	52,219,027
10	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 177	14,676,859
11	Total Residential EE Revenue Requirement	Line 9 + Line 10	$ 66,895,887

See Miller Exhibit 1 for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	2020
12	Non- Residential EE Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 37,708,077
13	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	10,010,194
14	Total EE Program Cost and Incentive Components	Line 12 + Line 13, Evans Exhibit 1, Line 27	47,718,271
15	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
16	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 14 * Line 15	47,785,172
17	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 194	5,183,714
18	Total Non-Residential EE Revenue Requirement	Line 16 + Line 17	$ 52,968,887
19	Projected NC Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 14	17,184,515,812
20	NC Non-Residential EE billing factor (Cents/kWh)	Line 18/Line 19*100	0.3082

DSM Programs

			2020
21	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 15,789,462
22	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	4,113,764
23	Total Non-Residential DSM Program Cost and Incentive Components	Line 21 + Line 22, Evans Exhibit 1, Line 29	19,903,226
24	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
25	Total Non-Residential DSM Revenue Requirement	Line 23 * Line 24	19,931,130
26	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 15	18,099,339,344
27	NC Non-Residential DSM billing factor	Line 25/Line 26*100	0.1101

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Gross Receipts Tax Years 2015 through estimated 2020

	Year		Actual GRT Rate In Effect
	2015	Jan - June	1.001352
		July - Dec	1.001482
Rider 6	2015	Weighted Average	1.001417
Rider 7	2016	Jan - June	1.001482
		July - Dec	1.001402
		Weighted Average	1.001442
Rider 8	2017		1.001402
Rider 9	2018		1.001402
Rider 10	2019		1.001402
Rider 11	2020		1.001402

Note: the current rate is used as the estimate for 2019 and 2020. This will be subject to true-up based on actual rates in effect.

IA

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2015

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%			(1-233503)	
Beginning Balance - source I		(200,678)			(47,390)						
2018	January	(186,248)	0.236149	3,408	(43,982)	(142,265)	0.006075	(432)	(432)	0.766497	(564)
2018	February	(157,663)	0.236149	6,750	(37,232)	(120,431)	0.006075	(798)	(1,230)	0.766497	(1,605)
2018	March	(136,697)	0.236149	4,951	(32,281)	(104,416)	0.006075	(683)	(1,913)	0.766497	(2,496)
2018	April	(115,580)	0.236149	4,987	(27,294)	(88,286)	0.006075	(585)	(2,498)	0.766497	(3,259)
2018	May	(97,147)	0.236149	4,353	(22,941)	(74,206)	0.006075	(494)	(2,992)	0.766497	(3,903)
2018	June	(70,765)	0.236149	6,230	(16,711)	(54,054)	0.006075	(390)	(3,382)	0.766497	(4,412)
2018	July	(40,447)	0.236149	7,160	(9,551)	(30,895)	0.006075	(258)	(3,640)	0.766497	(4,748)
2018	August	(12,568)	0.236149	6,584	(2,968)	(9,600)	0.005692	(115)	(3,755)	0.766497	(4,899)
2018	September	17,373	0.236149	7,070	4,103	13,270	0.005692	10	(3,744)	0.766497	(4,885)
2018	October	38,455	0.236149	4,979	9,081	29,374	0.005692	121	(3,623)	0.766497	(4,727)
2018	November	57,923	0.236149	4,597	13,679	44,245	0.005692	210	(3,414)	0.766497	(4,453)
2018	December	(536,672)	0.236149	(140,413)	(126,735)	(409,938)	0.005692	(1,041)	(4,454)	0.766497	(5,811)
								(4,454)			(5,811)

Note 1: Revenues collected represent amounts actually collected through 2018.

Interest Calculation

2017 - Rider 8	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	Lost Revenues	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		27,959,114	26,837,675	1,121,439		-	-		-	-	1,121,439
	January					-	-		-	-	1,121,439
	February					-	-		-	-	1,121,439
	March					-	-		-	-	1,121,439
	April					-	-		-	-	1,121,439
	May					-	-		-	-	1,121,439
	June					-	-		-	-	1,121,439
	July					-	-		-	-	1,121,439
	August					-	-		-	-	1,121,439
	September					-	-		-	-	1,121,439
	October					-	-		-	-	1,121,439
	November					-	-		-	-	1,121,439
	December					-	-		-	-	1,121,439
YTD Balance		27,959,114	26,837,675	1,121,439	14,733,024	14,142,082	590,942	4,852,974	4,658,321	194,654	1,907,034

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2015

Interest Calculation

2018 - Rider9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	Lost Revenues	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance		27,959,114	26,837,675	1,121,439	14,733,024	14,142,082	590,942	4,852,974	4,658,321	194,654	1,907,034
	January		-	-		155,318	(155,318)		2,365	(2,365)	1,749,351
	February		-	-		390,165	(390,165)		5,942	(5,942)	1,353,244
	March		-	-		326,594	(326,594)		4,974	(4,974)	1,021,675
	April		-	-		242,852	(242,852)		3,699	(3,699)	775,124
	May		-	-		236,501	(236,501)		3,602	(3,602)	535,022
	June		-	-		316,267	(316,267)		4,817	(4,817)	213,938
	July		-	-		402,008	(402,008)		6,123	(6,123)	(194,192)
	August		-	-		420,989	(420,989)		6,412	(6,412)	(621,592)
	September		-	-		406,238	(406,238)		6,187	(6,187)	(1,034,017)
	October		-	-		267,581	(267,581)		4,075	(4,075)	(1,305,673)
	November		-	-		235,865	(235,865)		3,592	(3,592)	(1,545,130)
	December		-	-	8,263,187	565,268	7,697,919	126,047	8,609	117,438	6,270,227
YTD Balance		-	-	-	8,263,187	3,965,645	4,297,542	126,047	60,396	65,651	
Cumulative Ending Balance		27,959,114	26,837,675	1,121,439	22,996,211	18,107,728	4,888,483	4,979,022	4,718,717	260,305	6,270,227

Interest Calculation

2019 - Rider10	Month	NC Program Costs Incurred	Revenue Collected	Cumulative Undercollected Balance	Lost Revenues	Revenue Collected	Cumulative Undercollected Balance	PPI	Revenue Collected	Cumulative Undercollected Balance	Total Cumulative Under/(Over) Collected Balance
Beginning Balance		27,959,114	26,837,675	1,121,439	22,996,211	18,107,728	4,888,483	4,979,022	4,718,717	260,305	6,270,227
	January		53,450	1,067,989		-	4,888,483		-	260,305	6,216,777
	February		105,182	962,808		-	4,888,483		-	260,305	6,111,595
	March		96,023	866,784		-	4,888,483		-	260,305	6,015,572
	April		91,900	774,884		-	4,888,483		-	260,305	5,923,672
	May		85,130	689,755		-	4,888,483		-	260,305	5,838,542
	June		108,233	581,522		-	4,888,483		-	260,305	5,730,310
	July		134,008	447,514		-	4,888,483		-	260,305	5,596,302
	August		132,032	315,482		-	4,888,483		-	260,305	5,464,270
	September		114,599	200,883		-	4,888,483		-	260,305	5,349,671
	October		89,350	111,533		-	4,888,483		-	260,305	5,260,321
	November		87,057	24,476		-	4,888,483		-	260,305	5,173,264
	December		225,155	(200,678)	6,753,855	8,269,323	3,373,016		148,603	111,702	3,284,039
YTD Balance		-	1,322,117		6,753,855	8,269,323		-	148,603		
Cumulative Ending Balance		27,959,114	28,159,792	(200,678)	29,750,066	26,377,050	3,373,016	4,979,022	4,867,320	111,702	3,284,039

Interest Calculation

2020 - Rider 11	Month	NC Program Costs Incurred	Revenue Collected	Cumulative Undercollected Balance	Lost Revenues	Revenue Collected	Cumulative Undercollected Balance	PPI	Revenue Collected	Cumulative Undercollected Balance	Total Cumulative Under/(Over) Collected Balance
Beginning Balance		27,959,114	28,159,792	(200,678)	29,750,066	26,377,050	3,373,016	4,979,022	4,867,320	111,702	3,284,039
	January		(14,431)	(186,248)	900,128	393,209	3,879,934		10,620	101,081	3,794,768
	February		(28,585)	(157,663)	797,208	778,892	3,898,250		21,037	80,044	3,820,631
	March		(20,966)	(136,697)	708,474	571,275	4,035,448		15,430	64,614	3,963,366
	April		(21,117)	(115,580)	625,633	575,405	4,085,676		15,541	49,073	4,019,169
	May		(18,433)	(97,147)	543,299	502,268	4,126,708		13,566	35,507	4,065,068
	June		(26,381)	(70,765)	450,244	718,851	3,858,100		19,416	16,091	3,803,425
	July		(30,319)	(40,447)	365,764	826,133	3,397,731		22,313	(6,222)	3,351,062
	August		(27,879)	(12,568)		759,650	2,638,081		20,518	(26,740)	2,598,773
	September		(29,941)	17,373		815,838	1,822,243		22,035	(48,775)	1,790,841
	October		(21,082)	38,455		574,463	1,247,781		15,869	(64,645)	1,221,592
	November		(19,468)	57,923		530,467	717,314		14,328	(78,972)	696,265
	December		(45,704)	103,627		1,245,359	(528,045)		33,282	(112,255)	(536,672)
YTD Balance		-	(304,305)		4,390,750	8,291,811		-	223,956		
Cumulative Ending Balance		27,959,114	27,855,487	103,627	34,140,816	34,668,861	(528,045)	4,979,022	5,091,276	(112,255)	(536,672)

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2015

NC Residential DSM		Total System NC DSM Program Costs Incurred	NC Residential DSM Allocation %	NC Allocated DSM Residential Program Costs	NC Residential Revenue Collected(EEC2)	NC Residential DSM Program Collection %	DSM Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 2 Line 9			See calc. at right		
Beginning Balance - from Ri		31,962,633	32.5218612%	10,394,843	12,983,975		(10,384,396)	10,447
2018	January		32.5218612%	-	1,070	61.5470492%	(659)	(659)
2018	February		32.5218612%	-	2,102	61.5470492%	(1,294)	(1,294)
2018	March		32.5218612%	-	1,547	61.5470492%	(952)	(952)
2018	April		32.5218612%	-	1,558	61.5470492%	(959)	(959)
2018	May		32.5218612%	-	1,362	61.5470492%	(838)	(838)
2018	June		32.5218612%	-	1,942	61.5470492%	(1,195)	(1,195)
2018	July		32.5218612%	-	2,229	61.5470492%	(1,372)	(1,372)
2018	August		32.5218612%	-	2,051	61.5470492%	(1,262)	(1,262)
2018	September		32.5218612%	-	2,201	61.5470492%	(1,355)	(1,355)
2018	October		32.5218612%	-	1,555	61.5470492%	(957)	(957)
2018	November		32.5218612%	-	1,437	61.5470492%	(885)	(885)
2018	December		32.5218612%	-	3,351	61.5470492%	(2,062)	(2,062)
		-		10,394,843	13,006,378		(10,398,185)	(3,341)

Program Costs to be recovered in Rider 11	10,447
Revenue Requirement Requested in Rider 11	16,974
Percent of Revenue to be applied to total collections	62%

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - from Ri		10,447			2,467	7,980					
2018	January	9,789	0.236149	(156)	2,312	7,477	0.006075	47	47	0.766497	61
2018	February	8,495	0.236149	(306)	2,006	6,489	0.006075	42	89	0.766497	117
2018	March	7,543	0.236149	(225)	1,781	5,762	0.006075	37	127	0.766497	165
2018	April	6,584	0.236149	(226)	1,555	5,029	0.006075	33	159	0.766497	208
2018	May	5,746	0.236149	(198)	1,357	4,389	0.006075	29	188	0.766497	245
2018	June	4,551	0.236149	(282)	1,075	3,476	0.006075	24	212	0.766497	276
2018	July	3,179	0.236149	(324)	751	2,429	0.006075	18	230	0.766497	300
2018	August	1,917	0.236149	(298)	453	1,464	0.005692	11	241	0.766497	314
2018	September	563	0.236149	(320)	133	430	0.005692	5	246	0.766497	321
2018	October	(395)	0.236149	(226)	(93)	(301)	0.005692	0	247	0.766497	322
2018	November	(1,279)	0.236149	(209)	(302)	(977)	0.005692	(4)	243	0.766497	317
2018	December	(3,341)	0.236149	(487)	(789)	(2,552)	0.005692	(10)	233	0.766497	304
								233			304

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2015

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected(EEC15)	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 2, Line 4			See calc. at right		
Beginning Balance - source Rider		40,096,318	72.9564706%	29,252,858	49,895,986		(27,536,038)	1,716,820
2018	January		72.9564706%	-	568,041	20.6964576%	(117,564)	(117,564)
2018	February		72.9564706%	-	602,713	20.6964576%	(124,740)	(124,740)
2018	March		72.9564706%	-	539,207	20.6964576%	(111,597)	(111,597)
2018	April		72.9564706%	-	571,303	20.6964576%	(118,239)	(118,239)
2018	May		72.9564706%	-	583,957	20.6964576%	(120,858)	(120,858)
2018	June		72.9564706%	-	707,348	20.6964576%	(146,396)	(146,396)
2018	July		72.9564706%	-	719,033	20.6964576%	(148,814)	(148,814)
2018	August		72.9564706%	-	715,298	20.6964576%	(148,041)	(148,041)
2018	September		72.9564706%	-	797,739	20.6964576%	(165,104)	(165,104)
2018	October		72.9564706%	-	826,401	20.6964576%	(171,036)	(171,036)
2018	November		72.9564706%	-	568,555	20.6964576%	(117,671)	(117,671)
2018	December		72.9564706%	-	787,159	20.6964576%	(162,914)	(162,914)
		-		29,252,858	57,882,741		(25,883,063)	63,845

Program Cost Allocation Calculation	
Non-Res EE Program Costs under collected balance	1,716,820
Non-Res EE Revenue Requirement in Rider 9	8,295,238
% Revenue related to Program Costs	21%
Note: Vintage Year 2015 collections in 2018 stem from Rider 9	

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance from Rider 9		1,716,820			405,425	1,311,395					
2018	January	1,599,256	0.236149	(27,762.70)	377,663	1,221,593	0.006075	7,694	7,694	0.766497	10,038
2018	February	1,474,516	0.236149	(29,457.30)	348,205	1,126,310	0.006075	7,132	14,826	0.766497	19,342
2018	March	1,362,919	0.236149	(26,353.48)	321,852	1,041,067	0.006075	6,583	21,409	0.766497	27,931
2018	April	1,244,680	0.236149	(27,922.13)	293,930	950,750	0.006075	6,050	27,459	0.766497	35,824
2018	May	1,123,821	0.236149	(28,540.60)	265,389	858,432	0.006075	5,495	32,955	0.766497	42,994
2018	June	977,425	0.236149	(34,571.28)	230,818	746,607	0.006075	4,875	37,830	0.766497	49,354
2018	July	828,611	0.236149	(35,142.37)	195,676	632,935	0.006075	4,190	42,020	0.766497	54,821
2018	August	680,569	0.236149	(34,959.80)	160,716	519,854	0.005692	3,281	45,301	0.766497	59,101
2018	September	515,466	0.236149	(38,989.08)	121,727	393,739	0.005692	2,600	47,901	0.766497	62,493
2018	October	344,430	0.236149	(40,389.92)	81,337	263,093	0.005692	1,869	49,770	0.766497	64,932
2018	November	226,759	0.236149	(27,787.83)	53,549	173,210	0.005692	1,242	51,012	0.766497	66,552
2018	December	63,845	0.236149	(38,471.97)	15,077	48,768	0.005692	632	51,643	0.766497	67,376
								51,643			67,376

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2015

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	Incentives Earned & GRT remitted (Allocated based on WA of Program Costs Incurred)	Total DSM Revenue Requirement	NC Non-Residential DSM Revenue Collected(DS15)	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	(Over)/Under Collection
			See Miller Exhibit 3 pg. 2, Line 10		calculated interest on entire balance due to over-collection in total			100% used due to over-collection of entire vintage		
Beginning Balance - revenue rec		31,958,782	42.44836559%	13,565,981	2,960,385	16,526,366	16,946,105	100.000000%	(16,946,105)	(419,739)
2018	January	-	42.44836559%	-		-	(53,805)	100.000000%	(53,805)	53,805
2018	February	-	42.44836559%	-		-	(37,120)	100.000000%	(37,120)	37,120
2018	March	-	42.44836559%	-		-	(32,596)	100.000000%	(32,596)	32,596
2018	April	-	42.44836559%	-		-	(35,291)	100.000000%	(35,291)	35,291
2018	May	-	42.44836559%	-		-	(35,545)	100.000000%	(35,545)	35,545
2018	June	-	42.44836559%	-		-	(42,596)	100.000000%	(42,596)	42,596
2018	July	-	42.44836559%	-		-	(44,317)	100.000000%	(44,317)	44,317
2018	August	-	42.44836559%	-		-	(43,372)	100.000000%	(43,372)	43,372
2018	September	-	42.44836559%	-		-	(48,517)	100.000000%	(48,517)	48,517
2018	October	-	42.44836559%	-		-	(50,018)	100.000000%	(50,018)	50,018
2018	November	-	42.44836559%	-		-	(35,152)	100.000000%	(35,152)	35,152
2018	December	-	42.44836559%	-		-	(56,830)	100.000000%	(56,830)	56,830
		-		-		16,526,366	16,430,948			95,418

Program Cost Allocation Methodology
No program cost allocation is needed because the vintage was overcollected in total and interest due was calculated on the entire vintage.

Therefore, 100% of all revenues offset the overcollected balance.

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
Beginning Balance - from Rider I		(419,739)			(99,121)	(320,618)					
2018	January	(365,934)	0.236149	12,706	(86,415)	(279,519)	0.006075	(1,823)	(1,823)	0.766497	(2,378)
2018	February	(328,814)	0.236149	8,766	(77,649)	(251,165)	0.006075	(1,612)	(3,435)	0.766497	(4,481)
2018	March	(296,218)	0.236149	7,697	(69,952)	(226,267)	0.006075	(1,450)	(4,885)	0.766497	(6,373)
2018	April	(260,927)	0.236149	8,334	(61,618)	(199,310)	0.006075	(1,293)	(6,178)	0.766497	(8,060)
2018	May	(225,383)	0.236149	8,394	(53,224)	(172,159)	0.006075	(1,128)	(7,306)	0.766497	(9,532)
2018	June	(182,787)	0.236149	10,059	(43,165)	(139,622)	0.006075	(947)	(8,253)	0.766497	(10,767)
2018	July	(138,470)	0.236149	10,465	(32,700)	(105,771)	0.006075	(745)	(8,999)	0.766497	(11,740)
2018	August	(95,098)	0.236149	10,242	(22,457)	(72,641)	0.005692	(508)	(9,506)	0.766497	(12,402)
2018	September	(46,581)	0.236149	11,457	(11,000)	(35,581)	0.005692	(308)	(9,814)	0.766497	(12,804)
2018	October	3,437	0.236149	11,812	812	2,625	0.005692	(94)	(9,908)	0.766497	(12,926)
2018	November	38,589	0.236149	8,301	9,113	29,476	0.005692	91	(9,817)	0.766497	(12,807)
2018	December	95,418	0.236149	13,420	22,533	72,885	0.005692	291	(9,525)	0.766497	(12,427)
								(9,525)			(12,427)

Note 1: Revenues collected represent amounts actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2016

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - source		11,777,137			2,781,159	8,995,978					
2018	January	11,187,036	0.236149	(139,352)	2,641,807	8,545,229	0.006075	53,281	53,281	0.766497	69,513
2018	February	9,990,702	0.236149	(282,513)	2,359,294	7,631,407	0.006075	49,137	102,418	0.766497	133,618
2018	March	9,120,709	0.236149	(205,448)	2,153,846	6,966,862	0.006075	44,342	146,760	0.766497	191,459
2018	April	8,244,224	0.236149	(206,981)	1,946,865	6,297,359	0.006075	40,290	187,050	0.766497	244,033
2018	May	7,482,701	0.236149	(179,833)	1,767,032	5,715,668	0.006075	36,490	223,540	0.766497	291,638
2018	June	6,380,741	0.236149	(260,227)	1,506,806	4,873,936	0.006075	32,166	255,706	0.766497	333,603
2018	July	5,110,153	0.236149	(300,048)	1,206,757	3,903,395	0.006075	26,661	282,367	0.766497	368,386
2018	August	3,944,064	0.236149	(275,371)	931,387	3,012,678	0.005692	19,682	302,049	0.766497	394,064
2018	September	2,689,658	0.236149	(296,227)	635,160	2,054,498	0.005692	14,420	316,469	0.766497	412,877
2018	October	1,814,656	0.236149	(206,631)	428,529	1,385,127	0.005692	9,791	326,261	0.766497	425,652
2018	November	1,008,808	0.236149	(190,300)	238,229	770,579	0.005692	6,138	332,398	0.766497	433,659
2018	December	(1,972,320)	0.236149	(703,990)	(465,762)	(1,506,559)	0.005692	(2,094)	330,304	0.766497	430,926
								330,304			430,926

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation -

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Lost Revenue	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761
	January					-	-				18,689,761
	February					-	-				18,689,761
	March					-	-				18,689,761
	April					-	-				18,689,761
	May					-	-				18,689,761
	June					-	-				18,689,761
	July					-	-				18,689,761
	August					-	-				18,689,761
	September					-	-				18,689,761
	October					-	-				18,689,761
	November					-	-				18,689,761
	December					-	-	-	-	-	18,689,761
YTD Balance		40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761

		%
EE Program Costs	40,021,103	0.63
EE PPI & GRT	6,821,368	0.11
EE Lost Revenue	16,669,126	0.26
Total EE Revenue Requirement	63,511,597	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2016

Interest Calculation

2019 - Rider 10	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Lost Revenue	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance		40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761
	January			-			-				18,689,761
	February			-			-				18,689,761
	March			-			-				18,689,761
	April			-			-				18,689,761
	May			-			-				18,689,761
	June			-			-				18,689,761
	July			-			-				18,689,761
	August			-			-				18,689,761
	September			-			-				18,689,761
	October			-			-				18,689,761
	November			-			-				18,689,761
	December	(2)		(2)	(50,792.97)		(50,793)	2,424,300	5,570,022	(3,145,722)	15,493,244
YTD Balance		(2)	-	(2)	(50,793)	-	(50,793)	2,424,300	5,570,022	(3,145,722)	15,493,244
Cumulative Ending Balance		40,021,101	28,243,964	11,777,137	6,770,575	4,814,022	1,956,553	19,093,426	17,333,871	1,759,555	15,493,244

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the undercollection of Year 1 Program costs or PPI. Interest continued to accrue on beginning balance.

Interest Calculation

2020 - Rider 11	Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Lost Revenue	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance		40,021,101	28,243,964	11,777,137	6,770,575	4,814,022	1,956,553	19,093,426	17,333,871	1,759,555	15,493,244
	January		590,101	11,187,036		98,034	1,858,519	1,390,664	575,924	2,574,295	15,619,850
	February		1,196,334	9,990,702		198,749	1,659,770	1,390,664	1,167,592	2,797,367	14,447,839
	March		869,993	9,120,709		144,533	1,515,237	1,390,664	849,091	3,338,940	13,974,885
	April		876,484	8,244,224		145,612	1,369,625	1,390,664	855,427	3,874,178	13,488,027
	May		761,524	7,482,701		126,513	1,243,112	1,390,664	743,228	4,521,614	13,247,426
	June		1,101,959	6,380,741		183,070	1,060,042	1,390,664	1,075,485	4,836,793	12,277,576
	July		1,270,589	5,110,153		211,085	848,957	1,390,651	1,240,063	4,987,381	10,946,491
	August		1,166,088	3,944,064		193,724	655,233		1,138,073	3,849,308	8,448,606
	September		1,254,406	2,689,658		208,396	446,837		1,224,269	2,625,039	5,761,535
	October		875,003	1,814,656		145,365	301,471		853,981	1,771,059	3,887,186
	November		805,848	1,008,808		133,877	167,595		786,488	984,571	2,160,973
	December		1,929,546	(920,739)		320,558	(152,964)		1,883,189	(898,618)	(1,972,320)
Cumulative Ending Balance		40,021,101	40,941,840	(920,739)	6,770,575	6,923,539	(152,964)	28,828,063	29,725,681	(898,618)	(1,972,320)

Revenue Requirement:		
Program Costs	11,777,137	0.47
PPI & GRT	1,956,553	0.08
Lost Revenue	11,494,191	0.46
Total Revenue Requirement	25,227,881	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2016

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - source		(986,784)			(233,028)	(753,756)					
2018	January	(943,803)	0.236149	10,150	(222,878)	(720,925)	0.006075	(4,479)	(4,479)	0.766497	(5,844)
2018	February	(851,272)	0.236149	21,851	(201,027)	(650,245)	0.006075	(4,165)	(8,644)	0.766497	(11,278)
2018	March	(785,414)	0.236149	15,552	(185,475)	(599,939)	0.006075	(3,797)	(12,442)	0.766497	(16,232)
2018	April	(719,025)	0.236149	15,678	(169,797)	(549,228)	0.006075	(3,491)	(15,932)	0.766497	(20,786)
2018	May	(662,033)	0.236149	13,459	(156,338)	(505,694)	0.006075	(3,204)	(19,137)	0.766497	(24,966)
2018	June	(577,215)	0.236149	20,030	(136,309)	(440,906)	0.006075	(2,875)	(22,012)	0.766497	(28,718)
2018	July	(478,615)	0.236149	23,284	(113,024)	(365,590)	0.006075	(2,450)	(24,462)	0.766497	(31,914)
2018	August	(388,556)	0.236149	21,267	(91,757)	(296,799)	0.006075	(2,012)	(26,474)	0.766497	(34,539)
2018	September	(291,278)	0.236149	22,972	(68,785)	(222,493)	0.006075	(1,577)	(28,051)	0.766497	(36,596)
2018	October	(225,011)	0.236149	15,649	(53,136)	(171,875)	0.006075	(1,198)	(29,249)	0.766497	(38,159)
2018	November	(164,396)	0.236149	14,314	(38,822)	(125,574)	0.006075	(904)	(30,152)	0.766497	(39,338)
2018	December	(11,973)	0.236149	35,994	(2,827)	(9,146)	0.006075	(409)	(30,562)	0.766497	(39,872)
								(30,562)			(39,872)

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983.02	(221,311)	(986,784)
	January					-	-	(986,784)
	February					-	-	(986,784)
	March					-	-	(986,784)
	April					-	-	(986,784)
	May					-	-	(986,784)
	June					-	-	(986,784)
	July					-	-	(986,784)
	August					-	-	(986,784)
	September					-	-	(986,784)
	October					-	-	(986,784)
	November					-	-	(986,784)
	December					-	-	(986,784)
YTD Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	

		%
DSM Program Costs	9,600,575	0.78
DSM PPI & GRT	2,775,672	0.22
Total Revenue Requirement	12,376,248	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2016

Interest Calculation

2019 - Rider 10	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)
	January			-			-	(986,784)
	February			-			-	(986,784)
	March			-			-	(986,784)
	April			-			-	(986,784)
	May			-			-	(986,784)
	June			-			-	(986,784)
	July			-			-	(986,784)
	August			-			-	(986,784)
	September			-			-	(986,784)
	October			-			-	(986,784)
	November			-			-	(986,784)
	December			-			-	(986,784)
YTD Balance		-	-	-		-	-	(986,784)
Cumulative Ending Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the overcollection of Program costs or PPI. Interest continued to accrue on beginning balance.

Interest Calculation

2020- Rider 11	Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)
	January		(38,138)	(727,336)	(6,183)	(11,026)	(216,467)	(943,803)
	February		(76,575)	(650,761)	(6,183)	(22,139)	(200,511)	(851,272)
	March		(55,884)	(594,877)	(6,183)	(16,157)	(190,537)	(785,414)
	April		(56,295)	(538,582)	(6,183)	(16,276)	(180,443)	(719,025)
	May		(49,007)	(489,575)	(6,183)	(14,169)	(172,458)	(662,033)
	June		(70,591)	(418,984)	(6,183)	(20,409)	(158,231)	(577,215)
	July		(81,283)	(337,701)	(6,183)	(23,500)	(140,914)	(478,615)
	August		(74,657)	(263,044)	(6,183)	(21,585)	(125,512)	(388,556)
	September		(60,257)	(182,787)	(6,183)	(23,204)	(108,491)	(291,278)
	October		(56,201)	(126,586)	(6,183)	(16,249)	(98,425)	(225,011)
	November		(51,817)	(74,769)	(6,183)	(14,981)	(89,627)	(164,396)
	December		(123,063)	48,294	(6,220)	(35,579)	(60,267)	(11,973)
YTD Balance		-	(813,768)		(74,230)	(235,273)	(60,267)	(11,973)
Cumulative Ending Balance		9,600,575	9,552,281	48,294	2,701,443	2,761,710	(60,267)	(11,973)

Revenue Requirement:		
Program Costs	(765,474)	0.78
PPI	(221,311)	0.22
Total	(986,784)	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non-Residential EE Programs Vintage 2016

NC Non-Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	Total Revenue Collected	Percent Attributable to Program Costs	NC Residential Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 3, Line 4					
Beginning Balance - Source Rider		68,416,594		50,009,987	45,662,897	69.71121%	(31,832,160)	18,177,827
2018	January		73.0962827%	-	679,787	45.63863%	(310,246)	(310,246)
2018	February		73.0962827%	-	2,902,313	45.63863%	(1,324,576)	(1,324,576)
2018	March		73.0962827%	-	2,586,992	45.63863%	(1,180,668)	(1,180,668)
2018	April		73.0962827%	-	2,741,877	45.63863%	(1,251,355)	(1,251,355)
2018	May		73.0962827%	-	2,801,556	45.63863%	(1,278,592)	(1,278,592)
2018	June		73.0962827%	-	3,405,104	45.63863%	(1,554,043)	(1,554,043)
2018	July		73.0962827%	-	3,471,798	45.63863%	(1,584,481)	(1,584,481)
2018	August		73.0962827%	-	3,444,453	45.63863%	(1,572,001)	(1,572,001)
2018	September		73.0962827%	-	3,831,885	45.63863%	(1,748,820)	(1,748,820)
2018	October		73.0962827%	-	4,000,975	45.63863%	(1,825,990)	(1,825,990)
2018	November		73.0962827%	-	2,724,564	45.63863%	(1,243,454)	(1,243,454)
2018	December		73.0962827%	-	3,701,529	45.63863%	(1,689,327)	(1,689,327)
		-		50,009,987	81,955,731		(48,395,713)	1,614,274

Program Costs to be Recovered in Rider 9	18,177,827
Revenues to be Collected in Rider 9	39,829,912
% Revenue to be assigned to Program Costs	0.4564

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - Source Rider		18,177,827			4,292,676						
2018	January	17,867,582	0.236149	(73,264.18)	4,219,412	13,648,170	0.006075	41,456	41,456	0.766497	54,085
2018	February	16,543,006	0.236149	(312,797.25)	3,906,614	12,636,391	0.006075	79,839	121,296	0.766497	158,247
2018	March	15,362,338	0.236149	(278,813.47)	3,627,801	11,734,537	0.006075	74,027	195,322	0.766497	254,825
2018	April	14,110,983	0.236149	(295,506.26)	3,332,295	10,778,689	0.006075	68,384	263,706	0.766497	344,041
2018	May	12,832,391	0.236149	(301,938.21)	3,030,356	9,802,035	0.006075	62,514	326,220	0.766497	425,599
2018	June	11,278,348	0.236149	(366,985.70)	2,663,371	8,614,977	0.006075	55,942	382,162	0.766497	498,582
2018	July	9,693,867	0.236149	(374,173.59)	2,289,197	7,404,670	0.006075	48,660	430,822	0.766497	562,066
2018	August	8,121,866	0.236149	(371,226.57)	1,917,970	6,203,895	0.006075	41,336	472,158	0.766497	615,994
2018	September	6,373,046	0.236149	(412,982.12)	1,504,988	4,868,057	0.006075	33,631	505,789	0.766497	659,870
2018	October	4,547,055	0.236149	(431,205.81)	1,073,783	3,473,273	0.006075	25,337	531,125	0.766497	692,926
2018	November	3,303,601	0.236149	(293,640.40)	780,142	2,523,459	0.006075	18,215	549,341	0.766497	716,690
2018	December	1,614,274	0.236149	(398,932.93)	381,209	1,233,065	0.006075	11,410	560,751	0.766497	731,576
								560,751			731,576

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - Source Rid		45,391			10,719	34,672					
2018	January	38,152	0.236149	(1,710)	9,010	29,142	0.006075	194	194	0.766497	253
2018	February	(3,375)	0.236149	(9,807)	(797)	(2,578)	0.006075	81	275	0.766497	358
2018	March	(39,808)	0.236149	(8,604)	(9,401)	(30,407)	0.006075	(100)	174	0.766497	227
2018	April	(17,951)	0.236149	5,161	(4,239)	(13,712)	0.006075	(134)	40	0.766497	53
2018	May	(42,359)	0.236149	(5,764)	(10,003)	(32,356)	0.006075	(140)	(100)	0.766497	(130)
2018	June	(71,615)	0.236149	(6,909)	(16,912)	(54,703)	0.006075	(264)	(364)	0.766497	(475)
2018	July	(102,080)	0.236149	(7,194)	(24,106)	(77,974)	0.006075	(403)	(767)	0.766497	(1,001)
2018	August	(131,902)	0.236149	(7,042)	(31,148)	(100,753)	0.005692	(509)	(1,276)	0.766497	(1,664)
2018	September	(164,952)	0.236149	(7,805)	(38,953)	(125,999)	0.005692	(645)	(1,921)	0.766497	(2,506)
2018	October	(199,743)	0.236149	(8,216)	(47,169)	(152,574)	0.005692	(793)	(2,714)	0.766497	(3,540)
2018	November	(223,833)	0.236149	(5,689)	(52,858)	(170,975)	0.005692	(921)	(3,635)	0.766497	(4,742)
2018	December	(250,377)	0.236149	(6,268)	(59,126)	(191,251)	0.005692	(1,031)	(4,665)	0.766497	(6,087)
								(4,665)			(6,087)

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	309,521
	January					-	-	309,521
	February					-	-	309,521
	March					-	-	309,521
	April					-	-	309,521
	May					-	-	309,521
	June					-	-	309,521
	July					-	-	309,521
	August					-	-	309,521
	September					-	-	309,521
	October					-	-	309,521
	November					-	-	309,521
	December					-	-	309,521
YTD Balance		11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	

		%
DSM Program Costs	11,594,497	0.78
DSM PPI & GRT	3,352,151	0.22
Total Revenue Requirement	14,946,648	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016

Interest Calculation

2019 - Rider 10 Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance	11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	309,521
January		192,582	(192,582)		55,678	(55,678)	61,261
February		1,806	(1,806)		522	(522)	58,933
March		(2,074)	2,074		(600)	600	61,607
April		(294)	294		(85)	85	61,986
May		20	(20)		6	(6)	61,960
June		(7)	7		(2)	2	61,969
July		(4)	4		(1)	1	61,974
August		(2,270)	2,270		(656)	656	64,901
September		(31)	31		(9)	9	64,940
October		8	(8)		2	(2)	64,930
November		(8)	8		(2)	2	64,940
December		4,982	(4,982)		1,440	(1,440)	58,517
YTD Balance	-	194,710	(194,710)	-	56,294	(56,294)	58,517
Cumulative Ending Balance	11,594,497	11,549,106	45,391	3,352,151	3,339,025	13,125	58,517

Note: There was no Non-Residential DSM Rider in Rider 10.
All revenues collected represented bill corrections, so
all revenues were allocated on the same basis as prior year.

Interest Calculation

2020- Rider 11 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance	11,594,497	11,549,106	45,391	3,352,151	3,339,025	13,125	58,517
January		7,239	38,152	(485)	(3,286)	15,927	54,079
February		41,527	(3,375)	(2,780)	(18,850)	31,998	28,623
March		36,433	(39,808)	(2,439)	(16,538)	46,097	6,289
April		39,543	(79,351)	(2,647)	(17,950)	61,400	(17,951)
May		39,817	(119,168)	(2,665)	(18,074)	76,809	(42,359)
June		47,726	(166,894)	(3,195)	(21,665)	95,279	(71,615)
July		49,697	(216,591)	(3,327)	(22,559)	114,511	(102,080)
August		48,648	(265,240)	(3,256)	(22,083)	133,338	(131,902)
September		53,916	(319,155)	(3,609)	(24,474)	154,203	(164,952)
October		56,754	(375,909)	(3,799)	(25,763)	176,167	(199,743)
November		39,300	(415,209)	(2,631)	(17,839)	191,375	(223,833)
December		43,300	(458,509)	(2,898)	(19,655)	208,133	(250,377)
YTD Balance	-	503,901	(458,509)	(33,730)	(228,737)	208,133	(250,377)
Cumulative Ending Balance	11,594,497	12,053,007	(458,509)	3,318,420	3,110,288	208,133	(250,377)

Revenue Requirement:		
Program Costs	45,391	1.83
PPI	(20,605)	(0.83)
Total	24,787	
Revenue Collected:	276,923	
Less Interest collected:	1,759	
Total	275,164	

Reconciliation to Filing - Exhibit 2 page 2 :

Interest not yet paid Rider 10 & 11	(2,667)
Revenue not yet given back	267,721
	14,678
Exhibit 2 page 2 Line 35	14,674
	3

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2017

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, Line 4			see calc. at right		
2018	January	65,222,734	72.8087506%	47,487,858	49,132,586	59.7964%	(29,379,532)	18,108,325
2018	February		72.8087506%	-		0.0000%	-	-
2018	March		72.8087506%	-		0.0000%	-	-
2018	April		72.8087506%	-		0.0000%	-	-
2018	May		72.8087506%	-		0.0000%	-	-
2018	June		72.8087506%	-		0.0000%	-	-
2018	July		72.8087506%	-		0.0000%	-	-
2018	August		72.8087506%	-		0.0000%	-	-
2018	September		72.8087506%	-		0.0000%	-	-
2018	October		72.8087506%	-		0.0000%	-	-
2018	November		72.8087506%	-		0.0000%	-	-
2018	December		72.8087506%	-		0.0000%	-	-
		65,222,734		47,487,858	49,132,586			18,108,325

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	18,108,325	0.236149	4,276,263	4,276,263	13,832,063	0.006075	42,015	42,015	0.766497	54,814
2018	February	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	126,045	0.766497	164,442
2018	March	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	210,074	0.766497	274,071
2018	April	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	294,104	0.766497	383,699
2018	May	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	378,134	0.766497	493,327
2018	June	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	462,164	0.766497	602,956
2018	July	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	546,194	0.766497	712,584
2018	August	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	624,921	0.766497	815,295
2018	September	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	703,649	0.766497	918,006
2018	October	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	782,376	0.766497	1,020,716
2018	November	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	861,104	0.766497	1,123,427
2018	December	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	939,831	0.766497	1,226,138
								939,831			1,226,138

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2017

NC Residential DSM		Total System NC DSM Program Costs Incurred	NC Residential DSM Allocation %	NC Allocated DSM Residential Program Costs	NC Residential Revenue Collected	NC Residential DSM Program Collection %	DSM Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4 Line 9			See calc. at right		
2018	January	29,822,653	33.8075104%	10,082,297	12,781,955	77.3907656%	(9,892,053)	190,244
2018	February		33.8075104%	-			-	-
2018	March		33.8075104%	-			-	-
2018	April		33.8075104%	-			-	-
2018	May		33.8075104%	-			-	-
2018	June		33.8075104%	-			-	-
2018	July		33.8075104%	-			-	-
2018	August		33.8075104%	-			-	-
2018	September		33.8075104%	-			-	-
2018	October		33.8075104%	-			-	-
2018	November		33.8075104%	-			-	-
2018	December		33.8075104%	-			-	-
		29,822,653		10,082,297	12,781,955		(9,892,053)	190,244

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	190,244	0.236149	44,926	44,926	145,318	0.006075	441	441	0.766497	576
2018	February	190,244	0.236149	-	44,926	145,318	0.006075	883	1,324	0.766497	1,728
2018	March	190,244	0.236149	-	44,926	145,318	0.006075	883	2,207	0.766497	2,879
2018	April	190,244	0.236149	-	44,926	145,318	0.006075	883	3,090	0.766497	4,031
2018	May	190,244	0.236149	-	44,926	145,318	0.006075	883	3,973	0.766497	5,183
2018	June	190,244	0.236149	-	44,926	145,318	0.006075	883	4,855	0.766497	6,335
2018	July	190,244	0.236149	-	44,926	145,318	0.006075	883	5,738	0.766497	7,486
2018	August	190,244	0.236149	-	44,926	145,318	0.005692	827	6,565	0.766497	8,565
2018	September	190,244	0.236149	-	44,926	145,318	0.005692	827	7,392	0.766497	9,644
2018	October	190,244	0.236149	-	44,926	145,318	0.005692	827	8,220	0.766497	10,724
2018	November	190,244	0.236149	-	44,926	145,318	0.005692	827	9,047	0.766497	11,803
2018	December	190,244	0.236149	-	44,926	145,318	0.005692	827	9,874	0.766497	12,882
								9,874			12,882

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2017

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4, Line 4			See calc. at right		
2018	January	97,443,527	72.8087506%	70,947,415	46,928,129	65.9170989%	(30,933,661)	40,013,754
2018	February			-			-	-
2018	March			-			-	-
2018	April			-			-	-
2018	May			-			-	-
2018	June			-			-	-
2018	July			-			-	-
2018	August			-			-	-
2018	September			-			-	-
2018	October			-			-	-
2018	November			-			-	-
2018	December			-			-	-
		97,443,527		70,947,415	46,928,129		(30,933,661)	40,013,754

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	40,013,754	0.236149	9,449,208.08	9,449,208	30,564,546	0.006075	92,840	92,840	0.766497	121,122
2018	February	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	278,519	0.766497	363,367
2018	March	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	464,199	0.766497	605,611
2018	April	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	649,879	0.766497	847,855
2018	May	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	835,558	0.766497	1,090,100
2018	June	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	1,021,238	0.766497	1,332,344
2018	July	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	1,206,918	0.766497	1,574,589
2018	August	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,380,881	0.766497	1,801,547
2018	September	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,554,844	0.766497	2,028,506
2018	October	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,728,807	0.766497	2,255,465
2018	November	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,902,770	0.766497	2,482,424
2018	December	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	2,076,734	0.766497	2,709,383
								2,076,734			2,709,383

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2017

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	NC Non-Residential DSM Revenue Collected	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	(Over)/Under Collection
			See Miller Exhibit 5 pg. 4, Line 10					
Beginning Balance		29,822,653	40.0747013%	11,951,339	15,361,431	77.3901377%	(11,888,233)	63,106
2018	January	-		-	-	77.3901377%		
2018	February	-		-	289	77.3901377%	(223)	(223)
2018	March	-		-	114	77.3901377%	(88)	(88)
2018	April	-		-	(135)	77.3901377%	104	104
2018	May	-		-	(109)	77.3901377%	85	85
2018	June	-		-	(46)	77.3901377%	36	36
2018	July	-		-	71	77.3901377%	(55)	(55)
2018	August	-		-	(48)	77.3901377%	37	37
2018	September	-		-	(2)	77.3901377%	2	2
2018	October	-		-	(2)	77.3901377%	2	2
2018	November	-		-	(0)	77.3901377%	0	0
2018	December	-		-	(1,215)	77.3901377%	940	940
		29,822,653		11,951,339	15,360,347		(11,887,394)	63,945

No rider was collected in 2018 for Vintage 2017. All revenue collected in 2018 represents bill corrections. Amounts allocated at same % as calculated in Rider 9.

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	63,106	0.236149	14,903	14,903	48,204	0.006075	146	146	0.766497	191
2018	February	62,883	0.236149	(53)	14,850	48,033	0.006075	292	439	0.766497	572
2018	March	62,795	0.236149	(21)	14,829	47,966	0.006075	292	730	0.766497	953
2018	April	62,899	0.236149	25	14,854	48,046	0.006075	292	1,022	0.766497	1,333
2018	May	62,984	0.236149	20	14,874	48,110	0.006075	292	1,314	0.766497	1,714
2018	June	63,019	0.236149	8	14,882	48,137	0.006075	292	1,606	0.766497	2,096
2018	July	62,964	0.236149	(13)	14,869	48,095	0.006075	292	1,899	0.766497	2,477
2018	August	63,002	0.236149	9	14,878	48,124	0.005692	274	2,173	0.766497	2,834
2018	September	63,003	0.236149	0	14,878	48,125	0.005692	274	2,446	0.766497	3,192
2018	October	63,005	0.236149	0	14,879	48,126	0.005692	274	2,720	0.766497	3,549
2018	November	63,005	0.236149	0	14,879	48,126	0.005692	274	2,994	0.766497	3,906
2018	December	63,945	0.236149	222	15,101	48,845	0.005692	276	3,270	0.766497	4,266
								3,270			4,266

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2018

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, Line 4			see calc. at right		
2018	January	6,092,327	72.7130507%	4,429,917	3,364,993	65.2053%	(2,194,154)	2,235,763
2018	February	4,207,163	72.7130507%	3,059,157	6,511,534	65.2053%	(4,311,070)	(1,251,914)
2018	March	4,408,777	72.7130507%	3,205,756	4,863,891	65.2053%	(3,171,514)	34,242
2018	April	4,357,763	72.7130507%	3,168,662	4,898,653	65.2053%	(3,194,181)	(25,519)
2018	May	1,949,686	72.7130507%	1,417,676	4,283,009	65.2053%	(2,792,749)	(1,375,072)
2018	June	9,554,979	72.7130507%	6,976,802	6,106,131	65.2053%	(3,981,521)	2,995,281
2018	July	7,017,359	72.7130507%	5,102,536	7,009,187	65.2053%	(4,570,362)	532,174
2018	August	8,991,684	72.7130507%	6,538,128	6,449,559	65.2053%	(4,205,454)	2,332,674
2018	September	4,496,588	72.7130507%	3,269,606	6,922,525	65.2053%	(4,513,853)	(1,244,247)
2018	October	8,315,873	72.7130507%	6,046,725	4,890,719	65.2053%	(3,189,008)	2,857,717
2018	November	7,870,683	72.7130507%	5,723,014	4,520,378	65.2053%	(2,947,526)	2,775,488
2018	December	10,505,708	72.7130507%	7,639,021	10,538,080	65.2053%	(6,871,587)	767,634
		77,808,590		56,576,999	70,458,658			10,634,221

EE Program Costs	56,577,001
EE Revenue Requirement	86,767,493
% Revenue related to Program Costs	65.2053%

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	2,235,763	0.236149	527,973	527,973	1,707,790	0.006075	5,187	5,187	0.766497	6,768
2018	February	983,849	0.236149	(295,638)	232,335	751,514	0.006075	7,470	12,658	0.766497	16,514
2018	March	1,018,091	0.236149	8,086	240,421	777,670	0.006075	4,645	17,302	0.766497	22,573
2018	April	992,572	0.236149	(6,026)	234,395	758,177	0.006075	4,665	21,968	0.766497	28,660
2018	May	(382,500)	0.236149	(324,722)	(90,327)	(292,173)	0.006075	1,415	23,383	0.766497	30,506
2018	June	2,612,781	0.236149	707,333	617,006	1,995,775	0.006075	5,175	28,558	0.766497	37,257
2018	July	3,144,955	0.236149	125,672	742,678	2,402,277	0.006075	13,359	41,917	0.766497	54,686
2018	August	5,477,629	0.236149	550,859	1,293,537	4,184,092	0.005692	18,744	60,661	0.766497	79,140
2018	September	4,233,382	0.236149	(293,828)	999,709	3,233,673	0.005692	21,110	81,770	0.766497	106,680
2018	October	7,091,099	0.236149	674,847	1,674,556	5,416,543	0.005692	24,617	106,387	0.766497	138,797
2018	November	9,866,587	0.236149	655,429	2,329,985	7,536,603	0.005692	36,862	143,250	0.766497	186,889
2018	December	10,634,221	0.236149	181,276	2,511,261	8,122,961	0.005692	44,565	187,814	0.766497	245,029
								187,814			245,029

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2018

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, Line 9			see calc. at right		
2018	January	1,796,566	32.1574721%	577,730	629,131	78.9688%	(496,817)	80,913
2018	February	1,530,759	32.1574721%	492,253	1,236,115	78.9688%	(976,146)	(483,892)
2018	March	1,744,325	32.1574721%	560,931	909,370	78.9688%	(718,119)	(157,188)
2018	April	1,806,257	32.1574721%	580,847	915,869	78.9688%	(723,251)	(142,404)
2018	May	1,425,924	32.1574721%	458,541	800,766	78.9688%	(632,356)	(173,814)
2018	June	3,051,553	32.1574721%	981,302	1,141,623	78.9688%	(901,526)	79,776
2018	July	3,527,230	32.1574721%	1,134,268	1,310,462	78.9688%	(1,034,856)	99,412
2018	August	3,581,196	32.1574721%	1,151,622	1,205,832	78.9688%	(952,231)	199,391
2018	September	4,029,852	32.1574721%	1,295,899	1,294,259	78.9688%	(1,022,061)	273,837
2018	October	3,506,777	32.1574721%	1,127,691	914,386	78.9688%	(722,080)	405,611
2018	November	1,643,444	32.1574721%	528,490	845,145	78.9688%	(667,401)	(138,911)
2018	December	2,762,644	32.1574721%	888,396	1,970,235	78.9688%	(1,555,872)	(667,476)
		30,406,527		9,777,970	13,173,193		(10,402,715)	(624,745)

DSM Program Costs	9,777,970
DSM Revenue Requirement	12,382,064
% Revenue related to Program Costs	78.9688%

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	80,913	0.236149	19,108	19,108	61,806	0.006075	188	188	0.766497	245
2018	February	(402,979)	0.236149	(114,271)	(95,163)	(307,816)	0.006075	(747)	(560)	0.766497	(730)
2018	March	(560,167)	0.236149	(37,120)	(132,283)	(427,884)	0.006075	(2,235)	(2,794)	0.766497	(3,645)
2018	April	(702,571)	0.236149	(33,629)	(165,911)	(536,660)	0.006075	(2,930)	(5,724)	0.766497	(7,468)
2018	May	(876,386)	0.236149	(41,046)	(206,958)	(669,428)	0.006075	(3,663)	(9,388)	0.766497	(12,247)
2018	June	(796,610)	0.236149	18,839	(188,119)	(608,491)	0.006075	(3,882)	(13,269)	0.766497	(17,311)
2018	July	(697,198)	0.236149	23,476	(164,643)	(532,555)	0.006075	(3,466)	(16,735)	0.766497	(21,833)
2018	August	(497,807)	0.236149	47,086	(117,557)	(380,250)	0.006075	(2,773)	(19,508)	0.766497	(25,451)
2018	September	(223,970)	0.236149	64,666	(52,890)	(171,079)	0.005692	(1,569)	(21,077)	0.766497	(27,497)
2018	October	181,642	0.236149	95,785	42,895	138,747	0.005692	(92)	(21,169)	0.766497	(27,618)
2018	November	42,731	0.236149	(32,804)	10,091	32,640	0.005692	488	(20,681)	0.766497	(26,981)
2018	December	(624,745)	0.236149	(157,624)	(147,533)	(477,212)	0.005692	(1,265)	(21,946)	0.766497	(28,632)
								(21,946)			(28,632)

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2018

NC Non-Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4, Line 4			See calc. at right		
2018	January	4,673,061	72.71305079%	3,397,925	1,957,913	54.3091341%	(1,063,325)	2,334,600
2018	February	7,695,239	72.71305079%	5,595,443	4,028,107	54.3091341%	(2,187,630)	3,407,813
2018	March	3,924,553	72.71305079%	2,853,662	3,609,259	54.3091341%	(1,960,157)	893,505
2018	April	3,329,880	72.71305079%	2,421,257	3,808,504	54.3091341%	(2,068,365)	352,892
2018	May	3,622,228	72.71305079%	2,633,832	3,892,120	54.3091341%	(2,113,777)	520,056
2018	June	3,399,916	72.71305079%	2,472,183	4,770,029	54.3091341%	(2,590,562)	(118,379)
2018	July	4,064,438	72.71305079%	2,955,377	4,861,345	54.3091341%	(2,640,154)	315,223
2018	August	3,790,914	72.71305079%	2,756,489	4,804,248	54.3091341%	(2,609,146)	147,344
2018	September	3,217,141	72.71305079%	2,339,281	5,326,524	54.3091341%	(2,892,789)	(553,508)
2018	October	3,753,904	72.71305079%	2,729,578	5,686,288	54.3091341%	(3,088,174)	(358,595)
2018	November	3,782,445	72.71305079%	2,750,331	3,774,427	54.3091341%	(2,049,859)	700,472
2018	December	6,005,262	72.71305079%	4,366,609	5,480,038	54.3091341%	(2,976,161)	1,390,448
		51,258,981		37,271,969	51,998,801		(28,240,099)	9,031,870

Non-Res EE Program Costs	37,271,969
Non-Res EE Revenue Requirement	68,629,282
% Revenue related to Program Costs	54%

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	2,334,600	0.236149	551,313.41	551,313	1,783,286	0.006075	5,417	5,417	0.766497	7,067
2018	February	5,742,413	0.236149	804,751.59	1,356,065	4,386,348	0.006075	18,740	24,157	0.766497	31,516
2018	March	6,635,918	0.236149	211,000.34	1,567,065	5,068,852	0.006075	28,720	52,877	0.766497	68,985
2018	April	6,988,810	0.236149	83,335.06	1,650,400	5,338,409	0.006075	31,612	84,489	0.766497	110,228
2018	May	7,508,865	0.236149	122,810.66	1,773,211	5,735,654	0.006075	33,637	118,127	0.766497	154,112
2018	June	7,390,486	0.236149	(27,955.08)	1,745,256	5,645,230	0.006075	34,569	152,696	0.766497	199,213
2018	July	7,705,709	0.236149	74,439.49	1,819,695	5,886,013	0.006075	35,026	187,722	0.766497	244,909
2018	August	7,853,053	0.236149	34,795.04	1,854,491	5,998,562	0.005692	33,822	221,544	0.766497	289,034
2018	September	7,299,545	0.236149	(130,710.25)	1,723,780	5,575,765	0.005692	32,939	254,482	0.766497	332,007
2018	October	6,940,950	0.236149	(84,681.96)	1,639,098	5,301,851	0.005692	30,956	285,438	0.766497	372,393
2018	November	7,641,422	0.236149	165,415.88	1,804,514	5,836,908	0.005692	31,699	317,137	0.766497	413,749
2018	December	9,031,870	0.236149	328,352.93	2,132,867	6,899,003	0.005692	36,244	353,382	0.766497	461,035
								353,382			461,035

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2018

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	NC Non-Residential DSM Revenue Collected	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	[Over]/Under Collection
			See Miller Exhibit 5 pg. 4, Line 10					
2018	January	1,796,566	41.4712829%	745,059	517,085	78.9688266%	(408,336)	336,723
2018	February	1,530,759	41.4712829%	634,825	1,108,919	78.9688266%	(875,700)	(240,875)
2018	March	1,744,325	41.4712829%	723,394	976,678	78.9688266%	(771,271)	(47,877)
2018	April	1,806,257	41.4712829%	749,078	1,056,527	78.9688266%	(834,327)	(85,249)
2018	May	1,425,924	41.4712829%	591,349	1,054,087	78.9688266%	(840,297)	(248,948)
2018	June	3,051,553	41.4712829%	1,265,518	1,275,106	78.9688266%	(1,006,936)	258,582
2018	July	3,527,230	41.4712829%	1,462,788	1,327,182	78.9688266%	(1,048,060)	414,727
2018	August	3,581,196	41.4712829%	1,485,168	1,298,531	78.9688266%	(1,025,435)	459,733
2018	September	4,029,852	41.4712829%	1,671,231	1,432,259	78.9688266%	(1,131,038)	540,194
2018	October	3,506,777	41.4712829%	1,454,305	1,521,526	78.9688266%	(1,201,531)	252,774
2018	November	1,643,444	41.4712829%	681,557	1,048,352	78.9688266%	(827,872)	(146,314)
2018	December	2,762,644	41.4712829%	1,145,704	1,448,672	78.9688266%	(1,143,999)	1,705
		30,406,527		12,609,977	14,074,924		(11,114,802)	1,495,175

DSM Program Costs	12,609,977
DSM Revenue Requirement	15,968,297
% Revenue related to Program Costs	79%

NC Non-Residential DSM		Cumulative [Over]/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	336,723	0.236149	79,517	79,517	257,206	0.005075	781	781	0.766497	1,019
2018	February	95,848	0.236149	(56,882)	22,634	73,214	0.005075	1,004	1,785	0.766497	2,329
2018	March	47,971	0.236149	(11,306)	11,328	36,642	0.005075	334	2,119	0.766497	2,764
2018	April	(37,278)	0.236149	(20,131)	(8,803)	(28,475)	0.005075	25	2,143	0.766497	2,796
2018	May	(286,226)	0.236149	(58,789)	(67,592)	(218,634)	0.005075	(751)	1,393	0.766497	1,817
2018	June	(27,644)	0.236149	61,064	(6,528)	(21,116)	0.005075	(728)	665	0.766497	867
2018	July	387,083	0.236149	97,937	91,409	295,674	0.005075	834	1,499	0.766497	1,955
2018	August	846,816	0.236149	108,566	199,975	646,841	0.005692	2,682	4,181	0.766497	5,454
2018	September	1,387,010	0.236149	127,566	327,541	1,059,469	0.005692	4,856	9,037	0.766497	11,790
2018	October	1,639,784	0.236149	59,692	387,233	1,252,551	0.005692	6,580	15,616	0.766497	20,374
2018	November	1,493,470	0.236149	(34,552)	352,681	1,140,788	0.005692	6,811	22,427	0.766497	29,260
2018	December	1,495,175	0.236149	403	353,084	1,142,091	0.005692	6,497	28,924	0.766497	37,735
								28,924			37,735

Note 1: Amounts represent all revenue actually collected through 2018.

Miller Exhibit 4

E/A

Duke Energy Carolinas, LLC
DSM/EE Actual Revenues Collected from Years 2015-2018 (By Vintage)
and Estimated 2019 Collections from revised forecast of Rider 10 (by Vintage)
Docket Number E-7, Sub 1192
For Vintage Year 2015-2019 Estimate and True Up Calculations

Line		Vintage	Actual 2015 Rider 6	Actual 2016 Rider 7	Actual 2017 Rider 8	Actual 2018 Rider 9	Estimated 2019 Rider 10 [1]	Total
	Residential							
1	EE/DSM	Year 2015	58,227,163	4,026,042	10,183,996	8,311,657	(1,014,271)	79,734,588
2		Year 2016		58,184,868	5,570,022	27,108,101	(2,560,305)	88,302,686
3		Year 2017			61,914,541	4,435,871	35,770,078	102,120,490
4		Year 2018				83,631,851	6,294,025	89,925,876
5		Year 2019					77,019,869	77,019,869
6	**Total Residential**		$ 58,227,163	$ 62,210,909	$ 77,668,559	$ 123,487,480	$ 115,509,396	$ 437,103,508
	Non-Residential							
7	EE	Year 2015	25,791,031	8,194,784	24,104,955	7,986,755	456,319	66,533,843
8		Year 2016		45,662,897	8,632,771	36,292,834	(2,329,721)	88,258,782
9		Year 2017			46,928,129	10,882,796	67,733,478	125,544,403
10		Year 2018				51,998,801	12,285,044	64,283,845
11		Year 2019					55,797,199	55,797,199
12	DSM	Year 2015	19,579,477	280,553	(2,398,768)	(515,157)	(451,445)	16,494,660
13		Year 2016		14,637,127	251,004	276,923	(267,721)	14,897,332
14		Year 2017			15,361,431	(1,084)	86,311	15,446,658
15		Year 2018				14,074,924	534,763	14,609,687
16		Year 2019					15,847,512	15,847,512
17	**Total Non-Residential**		$ 45,370,507	$ 68,775,361	$ 92,879,523	$ 120,996,791	$ 149,691,739	$ 477,713,921
18	**Total Revenue**		$ 103,597,671	$ 130,986,270	$ 170,548,082	$ 244,484,271	$ 265,201,135	$ 914,817,429

[1] Rider 10 estimates are based on Order issued in Docket No. E-7 Sub 1164 dated 9/11/18

Duke Energy Carolinas, LLC
Vintage Year 2015 Allocation Factors for the Period January 1, 2015 to December 31, 2015
Docket Number E-7, Sub 1192
Allocation Factors

Line			MWH
	New Mechanism Sales Allocator at Generator		
1	NC Retail MWH Sales Allocation	Company Records	59,567,575
2	SC Retail MWH Sales Allocation	Company Records	22,080,529
3	Total Retail	Line 1 + Line 2	81,648,104
	Allocation 1 to state based on kWh sales		
4	NC Retail	Line 1 / Line 3	**72.9564706%**

	Demand Allocators		**NC**	**SC**	**Total**
5	Residential	Company Records	4,994,057	1,469,714	6,463,771
6	Non Residential	Company Records	6,518,371	2,373,858	8,892,229
7	Total	Line 5 + Line 6	11,512,428	3,843,572	15,356,000
	Allocation 2 to state based on peak demand				
8	NC Retail	Line 7, NC / Line 7 Total	**74.9702266%**		
	Allocation 3 NC res vs non-res Peak Demand to retail system peak				
9	NC Residential	Line 5 NC/ Line 7 Total	**32.5218612%**		
10	NC Non-residential	Line 6 NC/ Line 7 Total	**42.4483655%**		

Duke Energy Carolinas, LLC
Vintage Year 2016 Allocation Factors for the Period January 1, 2016 to December 31, 2016
Docket Number E-7, Sub 1192
Allocation Factors

Line			MWH		
	New Mechanism Sales Allocator at Generator				
1	NC Retail MWH Sales Allocation	Company Records	60,762,752		
2	SC Retail MWH Sales Allocation	Company Records	22,364,255		
3	Total Retail	Line 1 + Line 2	83,127,007		
	Allocation 1 to state based on kWh sales				
4	NC Retail	Line 1 / Line 3	**73.0962827%**		
	Demand Allocators		**NC**	**SC**	**Total**
5	Residential	Company Records	5,403,520	1,714,752	7,118,272
6	Non Residential	Company Records	6,525,765	2,343,963	8,869,728
7	Total	Line 5 + Line 6	11,929,285	4,058,715	15,988,000
	Allocation 2 to state based on peak demand				
8	NC Retail	Line 7, NC / Line 7 Total	**74.6139917%**		
	Allocation 3 NC res vs non-res Peak Demand to retail system peak				
9	NC Residential	Line 5 NC/ Line 7 Total	**33.7973480%**		
10	NC Non-residential	Line 6 NC/ Line 7 Total	**40.8166437%**		

Duke Energy Carolinas, LLC
Vintage Year 2017 Allocation Factors for the Period January 1, 2017 - December 31, 2017
Docket Number E-7, Sub 1192
Allocation Factors

Line			MWH		
	New Mechanism Sales Allocator at Generator				
1	NC Retail MWH Sales Allocation	Company Records	60,219,051		
2	SC Retail MWH Sales Allocation	Company Records	22,489,484		
3	Total Retail	Line 1 + Line 2	82,708,535		
	Allocation 1 to state based on kWh sales				
4	NC Retail	Line 1 / Line 3	**72.8087506%**		
	Demand Allocators		**NC**	**SC**	**Total**
5	Residential	Company Records	5,545,784	1,803,958	7,349,742
6	Non Residential	Company Records	6,573,854	2,480,404	9,054,258
7	Total	Line 5 + Line 6	12,119,638	4,284,362	16,404,000
	Allocation 2 to state based on peak demand				
8	NC Retail	Line 7, NC / Line 7 Total	**73.8822117%**		
	Allocation 3 NC res vs non-res Peak Demand to retail system peak				
9	NC Residential	Line 5 NC/ Line 7 Total	**33.8075104%**		
10	NC Non-residential	Line 6 NC/ Line 7 Total	**40.0747013%**		

Duke Energy Carolinas, LLC
Vintage Year 2018 Allocation Factors for the Period January 1, 2018 - December 31, 2020
Docket Number E-7, Sub 1192
Allocation Factors

Line			MWH		
	New Mechanism Sales Allocator at Generator				
1	NC Retail MWH Sales Allocation	Company Records	58,534,269		
2	SC Retail MWH Sales Allocation	Company Records	21,966,093		
3	Total Retail	Line 1 + Line 2	80,500,362		
	Allocation 1 to state based on kWh sales				
4	NC Retail	Line 1 / Line 3	**72.7130507%**		
	Demand Allocators		**NC**	**SC**	**Total**
5	Residential	Company Records	5,078,308	1,617,566	6,695,874
6	Non Residential	Company Records	6,549,145	2,546,981	9,096,126
7	Total	Line 5 + Line 6	11,627,453	4,164,547	15,792,000
	Allocation 2 to state based on peak demand				
8	NC Retail	Line 7, NC / Line 7 Total	**73.6287551%**		
	Allocation 3 NC res vs non-res Peak Demand to retail system peak				
9	NC Residential	Line 5 NC/ Line 7 Total	**32.1574721%**		
10	NC Non-residential	Line 6 NC/ Line 7 Total	**41.4712829%**		

Miller Exhibit 6

I/A

Duke Energy Carolinas, LLC
DSM/EE Cost Recovery Rider 11
Docket Number E-7 Sub 1192
Forecasted 2020 kWh Sales for Rate Period for Vintage Years 2015-2020

Line	Fall 2018 Sales Forecast - kWhs	Forecasted 2020 sales
	North Carolina Retail:	
1	Residential	**21,487,301,475**
2	Non-Residential	**35,668,140,542**
3	Total Retail	**57,155,442,017**

	NC Opt Out Sales	Total Usage	Revised Opt-Outs	Net Usage
	Vintage 2015 Actual Opt Out			
4	EE	35,668,140,542	17,296,168,323	18,371,972,219
5	DSM	35,668,140,542	17,254,905,530	18,413,235,012
	Vintage 2016 Actual Opt Out			
6	EE	35,668,140,542	17,541,642,770	18,126,497,772
7	DSM	35,668,140,542	17,501,309,036	18,166,831,506
	Vintage 2017 Actual Opt Out			
8	EE	35,668,140,542	17,749,899,702	17,918,240,840
9	DSM	35,668,140,542	17,532,357,862	18,135,782,680
	Vintage 2018 Estimated Opt Out			
10	EE	35,668,140,542	18,347,183,120	17,320,957,422
11	DSM	35,668,140,542	17,611,595,199	18,056,545,344
	Vintage 2019 Estimated Opt Out			
12	EE	35,668,140,542	18,483,624,730	17,184,515,812
13	DSM	35,668,140,542	17,568,801,199	18,099,339,344
	Vintage 2020 Estimated Opt Out			
14	EE	35,668,140,542	18,483,624,730	17,184,515,812
15	DSM	35,668,140,542	17,568,801,199	18,099,339,344

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Fourteenth Revised Leaf No. 62
Superseding North Carolina Thirteenth Revised Leaf No. 62

Rider EE (NC)
ENERGY EFFICIENCY RIDER

APPLICABILITY (North Carolina Only)
Service supplied under the Company's rate schedules is subject to approved adjustments for new energy efficiency and demand-side management programs approved by the North Carolina Utilities Commission (NCUC). The Rider Adjustments are not included in the Rate Schedules of the Company and therefore, must be applied to the bill as calculated under the applicable rate.

As of January 1, 2020, cost recovery under Rider EE consists of the four year term program, years 2014-2017, as well as rates under the continuation of that program for years 2018-2020 as outlined below. This Rider applies to service supplied under all rate schedules, except rate schedules OL, FL, PL, GL and NL for program years 2015-2020.

GENERAL PROVISIONS
This Rider will recover the cost of new energy efficiency and demand-side management programs beginning January 1, 2014, using the method approved by the NCUC as set forth in Docket No. E-7 Sub 1032, Order dated October 29, 2013, as revised by Docket No. E-7, Sub 1130, Order dated August 23, 2017.

TRUE-UP PROVISIONS
Rider amounts will initially be determined based on estimated kW and kWh impacts related to expected customer participation in the programs, and will be trued-up as actual customer participation and actual kW and kWh impacts are verified. If a customer participates in any vintage of programs, the customer is subject to the true-ups as discussed in this section for any vintage of programs in which the customer participated.

RIDER EE OPT OUT PROVISION FOR QUALIFYING NON-RESIDENTIAL CUSTOMERS
The Rider EE increment applicable to energy efficiency programs and/or demand-side management programs will not be applied to the energy charge of the applicable rate schedule for customers qualified to opt out of the programs where:

a. The customer has notified the Company that it has implemented, or has plans for implementing, alternative energy efficiency measures in accordance with quantifiable goals.
b. Electric service to the customer must be provided under:
    1. An electric service agreement where the establishment is classified as a "manufacturing industry" by the Standard Industrial Classification Manual published by the United States Government and where more than 50% of the electric energy consumption of such establishment is used for its manufacturing processes. Additionally, all other agreements billed to the same entity associated with the manufacturing industry located on the same or contiguous properties are also eligible to opt out.
    2. An electric service agreement for general service as provided for under the Company's rate schedules where the customer's annual energy use is 1,000,000 kilowatt hours or more. Additionally, all other agreements billed to the same entity with lesser annual usage located on the same or contiguous properties are also eligible to opt out.

The following additional provisions apply for qualifying customers who elect to opt out:

For customers who elect to opt out of energy efficiency programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's energy efficiency programs each calendar year only during the annual two-month enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1. (Qualifying new customers have sixty days after beginning service to opt out).
- Customers may not opt out of individual energy efficiency programs offered by the Company. The choice to opt out applies to the Company's entire portfolio of energy efficiency programs.
- If a customer participates in any vintage of energy efficiency programs, the customer, irrespective of future opt-out decisions, remains obligated to pay the remaining portion of the lost revenues for each vintage of energy efficiency programs in which the customer participated.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's energy efficiency programs during the first 5 business days of March each calendar year. Customers making this election will be back-billed retroactively to the effective date of the new Rider EE.

For customers who elect to opt out of demand-side management programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's demand-side management program during the enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1 of the applicable year. (Qualifying new customers have sixty days after beginning service to opt out).

Rider EE (NC)
ENERGY EFFICIENCY RIDER

- If a customer elects to participate in a demand-side management program, the customer may not subsequently choose to opt out of demand-side management programs for three years.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's demand-side management program during the first 5 business days of March each calendar year. Customers making this election will be back-billed to the effective date of the new Rider EE.

Any qualifying non-residential customer that has not participated in an energy efficiency or demand-side management program may opt out during any enrollment period, and has no further responsibility to pay Rider EE amounts associated with the customer's opt out election for energy efficiency and/or demand-side management programs.

ENERGY EFFICIENCY RIDER ADJUSTMENTS (EEA) FOR ALL PROGRAM YEARS

The Rider EE amounts applicable to the residential and nonresidential rate schedules for the period January 1, 2019 through December 31, 2019 including utility assessments are as follows:

Residential	Vintage 2015[1],2016[1], 2017[1], 2018[1]	0.0956¢ per kWh
	Vintage 2017[2], 2018[2], 2019[2], 2020[2]	0.3892¢ per kWh
	Total Residential Rate	0.4848¢ per kWh
Nonresidential		
Vintage 2015[3]		
	Energy Efficiency	0.0064¢ per kWh
	Demand Side Management	0.0001¢ per kWh
Vintage 2016[3]		
	Energy Efficiency	0.0512¢ per kWh
	Demand Side Management	0.0001¢ per kWh
Vintage 2017[3]		
	Energy Efficiency	0.0957¢ per kWh
	Demand Side Management	0.0000¢ per kWh
Vintage 2018[3]		
	Energy Efficiency	0.0827¢ per kWh
	Demand Side Management	0.0077¢ per kWh
Vintage 2019[3]		
	Energy Efficiency	0.0509¢ per kWh
	Demand Side Management	0.0000¢ per kWh
Vintage 2020[3]		
	Energy Efficiency	0.3082¢ per kWh
	Demand Side Management	0.1101¢ per kWh
Total Nonresidential		0.7131¢ per kWh

[1] Includes the true-up of program costs, shared savings and lost revenues from Year 1 of Vintage 2018 and Year 2 of Vintage 2017, and Year 3 of 2016 and Year 4 of 2015.
[2] Includes prospective component of Vintage 2017, 2018, 2019 and 2020
[3] Not Applicable to Rate Schedules OL, FL, PL, GL, and NL.

Each factor listed under Nonresidential is applicable to nonresidential customers who are not eligible to opt out and to eligible customers who have not opted out. If a nonresidential customer has opted out of a Vintage(s), then the applicable energy efficiency and/or demand-side management charge(s) shown above for the Vintage(s) during which the customer has opted out, will not apply to the bill.

I/A

Duke Energy Carolinas, LLC
DSM/EE Cost Recovery Rider 11
Docket Number E-7 Sub 1192
Exhibit Summary of Rider EE Exhibits and Factors

Residential Billing Factors

Residential Billing Factor for Rider 11 True-up (EMF) Components

Line			Adjusted
1	Year 2015 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1 Line 15	524,656
2	Year 2016 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 2 Line 15	967,614
3	Year 2017 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 43Line 15	3,327,874
4	Year 2018 EE/DSM True-Up (EMF) Revenue Requirement	Miller Exhibit 2 pg 4 Line 15	15,463,399
5	Total True-up (EMF) Revenue Requirement	Sum Lines 1-4	$ 20,283,544
6	Projected NC Residential Sales (kWh) for rate period	Miller Exhibit 6 pg. 1, Line 1	21,487,301,475
7	*EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh)*	Line 5 / Line 6 * 100	0.0944

Residential Billing Factor for Rider 11 Prospective Components

8	Vintage 2017 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 4, Line 1	1,751,061
9	Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 5, Line 1	9,715,212
10	Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 11	5,232,466
11	Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement		66,898,601
12	Total Prospective Revenue Requirement	Sum Lines 8-11	$ 83,597,339
13	Projected NC Residential Sales (kWh) for rate period	Miller Exhibit 6 pg. 1, Line 1	21,487,301,475
14	*EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh)*	Line 12 / Line 13 * 100	0.3891

Total Revenue Requirements in Rider 11 from Residential Customers

15	Total True-up (EMF) Revenue Requirement	Line 5	$ 20,283,544
16	Total Prospective Revenue Requirement	Line 12	83,597,339
17	***Total EE/DSM Revenue Requirement for Residential Rider EE***	Line 15 + Line 16	$ 103,880,883
18	***Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh)***	Line 7 + Line 14	0.4835

Non-Residential Billing Factors for Rider 11 True-up (EMF) Components

19	Vintage Year 2015 EE True-up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1, Line 25	$ 1,171,685
20	Projected Year 2015 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 4	18,371,972,219
21	*EE Revenue Requirement Year 2015 EMF Non-Residential Rider EE (cents per kWh)*	Line 25/Line 26 * 100	0.0064
22	Vintage Year 2015 DSM True-up (EMF) Revenue Requirement	Miller Exhibit 2 pg. 1, Line 35	$ 19,262
23	Projected Year 2015 DSM Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 5	18,413,235,012
24	*DSM Revenue Requirement Year 2015 EMF Non-Residential Rider EE (cents per kWh)*	Line 28/Line 29 * 100	0.0001
25	*Vintage Year 2016 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 2, Line 25	$ 9,273,079
26	*Projected Year 2016 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 6	18,126,497,772
27	*EE Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)*	Line 31/Line 32 * 100	0.0512
28	*Vintage Year 2016 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 2, Line 35	$ 14,674
29	*Projected Year 2016 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 7	18,166,831,506
30	*DSM Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)*	Line 34/Line 35 * 100	0.0001
31	*Vintage Year 2017 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 3, Line 25	$ 11,550,961
32	*Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 8	17,918,240,840
33	*EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)*	Line 37/Line 38 * 100	0.0645
34	*Vintage Year 2017 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 3, Line 35	$ 1,084
35	*Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 9	18,135,782,680
36	*DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)*	Line 40/Line 41 * 100	-

37	*Vintage Year 2018 EE True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 4, Line 25	$	4,814,662
38	*Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 10		17,320,957,422
39	*EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)*	Line 37/Line 38 * 100		0.0278
40	*Vintage Year 2018 DSM True-up (EMF) Revenue Requirement*	Miller Exhibit 2 pg. 4, Line 35	$	1,398,093
41	*Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period*	Miller Exhibit 6 Line 11		18,056,545,344
42	*DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)*	Line 40/Line 41 * 100		0.0077

Non-Residential Billing Factors for Rider 11 Prospective Components

43	Vintage Year 2017 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 3, Line 25	$	5,593,790
44	Projected Program Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 8		17,918,240,840
45	*EE Revenue Requirement Vintage 2017 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 43/Line 44 * 100		0.0312
46	Vintage Year 2018 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 4, Line 25	$	9,507,185
47	Projected Vintage 2018 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 10		17,320,957,422
48	*EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 46/Line 47 * 100		0.0549
49	Vintage Year 2019 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 5, Line 4	$	8,746,000
50	Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 12		17,184,515,812
51	*EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 49/Line 50 * 100		0.0509
52	Vintage Year 2020 EE Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 18	$	52,968,365
53	Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 14		17,184,515,812
54	*EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 52/Line 53 * 100		0.3082
55	Vintage Year 2020 DSM Prospective Amounts Revenue Requirement	Miller Exhibit 2 pg. 6, Line 25	$	19,931,130
56	Projected Vintage 2020 DSM Participants NC Non-Residential Sales (kwh) for rate period	Miller Exhibit 6 Line 15		18,099,339,344
57	*DSM Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)*	Line 55/Line 56 * 100		0.1101
	Total EMF Rate			**0.1578**
	Total Prospective Rate			**0.5553**

Total Revenue Requirements in Rider 11 from Non-Residential Customers

58	Vintage Year 2015 EE True-up (EMF) Revenue Requirement	Line 19		1,171,685
59	Vintage Year 2015 DSM True-up (EMF) Revenue Requirement	Line 22		19,262
60	Vintage Year 2016 EE True-up (EMF) Revenue Requirement	Line 25		9,273,079
61	Vintage Year 2016 DSM True-up (EMF) Revenue Requirement	Line 28		14,674
62	Vintage Year 2017 EE True-up (EMF) Revenue Requirement	Line 31		11,550,961
63	Vintage Year 2017 DSM True-up (EMF) Revenue Requirement	Line 34		1,084
64	Vintage Year 2018 EE True-up (EMF) Revenue Requirement	Line 37		4,814,662
65	Vintage Year 2018 DSM True-up (EMF) Revenue Requirement	Line 40		1,398,093
64	Vintage Year 2017 EE Prospective Amounts Revenue Requirement	Line 43		5,593,790
65	Vintage Year 2018 EE Prospective Amounts Revenue Requirement	Line 46		9,507,185
66	Vintage Year 2019 EE Prospective Amounts Revenue Requirement	Line 49		8,746,000
67	Vintage Year 2020 EE Prospective Amounts Revenue Requirement	Line 52		52,968,365
68	Vintage Year 2020 DSM Prospective Amounts Revenue Requirement	Line 55		19,931,130
	Total Non-Residential Revenue Requirement in Rider 11	Sum (Lines 58-68)	$	124,589,970

EA

Supplemental

Miller Exhibit 2, page 1
NO CHANGE

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
True Up of Year 1, 2, 3 and 4 of Vintage Year 2015

RESIDENTIAL
Energy Efficiency Programs

Line		Reference
1	Residential EE Program Cost	Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 1
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 2
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 1
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12
14	Total Collected for Vintage Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 2
15	Total Residential EE/DSM Revenue Requirement	Line 13 - Line 14

E-7 Sub 1050	E-7 Sub 1073	E-7 Sub 1105	E-7 Sub 1105	E-7 Sub 1130	E-7 Sub 1130	E-7 Sub 1164	E-7 Sub 1192	
Rider 6 Original Estimate	Rider 7 Year 2 Lost Revenues	Rider 8 True up of Year 1	Rider 8 Year 3 Lost Revenues	Rider 9 True up of Lost Revenues & EM&V	Rider 9 Year 4 LR Estimate	Rider 10 True up	Rider 11 True up	Year 2015
$ 30,685,449		$ (2,726,335)		$ -		$ -		$ 27,959,114
2,374,641		2,431,922		125,671		-		4,932,234
		49,064		77,792		35,939	(5,811)	156,984
33,060,090		(245,948)		203,463		35,939	(5,811)	33,048,332
12,532,432		(2,157,589)		(1,252)		(0)		10,393,591
9,273,217		(676,007)		(12,280)		(532)		2,586,398
		(10,786)		29,451		11,838	304	24,807
15,807,649		(2,824,381)		9,919		11,306	304	13,004,795
48,867,739		(9,069,730)		213,382		47,245	(5,507)	46,053,129
1.001417		1.001402		1.001402		1.001402	1.001402	
48,936,985		(3,074,034)		213,681		47,310	(5,515)	46,118,427
9,169,840	4,071,955	5,563,184	8,090,365	4,191,232	3,431,636	(1,336,510)	959,134	34,140,816
58,106,825	4,071,955	2,489,151	8,090,365	4,404,913	3,431,636	(1,289,200)	953,599	80,259,243
								79,734,588
								$ 524,656

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 1, Line 24 * NC Alloc. Factor
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 1, Line 24 * NC Alloc. Factor
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 3
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 1
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22
24	Total Collected for Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 7
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 4
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100

E-7 Sub 1050	E-7 Sub 1073	E-7 Sub 1105	E-7 Sub 1105	E-7 Sub 1130	E-7 Sub 1130	E-7 Sub 1164	E-7 Sub 1192	
Rider 6 Original Estimate	Rider 7 Year 2 Lost Revenues	Rider 8 True up of Year 1	Rider 8 Year 3 Lost Revenues	Rider 9 True up of Lost Revenues & EM&V	Year 2015 Year 4 LR Estimate	Rider 10 True Up	Rider 11 True up	Year 2015
17,348,807		11,904,051		0		-		29,252,858
6,214,226		3,351,028		846,899		(594,998)		9,817,155
		457,891		836,299		449,315	67,376	1,811,881
23,563,033		15,712,970		1,685,198		(146,683)	67,376	40,881,894
1.001417		1.001402		1.001402		1.001402	1.001402	
23,596,422		15,735,000		1,687,561		(146,889)	67,470	40,939,564
2,523,480	8,194,003	2,547,914	9,483,428	2,426,543	4,183,188	(3,671,147)	1,078,554	26,765,963
26,119,902	8,194,003	18,282,914	9,483,428	4,114,104	4,183,188	(3,818,036)	1,146,025	67,705,528
								66,533,843
								1,171,685
								18,971,972,219
								0.0064

DSM Programs

		Reference
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 1 Line 25 * NC Alloc. Factor
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 1 Line 25 * NC Alloc. Factor
30	Return on overcollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 4
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32
34	Total Revenue Collected for Year 2015 (through estimated Rider 10)	Miller Exhibit 4 Line 12
35	Non-Residential DSM Revenue Requirement True-up Amount	Line 33- Line 34
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 Line 5
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100

E-7 Sub 1050	E-7 Sub 1005	E-7 Sub 1130	E-7 Sub 1164	E-7 Sub 1192	
Rider 6 Original Estimate	Rider 8 Original True Up	Rider 9 True Up	Rider 10 True Up	Rider 11 True up	Year 2015
16,493,488	(2,925,873)	(1,635)			13,565,981
4,910,997	(917,841)	(16,029)	(693)		3,375,833
	(107,297)	(203,069)	(128,531)	(12,427)	(451,324)
20,803,885	(3,951,011)	(220,733)	(129,224)	(12,427)	16,490,490
1.001417	1.001402	1.001402	1.001402	1.001402	
20,833,864	(3,956,550)	(221,042)	(129,405)	(12,445)	16,519,922
					16,494,660
					19,262
					18,419,235,012
					0.0001

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
True Up of Year 1, 2 and 3 for Vintage Year 2016

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Rider 9 True up (Year 1)	E-7 Sub 1130 Year 2016 Yr 3 LR Estimate	E-7 Sub 1164 Rider 10 True up (Year 2)	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
1	Residential EE Program Cost	Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor	$ 31,056,079		$ 8,965,024		$ (2)		$ 40,021,101
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor	2,392,652		4,361,799		(52,098)		6,702,353
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 5	-		272,476		710,785	430,926	1,414,188
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3	33,448,731		13,599,299		658,686	430,926	48,137,642
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor	10,613,016		(1,012,441)		0		9,600,575
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor	2,887,418		(129,612)		(27,890)		2,729,916
7	Return on overcollection of Residential DSM Program Costs	Miller Exhibit 3 pg 6			(26,922)		(46,199)	(39,872)	(112,993)
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7	13,500,434		(1,168,975)		(74,089)	(39,872)	12,218,099
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8	46,949,165		12,430,324		584,597	391,055	60,355,741
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7	1.001442		1.001402		1.001402	1.001402	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10	47,016,866		12,448,952		585,417	391,603	60,442,238
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	11,873,767	5,723,916	4,795,359	7,765,323	(5,299,616)	1,969,319	28,828,069
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	58,890,633	5,723,916	17,243,711	7,765,323	(4,714,199)	2,360,916	89,270,300
14	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 2							88,302,686
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12							$ 967,614

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1105 Rider 8 Year 2 Lost Revenues	E-7 Sub 1130 Year 1 True up	E-7 Sub 1130 Year 2016 Yr 3 LR Estimate	E-7 Sub 1164 Rider 10 True up (Year 2)	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor	36,494,611		15,515,376		1		50,009,988
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor	10,105,721		4,261,607		(353,368)		14,013,960
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 7			378,293		1,051,375	731,576	2,161,244
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18	46,600,332		18,155,276		698,008	731,576	66,185,192
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001442		1.001402		1.001402	1.001402	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20	46,667,530		18,180,730		698,987	732,602	66,279,848
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	4,745,315	8,309,444	2,524,047	13,375,167	(4,085,026)	6,583,046	31,252,013
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	51,412,845	8,309,444	20,704,776	13,375,167	(3,386,039)	7,115,648	97,531,860
24	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 8							88,258,782
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24							9,273,079
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 6							18,126,497,772
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100							0.0512

DSM Programs

		Reference	E-7 Sub 1073 Rider 7 Original Estimate	E-7 Sub 1130 Rider 9 True up	E-7 Sub 1164 Rider 10 True Up	E-7 Sub 1192 Rider 11 True Up (Year 3)	Year 2016
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor	12,855,910	(1,261,415)	0		11,594,497
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor	3,497,628	(167,059)	(33,683)		3,296,886
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 8	-	1,759	5,420	(6,087)	(908)
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30	16,353,538	(1,426,715)	(30,262)	(6,087)	14,890,476
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001442	1.001402	1.001402	1.001402	
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32	16,377,120	(1,428,719)	(30,305)	(6,095)	14,912,007
34	Total Collected for Vintage Year 2016 (through estimated Rider 10)	Miller Exhibit 4 Line 13					14,837,332
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34					14,674
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6, Line 7					18,166,831,506
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100					0.0001

* Year 4 Projected Lost Revenue is not being requested in this filing because lost revenue through the test period of Docket E7 Sub XXXX was requested as part of base rates.

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 4 Lost Revenue and True Up of Year 1 and 2 for Vintage Year 2017

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	Year 2017 Yr 4 LR Estimate
1	Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor	
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor	
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 9	
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3	
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor	
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor	
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 10	
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7	
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8	
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10	
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	$ 1,751,061
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	1,751,061
14	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 3	
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	$ 1,751,061

E-7 Sub 1105	E-7 Sub 1130	E-7 Sub 1164	E-7 Sub 1164	E-7 Sub 1192	
Rider 8 Year 1 Estimate	Year 2017 Yr 2 LR Estimate	Rider 10 True up	Year 2017 Year 3 Estimate	Rider 11 True Up	Year 2017
$ 33,488,974		$ 13,998,885		$ -	$ 47,487,859
4,149,244		4,340,033		(250,931)	8,238,346
		522,611		1,226,138	1,748,749
37,638,218		18,861,529		975,207	57,474,954
10,258,751		(176,455)		-	10,082,296
2,837,134		89,061		-	2,926,195
		15,015		12,882	27,897
13,095,885		(72,379)		12,882	13,036,388
50,734,103		18,789,150		988,088	70,511,342
1.001482		1.001402		1.001402	
50,809,291		18,815,493		989,474	70,614,257
12,699,119	4,202,002	6,456,129	8,904,587	2,572,270	84,834,107
63,508,411	4,202,002	25,271,622	8,904,587	3,561,743	105,448,364
					102,120,490
					$ 3,327,874

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	Year 2017 Yr 3 LR Estimate
16	Non-Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor	
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor	
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 7	
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18	
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20	
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 2	5,593,790
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	5,593,790
24	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 9	
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24	5,593,790
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 8	17,918,240,840
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100	0.0312

E-7 Sub 1105	E-7 Sub 1130	E-7 Sub 1164	E-7 Sub 1164	E-7 Sub 1192	
Rider 8 Year 1 Estimate	Year 2017 Yr 2 LR Estimate	Rider 10 True up	Year 2017 Year 3 Estimate	Rider 11 True Up	Year 2017
58,791,601		32,155,814		-	70,947,415
9,347,504		9,073,243		3,304,511	21,725,258
		1,588,185		2,709,383	4,297,568
48,139,105		42,817,242		6,013,893	96,970,240
1.001482		1.001402		1.001402	
48,210,447		42,877,271		6,022,325	97,110,043
6,039,892	9,466,867	2,627,210	14,570,381	7,280,971	39,985,321
54,250,339	9,466,867	45,504,481	14,570,381	13,303,295	137,095,364
					125,544,403
					11,550,961
					17,918,240,840
					0.0643

DSM Programs

		Reference
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 12
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32
34	Total Collected for Vintage Year 2017 (through estimated Rider 10)	Miller Exhibit 4 Line 14
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 pg. 1, Line 9
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100

E-7 Sub 1105		E-7 Sub 1164		E-7 Sub 1192	
Rider 8 Year 1 Estimate		Rider 10 True Up		Rider 11 True Up	Year 2017
13,389,985		(1,438,646)			11,951,339
3,703,101		(234,452)			3,468,649
-		4,761		4,266	9,027
17,093,086		(1,668,337)		4,266	15,429,016
1.001482		1.001402		1.001402	
17,118,418		(1,670,676)		4,272	15,447,742
					15,446,658
					1,084
					18,155,782,680
					-

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 3 Lost Revenue and True Up of Year 1 for Vintage Year 2018

RESIDENTIAL
Energy Efficiency Programs

Line		Reference	Year 2018 Yr 3 LR Estimate
1	Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor	
2	Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor	
3	Return on undercollection of Residential EE Program Costs	Miller Exhibit 3 pg 13	
4	Total EE Program Cost and Incentive Components	Line 1 + Line 2 + line 3	
5	Residential DSM Program Cost	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor	
6	Residential DSM Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor	
7	Return on undercollection of Residential DSM Program Costs	Miller Exhibit 3 pg 14	
8	Total DSM Program Cost and Incentive Components	Line 5 + Line 6 + Line 7	
9	Total EE/DSM Program Cost and Incentive Components	Line 4 + Line 8	
10	Revenue-related taxes and regulatory fees factor **	Miller Exhibit 2, pg. 7	
11	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 9 * Line 10	
12	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3	$ 9,715,212
13	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	9,715,212
14	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 4	
15	Total Residential EE/DSM Revenue Requirement	Line 11 + Line 12	$ 9,715,212

E-7 Sub 1130 Rider 9 Year 1 Estimate	E-7 Sub 1164 Year 2018 Yr 2 LR Estimate	E-7 Sub 1192 Rider 11 True up	Year 2018
$ 41,623,609		$ 14,606,717	$ 56,230,326
5,511,264		4,154,068	9,665,332
		244,540	244,540
47,134,873		19,005,324	66,140,197
9,903,130		(124,235)	9,778,895
2,569,925		17,215	2,587,140
		(28,626)	(28,626)
12,473,055		(135,646)	12,337,409
59,607,928		18,869,679	78,477,607
1.001402		1.001402	
59,691,498		18,896,134	78,587,632
19,612,717	6,294,025	894,901	26,801,643
79,304,216	6,294,025	19,791,035	105,389,275
			89,925,876
			$ 15,463,399

See Miller Exhibit A for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	Year 2018 Yr 3 LR Estimate
16	Non- Residential EE Program Cost	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor	
17	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1 pg. 3, Line 25 * NC Alloc. Factor	
18	Return on undercollection of Non-residential EE Program Costs	Miller Exhibit 3 page 15	
19	Total EE Program Cost and Incentive Components	Line 16 + Line 17 + Line 18	
20	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	
21	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 19 * Line 20	
22	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3	9,507,185
23	Total Non-Residential EE Revenue Requirement	Line 21 + Line 22	9,507,185
24	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 10	
25	Non-Residential EE Revenue Requirement	Line 23 - Line 24	9,507,185
26	Projected NC Residential Sales (kWh)	Miller Exhibit 6, Line 10	17,320,957,422
27	NC Non-Residential EE billing factor (Cents/kWh)	Line 25/Line 26*100	0.0549

E-7 Sub 1105 Rider 9 Year 1 Estimate	E-7 Sub 1130 Year 2018 Yr 2 LR Estimate	E-7 Sub 1192 Rider 11 True up	Year 2018
40,592,549		(3,317,005)	37,275,944
11,623,199		2,818,045	14,441,244
		461,049	461,049
52,216,148		(37,911)	52,178,237
1.001402		1.001402	
52,289,355		(37,965)	52,251,390
5,167,253	8,746,000	2,933,863	16,847,117
57,456,608	8,746,000	2,895,899	69,098,507
			64,283,845
			4,814,662
			17,320,957,422
			0.0278

DSM Programs

		Reference
28	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor
29	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 3 Line 26 * NC Alloc. Factor
30	Return on undercollection of Non-residential DSM Program Costs	Miller Exhibit 3 page 16
31	Total Non-Residential DSM Program Cost and Incentive Components	Line 28 + Line 29 + Line 30
32	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7
33	Total Non-Residential DSM Revenue Requirement	Line 31 * Line 32
34	Total Collected for Vintage Year 2018 (through estimated Rider 10)	Miller Exhibit 4 Line 15
35	Non-Residential EE Revenue Requirement True-up Amount	Line 33- Line 34
36	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6 Line 11
37	NC Non-Residential DSM billing factor	Line 35/Line 36*100

E-7 Sub 1105 Rider 9 Year 1 Estimate		E-7 Sub 1192 Rider 11 True Up	Year 2018
11,959,889		651,281	12,611,170
3,103,667		232,789	3,336,456
-		37,743	37,743
15,063,556		921,812	15,985,368
1.001402		1.001402	
15,084,675		923,105	16,007,780
			14,609,687
			1,398,093
			18,056,545,344
			0.0077

** Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Year 2 Lost Revenues for Vintage Year 2019

RESIDENTIAL

Line		Reference	2019
1	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 148	5,232,466
2	Projected NC Residential Sales (kWh)	Miller Exhibit 6	$ 21,487,301,475
3	**NC Residential EE Billing Factor (Cents/kWh)**	Line 1/Line 2*100	**0.0244**

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	2019
4	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 165	8,746,000
5	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6	17,184,515,812
6	**NC Non-Residential EE billing factor (Cents/kWh)**	Line 4/Line 5*100	**0.0509**

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2020

RESIDENTIAL

Line		Reference	2020
1	Residential EE Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 33,551,578
2	Residential EE Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	3,173,534
3	Total EE Program Cost and Incentive Components	Line 1 + Line 2, Evans Exhibit 1, Line 10	36,725,112
4	Residential DSM Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	12,243,392
5	Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	3,189,876
6	Total DSM Program Cost and Incentive Components	Line 4 + Line 5, Evans Exhibit 1, Line 12	15,433,268
7	Total EE/DSM Program Cost and Incentive Components	Line 3 + Line 6	52,158,380
8	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
9	Total EE/DSM Program Cost and Incentive Revenue Requirement	Line 7 * Line 8	52,231,506
10	Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 177	14,667,095
11	**Total Residential EE Revenue Requirement**	**Line 9 + Line 10**	$ 66,898,601

See Miller Exhibit 1 for rate

NON-RESIDENTIAL
Energy Efficiency Programs

		Reference	2020
12	Non- Residential EE Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 37,708,077
13	Non-Residential EE Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	10,010,194
14	Total EE Program Cost and Incentive Components	Line 12 + Line 13, Evans Exhibit 1, Line 27	47,718,271
15	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
16	Total Non-Residential EE Program Cost and Incentive Revenue Requirements	Line 14 * Line 15	47,785,172
17	Non-Residential Net Lost Revenues	Evans Exhibit 2 pg. 3 Line 194	5,183,193
18	**Total Non-Residential EE Revenue Requirement**	Line 16 + Line 17	$ 52,968,365
19	Projected NC Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 14	17,184,515,812
20	**NC Non-Residential EE billing factor (Cents/kWh)**	Line 18/Line 19*100	0.3082

DSM Programs

			2020
21	Non-Residential DSM Program Cost	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	$ 15,789,462
22	Non-Residential DSM Earned Utility Incentive	Evans Exhibit 1, pg. 5 * NC Alloc. Factor	4,113,764
23	Total Non-Residential DSM Program Cost and Incentive Components	Line 21 + Line 22, Evans Exhibit 1, Line 29	19,903,226
24	Revenue-related taxes and regulatory fees factor	Miller Exhibit 2, pg. 7	1.001402
25	Total Non-Residential DSM Revenue Requirement	Line 23 * Line 24	19,931,130
26	Projected NC Non-Residential Sales (kWh)	Miller Exhibit 6, pg. 1, Line 15	18,099,339,344
27	**NC Non-Residential DSM billing factor**	Line 25/Line 26*100	0.1101

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Gross Receipts Tax Years 2015 through estimated 2020

	Year		Actual GRT Rate In Effect
	2015	Jan - June	1.001352
		July - Dec	1.001482
Rider 6	2015	Weighted Average	1.001417
Rider 7	2016	Jan - June	1.001482
		July - Dec	1.001402
		Weighted Average	1.001442
Rider 8	2017		1.001402
Rider 9	2018		1.001402
Rider 10	2019		1.001402
Rider 11	2020		1.001402

Note: the current rate is used as the estimate for 2019 and 2020. This will be subject to true-up based on actual rates in effect.

Supplemental E/A

Miller Exhibit 3, page 1A
NO CHANGE

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2015

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%			(1-233503)	
Beginning Balance - source		(200,678)			(47,390)						
2018	January	(186,248)	0.236149	3,408	(43,982)	(142,265)	0.006075	(432)	(432)	0.766497	(564)
2018	February	(157,663)	0.236149	6,750	(37,232)	(120,431)	0.006075	(798)	(1,230)	0.766497	(1,605)
2018	March	(136,697)	0.236149	4,951	(32,281)	(104,416)	0.006075	(683)	(1,913)	0.766497	(2,496)
2018	April	(115,580)	0.236149	4,987	(27,294)	(88,286)	0.006075	(585)	(2,498)	0.766497	(3,259)
2018	May	(97,147)	0.236149	4,353	(22,941)	(74,206)	0.006075	(494)	(2,992)	0.766497	(3,903)
2018	June	(70,765)	0.236149	6,230	(16,711)	(54,054)	0.006075	(390)	(3,382)	0.766497	(4,412)
2018	July	(40,447)	0.236149	7,160	(9,551)	(30,895)	0.006075	(258)	(3,640)	0.766497	(4,748)
2018	August	(12,568)	0.236149	6,584	(2,968)	(9,600)	0.005692	(115)	(3,755)	0.766497	(4,899)
2018	September	17,373	0.236149	7,070	4,103	13,270	0.005692	10	(3,744)	0.766497	(4,885)
2018	October	38,455	0.236149	4,979	9,081	29,374	0.005692	121	(3,623)	0.766497	(4,727)
2018	November	57,923	0.236149	4,597	13,679	44,245	0.005692	210	(3,414)	0.766497	(4,453)
2018	December	(536,672)	0.236149	(140,413)	(126,735)	(409,938)	0.005692	(1,041)	(4,454)	0.766497	(5,811)
								(4,454)			(5,811)

Note 1: Revenues collected represent amounts actually collected through 2018.

Interest Calculation

2017 - Rider 8	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	Lost Revenues	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		27,959,114	26,837,675	1,121,439		-	-		-	-	1,121,439
	January					-	-		-	-	1,121,439
	February					-	-		-	-	1,121,439
	March					-	-		-	-	1,121,439
	April					-	-		-	-	1,121,439
	May					-	-		-	-	1,121,439
	June					-	-		-	-	1,121,439
	July					-	-		-	-	1,121,439
	August					-	-		-	-	1,121,439
	September					-	-		-	-	1,121,439
	October					-	-		-	-	1,121,439
	November					-	-		-	-	1,121,439
	December					-	-		-	-	1,121,439
YTD Balance		27,959,114	26,837,675	1,121,439	14,733,024	14,142,082	590,942	4,852,974	4,658,321	194,654	1,907,034

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2015

Interest Calculation

2018 - Rider9 Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	Lost Revenues	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance	27,959,114	26,837,675	1,121,439	14,733,024	14,142,082	590,942	4,852,974	4,658,321	194,654	1,907,034
January		-	-		155,318	(155,318)		2,365	(2,365)	1,749,351
February		-	-		390,165	(390,165)		5,942	(5,942)	1,353,244
March		-	-		326,594	(326,594)		4,974	(4,974)	1,021,675
April		-	-		242,852	(242,852)		3,699	(3,699)	775,124
May		-	-		236,501	(236,501)		3,602	(3,602)	535,022
June		-	-		316,267	(316,267)		4,817	(4,817)	213,938
July		-	-		402,008	(402,008)		6,123	(6,123)	(194,192)
August		-	-		420,989	(420,989)		6,412	(6,412)	(621,592)
September		-	-		406,238	(406,238)		6,187	(6,187)	(1,034,017)
October		-	-		267,581	(267,581)		4,075	(4,075)	(1,305,673)
November		-	-		235,865	(235,865)		3,592	(3,592)	(1,545,130)
December		-	-	8,263,187	565,268	7,697,919	126,047	8,609	117,438	6,270,227
YTD Balance	-	-	-	8,263,187	3,965,645	4,297,542	126,047	60,396	65,651	
Cumulative Ending Balance	27,959,114	26,837,675	1,121,439	22,996,211	18,107,728	4,888,483	4,979,022	4,718,717	260,305	6,270,227

Interest Calculation

2019 - Rider10 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Undercollected Balance	Lost Revenues	Revenue Collected	Cumulative Undercollected Balance	PPI	Revenue Collected	Cumulative Undercollected Balance	Total Cumulative Under/(Over) Collected Balance
Beginning Balance	27,959,114	26,837,675	1,121,439	22,996,211	18,107,728	4,888,483	4,979,022	4,718,717	260,305	6,270,227
January		53,450	1,067,989		-	4,888,483		-	260,305	6,216,777
February		105,182	962,808		-	4,888,483		-	260,305	6,111,595
March		96,023	866,784		-	4,888,483		-	260,305	6,015,572
April		91,900	774,884		-	4,888,483		-	260,305	5,923,672
May		85,130	689,755		-	4,888,483		-	260,305	5,838,542
June		108,233	581,522		-	4,888,483		-	260,305	5,730,310
July		134,008	447,514		-	4,888,483		-	260,305	5,596,302
August		132,032	315,482		-	4,888,483		-	260,305	5,464,270
September		114,599	200,883		-	4,888,483		-	260,305	5,349,671
October		89,350	111,533		-	4,888,483		-	260,305	5,260,321
November		87,057	24,476		-	4,888,483		-	260,305	5,173,264
December		225,155	(200,678)	6,753,855	8,269,323	3,373,016		148,603	111,702	3,284,039
YTD Balance	-	1,322,117		6,753,855	8,269,323		-	148,603		
Cumulative Ending Balance	27,959,114	28,159,792	(200,678)	29,750,066	26,377,050	3,373,016	4,979,022	4,867,320	111,702	3,284,039

Interest Calculation

2020 - Rider 11 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Undercollected Balance	Lost Revenues	Revenue Collected	Cumulative Undercollected Balance	PPI	Revenue Collected	Cumulative Undercollected Balance	Total Cumulative Under/(Over) Collected Balance
Beginning Balance	27,959,114	28,159,792	(200,678)	29,750,066	26,377,050	3,373,016	4,979,022	4,867,320	111,702	3,284,039
January		(14,431)	(186,248)	900,128	393,209	3,879,934		10,620	101,081	3,794,768
February		(28,585)	(157,663)	797,208	778,892	3,898,250		21,037	80,044	3,820,631
March		(20,966)	(136,697)	708,474	571,275	4,035,448		15,430	64,614	3,963,366
April		(21,117)	(115,580)	625,633	575,405	4,085,676		15,541	49,073	4,019,169
May		(18,433)	(97,147)	543,299	502,268	4,126,708		13,566	35,507	4,065,068
June		(26,381)	(70,765)	450,244	718,851	3,858,100		19,416	16,091	3,803,425
July		(30,319)	(40,447)	365,764	826,133	3,397,731		22,313	(6,222)	3,351,062
August		(27,879)	(12,568)		759,650	2,638,081		20,518	(26,740)	2,598,773
September		(29,941)	17,373		815,838	1,822,243		22,035	(48,775)	1,790,841
October		(21,082)	38,455		574,463	1,247,781		15,869	(64,645)	1,221,592
November		(19,468)	57,923		530,467	717,314		14,328	(78,972)	696,265
December		(45,704)	103,627		1,245,359	(528,045)		33,282	(112,255)	(536,672)
YTD Balance	-	(304,305)		4,390,750	8,291,811		-	223,956		
Cumulative Ending Balance	27,959,114	27,855,487	103,627	34,140,816	34,668,861	(528,045)	4,979,022	5,091,276	(112,255)	(536,672)

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2015

NC Residential DSM		Total System NC DSM Program Costs Incurred	NC Residential DSM Allocation %	NC Allocated DSM Residential Program Costs	NC Residential Revenue Collected(EEC2)	NC Residential DSM Program Collection %	DSM Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 2 Line 9			See calc. at right		
Beginning Balance - from RI		31,962,633	32.5218612%	10,394,843	12,983,975		(10,384,396)	10,447
2018	January		32.5218612%	-	1,070	61.5470492%	(659)	(659)
2018	February		32.5218612%	-	2,102	61.5470492%	(1,294)	(1,294)
2018	March		32.5218612%	-	1,547	61.5470492%	(952)	(952)
2018	April		32.5218612%	-	1,558	61.5470492%	(959)	(959)
2018	May		32.5218612%	-	1,362	61.5470492%	(838)	(838)
2018	June		32.5218612%	-	1,942	61.5470492%	(1,195)	(1,195)
2018	July		32.5218612%	-	2,229	61.5470492%	(1,372)	(1,372)
2018	August		32.5218612%	-	2,051	61.5470492%	(1,262)	(1,262)
2018	September		32.5218612%	-	2,201	61.5470492%	(1,355)	(1,355)
2018	October		32.5218612%	-	1,555	61.5470492%	(957)	(957)
2018	November		32.5218612%	-	1,437	61.5470492%	(885)	(885)
2018	December		32.5218612%	-	3,351	61.5470492%	(2,062)	(2,062)
		-		10,394,843	13,006,378		(10,398,185)	(3,341)

Program Costs to be recovered in Rider 11	10,447
Revenue Requirement Requested in Rider 11	16,974
Percent of Revenue to be applied to total collections	62%

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - from RI		10,447			2,467	7,980					
2018	January	9,789	0.236149	(156)	2,312	7,477	0.006075	47	47	0.766497	61
2018	February	8,495	0.236149	(306)	2,006	6,489	0.006075	42	89	0.766497	117
2018	March	7,543	0.236149	(225)	1,781	5,762	0.006075	37	127	0.766497	165
2018	April	6,584	0.236149	(226)	1,555	5,029	0.006075	33	159	0.766497	208
2018	May	5,746	0.236149	(198)	1,357	4,389	0.006075	29	188	0.766497	245
2018	June	4,551	0.236149	(282)	1,075	3,476	0.006075	24	212	0.766497	276
2018	July	3,179	0.236149	(324)	751	2,429	0.006075	18	230	0.766497	300
2018	August	1,917	0.236149	(298)	453	1,464	0.005692	11	241	0.766497	314
2018	September	563	0.236149	(320)	133	430	0.005692	5	246	0.766497	321
2018	October	(395)	0.236149	(226)	(93)	(301)	0.005692	0	247	0.766497	322
2018	November	(1,279)	0.236149	(209)	(302)	(977)	0.005692	(4)	243	0.766497	317
2018	December	(3,341)	0.236149	(487)	(789)	(2,552)	0.005692	(10)	233	0.766497	304
								233			304

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2015

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected(EEC15)	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5. pg 2, Line 4	-		See calc. at right		
Beginning Balance - source Rider		40,096,318	72.9564706%	29,252,858	49,895,986		(27,536,038)	1,716,820
2018	January		72.9564706%	-	568,041	20.6964576%	(117,564)	(117,564)
2018	February		72.9564706%	-	602,713	20.6964576%	(124,740)	(124,740)
2018	March		72.9564706%	-	539,207	20.6964576%	(111,597)	(111,597)
2018	April		72.9564706%	-	571,303	20.6964576%	(118,239)	(118,239)
2018	May		72.9564706%	-	583,957	20.6964576%	(120,858)	(120,858)
2018	June		72.9564706%	-	707,348	20.6964576%	(146,396)	(146,396)
2018	July		72.9564706%	-	719,033	20.6964576%	(148,814)	(148,814)
2018	August		72.9564706%	-	715,298	20.6964576%	(148,041)	(148,041)
2018	September		72.9564706%	-	797,739	20.6964576%	(165,104)	(165,104)
2018	October		72.9564706%	-	826,401	20.6964576%	(171,036)	(171,036)
2018	November		72.9564706%	-	568,555	20.6964576%	(117,671)	(117,671)
2018	December		72.9564706%	-	787,159	20.6964576%	(162,914)	(162,914)
		-		29,252,858	57,882,741		(25,883,063)	63,845

Program Cost Allocation Calculation	
Non-Res EE Program Costs under collected balance	1,716,820
Non-Res EE Revenue Requirement in Rider 9	8,295,238
% Revenue related to Program Costs	21%
Note: Vintage Year 2015 collections in 2018 stem from Rider 9	

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance from Rider 9		1,716,820			405,425	1,311,395					
2018	January	1,599,256	0.236149	(27,762.70)	377,663	1,221,593	0.006075	7,694	7,694	0.766497	10,038
2018	February	1,474,516	0.236149	(29,457.30)	348,205	1,126,310	0.006075	7,132	14,826	0.766497	19,342
2018	March	1,362,919	0.236149	(26,353.48)	321,852	1,041,067	0.006075	6,583	21,409	0.766497	27,931
2018	April	1,244,680	0.236149	(27,922.13)	293,930	950,750	0.006075	6,050	27,459	0.766497	35,824
2018	May	1,123,821	0.236149	(28,540.60)	265,389	858,432	0.006075	5,495	32,955	0.766497	42,994
2018	June	977,425	0.236149	(34,571.28)	230,818	746,607	0.006075	4,875	37,830	0.766497	49,354
2018	July	828,611	0.236149	(35,142.37)	195,676	632,935	0.006075	4,190	42,020	0.766497	54,821
2018	August	680,569	0.236149	(34,959.80)	160,716	519,854	0.005692	3,281	45,301	0.766497	59,101
2018	September	515,466	0.236149	(38,989.08)	121,727	393,739	0.005692	2,600	47,901	0.766497	62,493
2018	October	344,430	0.236149	(40,389.92)	81,337	263,093	0.005692	1,869	49,770	0.766497	64,932
2018	November	226,759	0.236149	(27,787.83)	53,549	173,210	0.005692	1,242	51,012	0.766497	66,552
2018	December	63,845	0.236149	(38,471.97)	15,077	48,768	0.005692	632	51,643	0.766497	67,376
								51,643			67,376

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2015

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	Incentives Earned & GRT remitted (Allocated based on WA of Program Costs Incurred)	Total DSM Revenue Requirement	NC Non-Residential DSM Revenue Collected(DS1S)	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	(Over)/Under Collection
			See Miller Exhibit S pg. 2, Line 10		calculated interest on entire balance due to over-collection in total			100% used due to over-collection of entire vintage		
Beginning Balance - revenue req		**31,958,782**	**42.4483655%**	**13,565,981**	**2,960,385**	**16,526,366**	**16,946,105**	**100.000000%**	**(16,946,105)**	**(419,739)**
2018	January	-	42.4483655%	-		-	(53,805)	100.000000%	(53,805)	53,805
2018	February	-	42.4483655%	-		-	(37,120)	100.000000%	(37,120)	37,120
2018	March	-	42.4483655%	-		-	(32,596)	100.000000%	(32,596)	32,596
2018	April	-	42.4483655%	-		-	(35,291)	100.000000%	(35,291)	35,291
2018	May	-	42.4483655%	-		-	(35,545)	100.000000%	(35,545)	35,545
2018	June	-	42.4483655%	-		-	(42,596)	100.000000%	(42,596)	42,596
2018	July	-	42.4483655%	-		-	(44,317)	100.000000%	(44,317)	44,317
2018	August	-	42.4483655%	-		-	(43,372)	100.000000%	(43,372)	43,372
2018	September	-	42.4483655%	-		-	(48,517)	100.000000%	(48,517)	48,517
2018	October	-	42.4483655%	-		-	(50,018)	100.000000%	(50,018)	50,018
2018	November	-	42.4483655%	-		-	(35,152)	100.000000%	(35,152)	35,152
2018	December	-	42.4483655%	-		-	(56,830)	100.000000%	(56,830)	56,830
		-		-		16,526,366	16,430,948			95,418

Program Cost Allocation Methodology
No program cost allocation is needed because the vintage was overcollected in total and interest due was calculated on the entire vintage.

Therefore, 100% of all revenues offset the overcollected balance.

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - from Rider S		**(419,739)**			**(99,121)**	**(320,618)**					
2018	January	(365,934)	0.236149	12,706	(86,415)	(279,519)	0.006075	(1,823)	(1,823)	0.766497	(2,378)
2018	February	(328,814)	0.236149	8,766	(77,649)	(251,165)	0.006075	(1,612)	(3,435)	0.766497	(4,481)
2018	March	(296,218)	0.236149	7,597	(69,952)	(226,267)	0.006075	(1,450)	(4,885)	0.766497	(6,373)
2018	April	(260,927)	0.236149	8,334	(61,618)	(199,310)	0.006075	(1,293)	(6,178)	0.766497	(8,060)
2018	May	(225,383)	0.236149	8,394	(53,224)	(172,159)	0.006075	(1,128)	(7,306)	0.766497	(9,532)
2018	June	(182,787)	0.236149	10,059	(43,165)	(139,622)	0.006075	(947)	(8,253)	0.766497	(10,767)
2018	July	(138,470)	0.236149	10,465	(32,700)	(105,771)	0.006075	(745)	(8,999)	0.766497	(11,740)
2018	August	(95,098)	0.236149	10,242	(22,457)	(72,641)	0.005692	(508)	(9,506)	0.766497	(12,402)
2018	September	(46,581)	0.236149	11,457	(11,000)	(35,581)	0.005692	(308)	(9,814)	0.766497	(12,804)
2018	October	3,437	0.236149	11,812	812	2,625	0.005692	(94)	(9,908)	0.766497	(12,926)
2018	November	38,589	0.236149	8,301	9,113	29,476	0.005692	91	(9,817)	0.766497	(12,807)
2018	December	95,418	0.236149	13,420	22,533	72,885	0.005692	291	(9,525)	0.766497	(12,427)
								(9,525)			(12,427)

Note 1: Revenues collected represent amounts actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2016

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - source		11,777,137			2,781,159	8,995,978					
2018	January	11,187,036	0.236149	(139,352)	2,641,807	8,545,229	0.006075	53,281	53,281	0.766497	69,513
2018	February	9,990,702	0.236149	(282,513)	2,359,294	7,631,407	0.006075	49,137	102,418	0.766497	133,618
2018	March	9,120,709	0.236149	(205,448)	2,153,846	6,966,862	0.006075	44,342	146,760	0.766497	191,469
2018	April	8,244,224	0.236149	(206,981)	1,946,865	6,297,359	0.006075	40,290	187,050	0.766497	244,033
2018	May	7,482,701	0.236149	(179,833)	1,767,032	5,715,668	0.006075	36,490	223,540	0.766497	291,638
2018	June	6,380,741	0.236149	(260,227)	1,506,806	4,873,936	0.006075	32,166	255,706	0.766497	333,603
2018	July	5,110,153	0.236149	(300,048)	1,206,757	3,903,395	0.006075	26,661	282,367	0.766497	368,386
2018	August	3,944,064	0.236149	(275,371)	931,387	3,012,678	0.006692	19,682	302,049	0.766497	394,064
2018	September	2,689,658	0.236149	(296,227)	635,160	2,054,498	0.006692	14,420	316,469	0.766497	412,877
2018	October	1,814,656	0.236149	(206,631)	428,529	1,386,127	0.006692	9,791	326,261	0.766497	425,652
2018	November	1,008,808	0.236149	(190,300)	238,229	770,579	0.006692	6,138	332,398	0.766497	433,659
2018	December	(1,972,320)	0.236149	(703,990)	(465,762)	(1,506,559)	0.006692	(2,094)	330,304	0.766497	430,926
								330,304			430,926

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Lost Revenue	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761
	January					-	-				18,689,761
	February					-	-				18,689,761
	March					-	-				18,689,761
	April					-	-				18,689,761
	May					-	-				18,689,761
	June					-	-				18,689,761
	July					-	-				18,689,761
	August					-	-				18,689,761
	September					-	-				18,689,761
	October					-	-				18,689,761
	November					-	-				18,689,761
	December					-	-				18,689,761
YTD Balance		40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761

		%
EE Program Costs	40,021,103	0.63
EE PPI & GRT	6,821,368	0.11
EE Lost Revenue	16,669,126	0.26
Total EE Revenue Requirement	63,511,597	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2016

Interest Calculation

2019 - Rider 10 Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Lost Revenue	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance	40,021,103	28,243,964	11,777,138	6,821,368	4,814,022	2,007,346	16,669,126	11,763,849	4,905,277	18,689,761
January			-			-				18,689,761
February			-			-				18,689,761
March			-			-				18,689,761
April			-			-				18,689,761
May			-			-				18,689,761
June			-			-				18,689,761
July			-			-				18,689,761
August			-			-				18,689,761
September			-			-				18,689,761
October			-			-				18,689,761
November			-			-				18,689,761
December	(2)		(2)	(50,792.97)		(50,793)	2,424,300	5,570,022	(3,145,722)	15,493,244
YTD Balance	(2)	-	(2)	(50,793)	-	(50,793)	2,424,300	5,570,022	(3,145,722)	15,493,244
Cumulative Ending Balance	40,021,101	28,243,964	11,777,137	6,770,575	4,814,022	1,956,553	19,093,426	17,333,871	1,759,555	15,493,244

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the undercollection of Year 1 Program costs or PPI. Interest continued to accrue on beginning balance.

Interest Calculation

2020- Rider 11 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Lost Revenue	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance	40,021,101	28,243,964	11,777,137	6,770,575	4,814,022	1,956,553	19,093,426	17,333,871	1,759,555	15,493,244
January		590,101	11,187,036		98,034	1,858,519	1,390,664	575,924	2,574,295	15,619,850
February		1,196,334	9,990,702		198,749	1,659,770	1,390,664	1,167,592	2,797,367	14,447,839
March		869,993	9,120,709		144,533	1,515,237	1,390,664	849,091	3,338,940	13,974,885
April		876,484	8,244,224		145,612	1,369,625	1,390,664	855,427	3,874,178	13,488,027
May		761,524	7,482,701		126,513	1,243,112	1,390,664	743,228	4,521,614	13,247,426
June		1,101,959	6,380,741		183,070	1,060,042	1,390,664	1,075,485	4,836,793	12,277,576
July		1,270,589	5,110,153		211,085	848,957	1,390,651	1,240,063	4,937,381	10,946,491
August		1,166,088	3,944,064		193,724	655,233		1,138,073	3,849,308	8,448,606
September		1,254,406	2,689,658		208,396	446,837		1,224,269	2,625,039	5,761,535
October		875,003	1,814,656		145,365	301,471		853,981	1,771,059	3,887,186
November		805,848	1,008,808		133,877	167,595		786,488	984,571	2,160,973
December		1,929,546	(920,739)		320,558	(152,964)		1,883,189	(898,618)	(1,972,320)
Cumulative Ending Balance	40,021,101	40,941,840	(920,739)	6,770,575	6,923,539	(152,964)	28,828,063	29,726,681	(898,618)	(1,972,320)

Revenue Requirement:		
Program Costs	11,777,137	0.47
PPI & GRT	1,956,553	0.08
Lost Revenue	11,494,191	0.46
Total Revenue Requirement	25,227,881	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2016

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - source		(986,784)			(233,028)	(753,756)					
2018	January	(943,803)	0.236149	10,150	(222,878)	(720,925)	0.006075	(4,479)	(4,479)	0.766497	(5,844)
2018	February	(851,272)	0.236149	21,851	(201,027)	(650,245)	0.006075	(4,165)	(8,644)	0.766497	(11,278)
2018	March	(785,414)	0.236149	15,552	(185,475)	(599,939)	0.006075	(3,797)	(12,442)	0.766497	(16,232)
2018	April	(719,025)	0.236149	15,678	(169,797)	(549,228)	0.006075	(3,491)	(15,932)	0.766497	(20,786)
2018	May	(662,033)	0.236149	13,459	(156,338)	(505,694)	0.006075	(3,204)	(19,137)	0.766497	(24,966)
2018	June	(577,215)	0.236149	20,030	(136,309)	(440,906)	0.006075	(2,875)	(22,012)	0.766497	(28,718)
2018	July	(478,615)	0.236149	23,284	(113,024)	(365,590)	0.006075	(2,450)	(24,462)	0.766497	(31,914)
2018	August	(388,556)	0.236149	21,267	(91,757)	(296,799)	0.006075	(2,012)	(26,474)	0.766497	(34,539)
2018	September	(291,278)	0.236149	22,972	(68,785)	(222,493)	0.006075	(1,577)	(28,051)	0.766497	(36,596)
2018	October	(225,011)	0.236149	15,649	(53,136)	(171,875)	0.006075	(1,198)	(29,249)	0.766497	(38,159)
2018	November	(164,396)	0.236149	14,314	(38,822)	(125,574)	0.006075	(904)	(30,152)	0.766497	(39,338)
2018	December	(11,973)	0.236149	35,994	(2,827)	(9,146)	0.006075	(409)	(30,562)	0.766497	(39,872)
								(30,562)			(39,872)

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983.02	(221,311)	(986,784)
	January					-	-	(986,784)
	February					-	-	(986,784)
	March					-	-	(986,784)
	April					-	-	(986,784)
	May					-	-	(986,784)
	June					-	-	(986,784)
	July					-	-	(986,784)
	August					-	-	(986,784)
	September					-	-	(986,784)
	October					-	-	(986,784)
	November					-	-	(986,784)
	December					-	-	(986,784)
YTD Balance		9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	

		%
DSM Program Costs	9,600,575	0.78
DSM PPI & GRT	2,775,672	0.22
Total Revenue Requirement	12,376,248	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2016

Interest Calculation

2019 - Rider 10 Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance	9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)
January			-			-	(986,784)
February			-			-	(986,784)
March			-			-	(986,784)
April			-			-	(986,784)
May			-			-	(986,784)
June			-			-	(986,784)
July			-			-	(986,784)
August			-			-	(986,784)
September			-			-	(986,784)
October			-			-	(986,784)
November			-			-	(986,784)
December			-			-	(986,784)
YTD Balance	-	-	-		-	-	(986,784)
Cumulative Ending Balance	9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the overcollection of Program costs or PPI. Interest continued to accrue on beginning balance.

Interest Calculation

2020- Rider 11 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance	9,600,575	10,366,049	(765,474)	2,775,672	2,996,983	(221,311)	(986,784)
January		(38,138)	(727,336)	(6,183)	(11,026)	(216,467)	(943,803)
February		(76,575)	(650,761)	(6,183)	(22,139)	(200,511)	(851,272)
March		(55,884)	(594,877)	(6,183)	(16,157)	(190,537)	(785,414)
April		(56,295)	(538,582)	(6,183)	(16,276)	(180,443)	(719,025)
May		(49,007)	(489,575)	(6,183)	(14,169)	(172,458)	(662,033)
June		(70,591)	(418,984)	(6,183)	(20,409)	(158,231)	(577,215)
July		(81,283)	(337,701)	(6,183)	(23,500)	(140,914)	(478,615)
August		(74,657)	(263,044)	(6,183)	(21,585)	(125,512)	(388,556)
September		(80,257)	(182,787)	(6,183)	(23,204)	(108,491)	(291,278)
October		(56,201)	(126,586)	(6,183)	(16,249)	(98,425)	(225,011)
November		(51,817)	(74,769)	(6,183)	(14,981)	(89,627)	(164,396)
December		(123,063)	48,294	(6,220)	(35,579)	(60,267)	(11,973)
YTD Balance	-	(813,768)		(74,230)	(235,273)	(60,267)	(11,973)
Cumulative Ending Balance	9,600,575	9,552,281	48,294	2,701,443	2,761,710	(60,267)	(11,973)

Revenue Requirement:		
Program Costs	(765,474)	0.78
PPI	(221,311)	0.22
Total	(986,784)	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2016

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	Total Revenue Collected	Percent Attributable to Program Costs	NC Residential Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5. pg 3, Line 4					
Beginning Balance - Source Ride		68,416,594		50,009,987	45,662,897	69.71121%	(31,832,160)	18,177,827
2018	January		73.0962827%	-	679,787	45.63863%	(310,246)	(310,246)
2018	February		73.0962827%	-	2,902,313	45.63863%	(1,324,576)	(1,324,576)
2018	March		73.0962827%	-	2,586,992	45.63863%	(1,180,668)	(1,180,668)
2018	April		73.0962827%	-	2,741,877	45.63863%	(1,251,355)	(1,251,355)
2018	May		73.0962827%	-	2,801,556	45.63863%	(1,278,592)	(1,278,592)
2018	June		73.0962827%	-	3,405,104	45.63863%	(1,554,043)	(1,554,043)
2018	July		73.0962827%	-	3,471,798	45.63863%	(1,584,481)	(1,584,481)
2018	August		73.0962827%	-	3,444,453	45.63863%	(1,572,001)	(1,572,001)
2018	September		73.0962827%	-	3,831,885	45.63863%	(1,748,820)	(1,748,820)
2018	October		73.0962827%	-	4,000,975	45.63863%	(1,825,990)	(1,825,990)
2018	November		73.0962827%	-	2,724,564	45.63863%	(1,243,454)	(1,243,454)
2018	December	-	73.0962827%	-	3,701,529	45.63863%	(1,689,327)	(1,689,327)
		-		50,009,987	81,955,731		(48,395,713)	1,614,274

Program Costs to be Recovered in Rider 9	18,177,827
Revenues to be Collected in Rider 9	39,829,912
% Revenue to be assigned to Program Costs	0.4564

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	-
							6.83%				
Beginning Balance - Source Ride		18,177,827			4,292,676						
2018	January	17,867,582	0.236149	(73,264.18)	4,219,412	13,648,170	0.006075	41,456	41,456	0.766497	54,085
2018	February	16,543,006	0.236149	(312,797.25)	3,906,614	12,636,391	0.006075	79,839	121,296	0.766497	158,247
2018	March	15,362,338	0.236149	(278,813.47)	3,627,801	11,734,537	0.006075	74,027	195,322	0.766497	254,825
2018	April	14,110,983	0.236149	(295,506.26)	3,332,295	10,778,689	0.006075	68,384	263,706	0.766497	344,041
2018	May	12,832,391	0.236149	(301,938.21)	3,030,356	9,802,035	0.006075	62,514	326,220	0.766497	425,599
2018	June	11,278,348	0.236149	(366,985.70)	2,663,371	8,614,977	0.006075	55,942	382,162	0.766497	498,582
2018	July	9,693,867	0.236149	(374,173.59)	2,289,197	7,404,670	0.006075	48,660	430,822	0.766497	562,066
2018	August	8,121,866	0.236149	(371,226.57)	1,917,970	6,203,895	0.006075	41,336	472,158	0.766497	615,994
2018	September	6,373,046	0.236149	(412,982.12)	1,504,988	4,868,057	0.006075	33,631	505,789	0.766497	659,870
2018	October	4,547,055	0.236149	(431,205.81)	1,073,783	3,473,273	0.006075	25,337	531,125	0.766497	692,926
2018	November	3,303,601	0.236149	(293,640.40)	780,142	2,523,459	0.006075	18,215	549,341	0.766497	716,690
2018	December	1,614,274	0.236149	(398,932.93)	381,209	1,233,065	0.006075	11,410	560,751	0.766497	731,576
								560,751			731,576

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
Beginning Balance - Source Rid		45,391			10,719	34,672					
2018	January	38,152	0.236149	(1,710)	9,010	29,142	0.006075	194	194	0.766497	253
2018	February	(3,375)	0.236149	(9,807)	(797)	(2,578)	0.006075	81	275	0.766497	358
2018	March	(39,808)	0.236149	(8,604)	(9,401)	(30,407)	0.006075	(100)	174	0.766497	227
2018	April	(17,951)	0.236149	5,161	(4,239)	(13,712)	0.006075	(134)	40	0.766497	53
2018	May	(42,359)	0.236149	(5,764)	(10,003)	(32,356)	0.006075	(140)	(100)	0.766497	(130)
2018	June	(71,615)	0.236149	(6,909)	(16,912)	(54,703)	0.006075	(264)	(364)	0.766497	(475)
2018	July	(102,080)	0.236149	(7,194)	(24,106)	(77,974)	0.006075	(403)	(767)	0.766497	(1,001)
2018	August	(131,902)	0.236149	(7,042)	(31,148)	(100,753)	0.005692	(509)	(1,276)	0.766497	(1,664)
2018	September	(164,952)	0.236149	(7,805)	(38,953)	(125,999)	0.005692	(645)	(1,921)	0.766497	(2,506)
2018	October	(199,743)	0.236149	(8,216)	(47,169)	(152,574)	0.005692	(793)	(2,714)	0.766497	(3,540)
2018	November	(223,833)	0.236149	(5,689)	(52,858)	(170,975)	0.005692	(921)	(3,635)	0.766497	(4,742)
2018	December	(250,377)	0.236149	(6,268)	(59,126)	(191,251)	0.005692	(1,031)	(4,665)	0.766497	(6,087)
								(4,665)			(6,087)

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

2018 - Rider 9	Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Under/Over Collected
Beginning Balance		-	11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	309,521
	January					-	-	309,521
	February					-	-	309,521
	March					-	-	309,521
	April					-	-	309,521
	May					-	-	309,521
	June					-	-	309,521
	July					-	-	309,521
	August					-	-	309,521
	September					-	-	309,521
	October					-	-	309,521
	November					-	-	309,521
	December					-	-	309,521
YTD Balance			11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	

		%
DSM Program Costs	11,594,497	0.78
DSM PPI & GRT	3,352,151	0.22
Total Revenue Requirement	14,946,648	

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016

Interest Calculation

2019 - Rider 10 Month	NC Program Costs Incurred	Revenue Collected	Undercollected Balance	PPI	Revenue Collected	Undercollected Balance	Total Cumulative Over/Under Collected
Beginning Balance	11,594,497	11,354,396	240,102	3,352,151	3,282,731	69,419	309,521
January		192,582	(192,582)		55,678	(55,678)	61,261
February		1,806	(1,806)		522	(522)	58,933
March		(2,074)	2,074		(600)	600	61,607
April		(294)	294		(85)	85	61,986
May		20	(20)		6	(6)	61,960
June		(7)	7		(2)	2	61,969
July		(4)	4		(1)	1	61,974
August		(2,270)	2,270		(656)	656	64,901
September		(31)	31		(9)	9	64,940
October		8	(8)		2	(2)	64,930
November		(8)	8		(2)	2	64,940
December		4,982	(4,982)		1,440	(1,440)	58,517
YTD Balance	-	194,710	(194,710)	-	56,294	(56,294)	58,517
Cumulative Ending Balance	11,594,497	11,549,106	45,391	3,352,151	3,339,025	13,125	58,517

Note: There was no Non-Residential DSM Rider in Rider 10.
All revenues collected represented bill corrections, so
all revenues were allocated on the same basis as prior year.

Interest Calculation

2020- Rider 11 Month	NC Program Costs Incurred	Revenue Collected	Cumulative Under/(Over)collected Balance	PPI	Revenue Collected	Cumulative Under/(Over)collected Balance	Total Cumulative Over/Under Collected
Beginning Balance	11,594,497	11,549,106	45,391	3,352,151	3,339,025	13,125	58,517
January		7,239	38,152	(485)	(3,286)	15,927	54,079
February		41,527	(3,375)	(2,780)	(18,850)	31,998	28,623
March		36,433	(39,808)	(2,439)	(16,538)	46,097	6,289
April		39,543	(79,351)	(2,647)	(17,950)	61,400	(17,951)
May		39,817	(119,168)	(2,665)	(18,074)	76,809	(42,359)
June		47,726	(166,894)	(3,195)	(21,665)	95,279	(71,615)
July		49,697	(216,591)	(3,327)	(22,559)	114,511	(102,080)
August		48,648	(265,240)	(3,256)	(22,083)	133,338	(131,902)
September		53,916	(319,155)	(3,609)	(24,474)	154,203	(164,952)
October		56,754	(375,909)	(3,799)	(25,763)	176,167	(199,743)
November		39,300	(415,209)	(2,631)	(17,839)	191,375	(223,833)
December		43,300	(458,509)	(2,898)	(19,655)	208,133	(250,377)
YTD Balance	-	503,901	(458,509)	(33,730)	(228,737)	208,133	(250,377)
Cumulative Ending Balance	11,594,497	12,053,007	(458,509)	3,318,420	3,110,288	208,133	(250,377)

Revenue Requirement:		
Program Costs	45,391	1.83
PPI	(20,605)	(0.83)
Total	24,787	
Revenue Collected:	276,923	
Less Interest collected:	1,759	
Total	275,164	

Reconciliation to Filing - Exhibit 2 page 2 :

Interest not yet paid Rider 10 & 11	(2,667)
Revenue not yet given back	267,721
	14,678
Exhibit 2 page 2 Line 35	14,674
	3

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2017

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, Line 4			see calc. at right		
2018	January	65,222,734	72.8087506%	47,487,858	49,132,586	59.7964%	(29,379,532)	18,108,325
2018	February		72.8087506%	-		0.0000%	-	-
2018	March		72.8087506%	-		0.0000%	-	-
2018	April		72.8087506%	-		0.0000%	-	-
2018	May		72.8087506%	-		0.0000%	-	-
2018	June		72.8087506%	-		0.0000%	-	-
2018	July		72.8087506%	-		0.0000%	-	-
2018	August		72.8087506%	-		0.0000%	-	-
2018	September		72.8087506%	-		0.0000%	-	-
2018	October		72.8087506%	-		0.0000%	-	-
2018	November		72.8087506%	-		0.0000%	-	-
2018	December		72.8087506%	-		0.0000%	-	-
		65,222,734		47,487,858	49,132,586			18,108,325

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	18,108,325	0.236149	4,276,263	4,276,263	13,832,063	0.006075	42,015	42,015	0.766497	54,814
2018	February	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	126,045	0.766497	164,442
2018	March	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	210,074	0.766497	274,071
2018	April	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	294,104	0.766497	383,699
2018	May	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	378,134	0.766497	493,327
2018	June	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	462,164	0.766497	602,956
2018	July	18,108,325	0.236149	-	4,276,263	13,832,063	0.006075	84,030	546,194	0.766497	712,584
2018	August	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	624,921	0.766497	815,295
2018	September	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	703,649	0.766497	918,006
2018	October	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	782,376	0.766497	1,020,716
2018	November	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	861,104	0.766497	1,123,427
2018	December	18,108,325	0.236149	-	4,276,263	13,832,063	0.005692	78,727	939,831	0.766497	1,226,138
								939,831			1,226,138

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2017

NC Residential DSM		Total System NC DSM Program Costs Incurred	NC Residential DSM Allocation %	NC Allocated DSM Residential Program Costs	NC Residential Revenue Collected	NC Residential DSM Program Collection %	DSM Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4 Line 9			See calc. at right		
2018	January	29,822,653	33.8075104%	10,082,297	12,781,955	77.3907656%	(9,892,053)	190,244
2018	February		33.8075104%	-			-	-
2018	March		33.8075104%	-			-	-
2018	April		33.8075104%	-			-	-
2018	May		33.8075104%	-			-	-
2018	June		33.8075104%	-			-	-
2018	July		33.8075104%	-			-	-
2018	August		33.8075104%	-			-	-
2018	September		33.8075104%	-			-	-
2018	October		33.8075104%	-			-	-
2018	November		33.8075104%	-			-	-
2018	December		33.8075104%	-			-	-
		29,822,653		10,082,297	12,781,955		(9,892,053)	190,244

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	190,244	0.236149	44,926	44,926	145,318	0.006075	441	441	0.766497	576
2018	February	190,244	0.236149	-	44,926	145,318	0.006075	883	1,324	0.766497	1,728
2018	March	190,244	0.236149	-	44,926	145,318	0.006075	883	2,207	0.766497	2,879
2018	April	190,244	0.236149	-	44,926	145,318	0.006075	883	3,090	0.766497	4,031
2018	May	190,244	0.236149	-	44,926	145,318	0.006075	883	3,973	0.766497	5,183
2018	June	190,244	0.236149	-	44,926	145,318	0.006075	883	4,855	0.766497	6,335
2018	July	190,244	0.236149	-	44,926	145,318	0.006075	883	5,738	0.766497	7,486
2018	August	190,244	0.236149	-	44,926	145,318	0.005692	827	6,565	0.766497	8,565
2018	September	190,244	0.236149	-	44,926	145,318	0.005692	827	7,392	0.766497	9,644
2018	October	190,244	0.236149	-	44,926	145,318	0.005692	827	8,220	0.766497	10,724
2018	November	190,244	0.236149	-	44,926	145,318	0.005692	827	9,047	0.766497	11,803
2018	December	190,244	0.236149	-	44,926	145,318	0.005692	827	9,874	0.766497	12,882
								9,874			12,882

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2017

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4, Line 4			See calc. at right		
2018	January	97,443,527	72.8087506%	70,947,415	46,928,129	65.9170989%	(30,933,661)	40,013,754
2018	February			-			-	-
2018	March			-			-	-
2018	April			-			-	-
2018	May			-			-	-
2018	June			-			-	-
2018	July			-			-	-
2018	August			-			-	-
2018	September			-			-	-
2018	October			-			-	-
2018	November			-			-	-
2018	December			-			-	-
		97,443,527		70,947,415	46,928,129		(30,933,661)	40,013,754

Note: All revenues collected in Rider 9 were to collect Y2 of lost revenue. Therefore, no revenue received in 2018 would offset the under collected balance of program costs and a return would still be earned.

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	40,013,754	0.236149	9,449,208.08	9,449,208	30,564,546	0.006075	92,840	92,840	0.766497	121,122
2018	February	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	278,519	0.766497	363,367
2018	March	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	464,199	0.766497	605,611
2018	April	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	649,879	0.766497	847,855
2018	May	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	835,558	0.766497	1,090,100
2018	June	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	1,021,238	0.766497	1,332,344
2018	July	40,013,754	0.236149	-	9,449,208	30,564,546	0.006075	185,680	1,206,918	0.766497	1,574,589
2018	August	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,380,881	0.766497	1,801,547
2018	September	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,554,844	0.766497	2,028,506
2018	October	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,728,807	0.766497	2,255,465
2018	November	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	1,902,770	0.766497	2,482,424
2018	December	40,013,754	0.236149	-	9,449,208	30,564,546	0.005692	173,963	2,076,734	0.766497	2,709,383
								2,076,734			2,709,383

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2017

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	NC Non-Residential DSM Revenue Collected	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	(Over)/Under Collection
			See Miller Exhibit 5 pg. 4, Line 10					
Beginning Balance		29,822,653	40.0747013%	11,951,339	15,361,431	77.3901377%	(11,888,233)	63,106
2018	January				-	77.3901377%		
2018	February	-		-	289	77.3901377%	(223)	(223)
2018	March	-		-	114	77.3901377%	(88)	(88)
2018	April	-		-	(135)	77.3901377%	104	104
2018	May	-		-	(109)	77.3901377%	85	85
2018	June	-		-	(46)	77.3901377%	36	36
2018	July	-		-	71	77.3901377%	(55)	(55)
2018	August	-		-	(48)	77.3901377%	37	37
2018	September	-		-	(2)	77.3901377%	2	2
2018	October	-		-	(2)	77.3901377%	2	2
2018	November	-		-	(0)	77.3901377%	0	0
2018	December	-		-	(1,215)	77.3901377%	940	940
		29,822,653		11,951,339	15,360,347		(11,887,394)	63,945

No rider was collected in 2018 for Vintage 2017. All revenue collected in 2018 represents bill corrections. Amounts allocated at same % as calculated in Rider 9.

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	63,106	0.236149	14,903	14,903	48,204	0.006075	146	146	0.766497	191
2018	February	62,883	0.236149	(53)	14,850	48,033	0.006075	292	439	0.766497	572
2018	March	62,795	0.236149	(21)	14,829	47,966	0.006075	292	730	0.766497	953
2018	April	62,899	0.236149	25	14,854	48,046	0.006075	292	1,022	0.766497	1,333
2018	May	62,984	0.236149	20	14,874	48,110	0.006075	292	1,314	0.766497	1,714
2018	June	63,019	0.236149	8	14,882	48,137	0.006075	292	1,606	0.766497	2,096
2018	July	62,954	0.236149	(13)	14,869	48,095	0.006075	292	1,899	0.766497	2,477
2018	August	63,002	0.236149	9	14,878	48,124	0.005692	274	2,173	0.766497	2,834
2018	September	63,003	0.236149	0	14,878	48,125	0.005692	274	2,446	0.766497	3,192
2018	October	63,005	0.236149	0	14,879	48,126	0.005692	274	2,720	0.766497	3,549
2018	November	63,005	0.236149	0	14,879	48,126	0.005692	274	2,994	0.766497	3,906
2018	December	63,945	0.236149	222	15,101	48,845	0.005692	276	3,270	0.766497	4,266
								3,270			4,266

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential EE Programs Vintage 2018

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, line 4			see calc. at right		
2018	January	6,092,327	72.7130507%	4,429,917	3,364,993	65.0094%	(2,187,562)	2,242,355
2018	February	4,207,163	72.7130507%	3,059,157	6,611,534	65.0094%	(4,298,120)	(1,238,963)
2018	March	4,408,777	72.7130507%	3,205,756	4,869,891	65.0094%	(3,161,987)	43,769
2018	April	4,857,763	72.7130507%	3,168,662	4,898,653	65.0094%	(3,184,586)	(15,923)
2018	May	1,949,686	72.7130507%	1,417,676	4,283,009	65.0094%	(2,784,359)	(1,366,683)
2018	June	9,594,979	72.7130507%	6,976,802	6,106,131	65.0094%	(3,969,560)	3,007,241
2018	July	7,017,359	72.7130507%	5,102,536	7,009,187	65.0094%	(4,556,632)	545,904
2018	August	8,991,684	72.7130507%	6,538,128	6,449,559	65.0094%	(4,192,821)	2,345,307
2018	September	4,496,588	72.7130507%	3,269,606	6,922,525	65.0094%	(4,500,293)	(1,230,687)
2018	October	7,847,725	72.7130507%	5,706,320	4,890,719	65.0094%	(3,179,428)	2,526,893
2018	November	7,870,683	72.7130507%	5,723,014	4,520,378	65.0094%	(2,938,671)	2,784,343
2018	December	10,497,084	72.7130507%	7,632,750	10,538,080	65.0094%	(6,850,745)	782,005
		77,331,818		56,230,324	70,458,658			10,425,561

EE Program Costs	56,230,326
EE Revenue Requirement	86,495,661
% Revenue related to Program Costs	65.0094%

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	2,242,355	0.236149	529,530	529,530	1,712,825	0.006075	5,203	5,203	0.766497	6,788
2018	February	1,003,391	0.236149	(292,580)	236,950	766,441	0.006075	7,531	12,733	0.766497	16,613
2018	March	1,047,161	0.236149	10,336	247,286	799,875	0.006075	4,758	17,491	0.766497	22,820
2018	April	1,031,237	0.236149	(3,760)	243,526	787,712	0.006075	4,822	22,313	0.766497	29,111
2018	May	(335,445)	0.236149	(322,741)	(79,215)	(256,230)	0.006075	1,614	23,928	0.766497	31,217
2018	June	2,671,796	0.236149	710,157	630,942	2,040,854	0.006075	5,421	29,349	0.766497	38,289
2018	July	3,217,700	0.236149	128,915	759,857	2,457,843	0.006075	13,665	43,013	0.766497	56,117
2018	August	5,563,007	0.236149	553,842	1,313,699	4,249,308	0.005692	19,087	62,101	0.766497	81,019
2018	September	4,332,920	0.236149	(290,625)	1,023,073	3,309,247	0.005692	21,510	83,611	0.766497	109,082
2018	October	6,859,213	0.236149	596,723	1,619,796	5,239,417	0.005692	24,328	107,939	0.766497	140,822
2018	November	9,643,555	0.236149	657,520	2,277,316	7,366,239	0.005692	35,874	143,813	0.766497	187,624
2018	December	10,425,561	0.236149	184,670	2,461,986	7,963,575	0.005692	43,626	187,439	0.766497	244,540
								187,439			244,540

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Residential DSM Programs Vintage 2018

NC Residential EE		Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Residential EE Program Collection %	EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5 pg. 4, Line 9			see calc. at right		
2018	January	1,796,566	32.1574721%	577,730	629,131	78.9680%	(496,812)	80,919
2018	February	1,530,759	32.1574721%	492,253	1,236,115	78.9680%	(976,135)	(483,881)
2018	March	1,744,325	32.1574721%	560,931	909,370	78.9680%	(718,111)	(157,180)
2018	April	1,806,257	32.1574721%	580,847	915,869	78.9680%	(723,243)	(142,396)
2018	May	1,425,924	32.1574721%	458,541	800,766	78.9680%	(632,349)	(173,807)
2018	June	3,051,553	32.1574721%	981,302	1,141,623	78.9680%	(901,517)	79,786
2018	July	3,527,230	32.1574721%	1,134,268	1,310,462	78.9680%	(1,034,845)	99,423
2018	August	3,581,196	32.1574721%	1,151,622	1,205,832	78.9680%	(952,221)	199,402
2018	September	4,029,852	32.1574721%	1,295,899	1,294,259	78.9680%	(1,022,050)	273,849
2018	October	3,506,777	32.1574721%	1,127,691	914,386	78.9680%	(722,072)	405,619
2018	November	1,643,444	32.1574721%	528,490	845,145	78.9680%	(667,394)	(138,904)
2018	December	2,765,522	32.1574721%	889,322	1,970,236	78.9680%	(1,555,855)	(666,533)
		30,409,405		9,778,896	13,173,193		(10,402,600)	(623,705)

DSM Program Costs	9,778,895
DSM Revenue Requirement	12,383,372
% Revenue related to Program Costs	78.9680%

NC Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	80,919	0.236149	19,109	19,109	61,810	0.006075	188	188	0.766497	245
2018	February	(402,963)	0.236149	(114,268)	(95,159)	(307,803)	0.006075	(747)	(559)	0.766497	(730)
2018	March	(560,143)	0.236149	(37,118)	(132,277)	(427,865)	0.006075	(2,235)	(2,794)	0.766497	(3,645)
2018	April	(702,539)	0.236149	(33,627)	(165,904)	(536,635)	0.006075	(2,930)	(5,724)	0.766497	(7,467)
2018	May	(876,346)	0.236149	(41,044)	(206,948)	(669,398)	0.006075	(3,663)	(9,387)	0.766497	(12,247)
2018	June	(796,561)	0.236149	18,841	(188,107)	(608,454)	0.006075	(3,881)	(13,269)	0.766497	(17,311)
2018	July	(697,137)	0.236149	23,479	(164,628)	(532,509)	0.006075	(3,466)	(16,734)	0.766497	(21,832)
2018	August	(497,736)	0.236149	47,088	(117,540)	(380,196)	0.006075	(2,772)	(19,507)	0.766497	(25,449)
2018	September	(223,887)	0.236149	64,669	(52,871)	(171,016)	0.005692	(1,569)	(21,075)	0.766497	(27,495)
2018	October	181,732	0.236149	95,787	42,916	138,816	0.005692	(92)	(21,167)	0.766497	(27,615)
2018	November	42,828	0.236149	(32,802)	10,114	32,714	0.005692	488	(20,679)	0.766497	(26,978)
2018	December	(623,705)	0.236149	(157,401)	(147,287)	(476,417)	0.005692	(1,263)	(21,941)	0.766497	(28,626)
								(21,941)			(28,626)

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation - Non- Residential EE Programs Vintage 2018

NC Non- Residential EE		Non-Residential EE Program Costs Incurred	NC Allocation %	NC Allocated EE Program Costs	NC Residential Revenue Collected	NC Non-Residential EE Program Collection %	Non-Residential EE Program Costs Revenue Collected	(Over)/Under Collection
			Miller Exhibit 5, pg 4, Line 4			See calc. at right		
2018	January	4,673,061	72.7130507%	3,397,925	1,957,913	54.3089677%	(1,063,322)	2,334,603
2018	February	7,695,239	72.7130507%	5,595,443	4,028,107	54.3089677%	(2,187,623)	3,407,820
2018	March	3,924,553	72.7130507%	2,853,662	3,609,259	54.3089677%	(1,960,151)	893,511
2018	April	3,329,880	72.7130507%	2,421,257	3,808,504	54.3089677%	(2,068,359)	352,898
2018	May	3,622,228	72.7130507%	2,633,832	3,892,120	54.3089677%	(2,113,770)	520,062
2018	June	3,399,916	72.7130507%	2,472,183	4,770,029	54.3089677%	(2,590,554)	(118,371)
2018	July	4,064,438	72.7130507%	2,955,377	4,861,345	54.3089677%	(2,640,146)	315,231
2018	August	3,790,914	72.7130507%	2,756,489	4,804,248	54.3089677%	(2,609,138)	147,352
2018	September	3,217,141	72.7130507%	2,339,281	5,326,524	54.3089677%	(2,892,780)	(553,499)
2018	October	3,753,904	72.7130507%	2,729,578	5,686,288	54.3089677%	(3,088,164)	(358,586)
2018	November	3,782,445	72.7130507%	2,750,331	3,774,427	54.3089677%	(2,049,852)	700,479
2018	December	6,010,729	72.7130507%	4,370,584	5,480,038	54.3089677%	(2,976,152)	1,394,432
		51,264,448		37,275,944	51,998,801		(28,240,012)	9,035,932

Non-Res EE Program Costs	37,275,944
Non-Res EE Revenue Requirement	68,636,812
% Revenue related to Program Costs	54%

NC Non-Residential EE		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29% 6.83%			0.766497	
2018	January	2,334,603	0.236149	551,314.18	551,314	1,783,289	0.006075	5,417	5,417	0.766497	7,067
2018	February	5,742,423	0.236149	804,753.18	1,356,067	4,386,355	0.006075	18,740	24,157	0.766497	31,516
2018	March	6,635,934	0.236149	211,001.75	1,567,069	5,068,865	0.006075	28,720	52,877	0.766497	68,986
2018	April	6,988,832	0.236149	83,336.56	1,650,406	5,338,426	0.006075	31,612	84,489	0.766497	110,228
2018	May	7,508,894	0.236149	122,812.19	1,773,218	5,735,676	0.006075	33,638	118,127	0.766497	154,113
2018	June	7,390,523	0.236149	(27,953.21)	1,745,265	5,645,258	0.006075	34,570	152,697	0.766497	199,214
2018	July	7,705,754	0.236149	74,441.40	1,819,706	5,886,048	0.006075	35,026	187,723	0.766497	244,910
2018	August	7,853,105	0.236149	34,796.93	1,854,503	5,998,602	0.005692	33,822	221,545	0.766497	289,035
2018	September	7,299,607	0.236149	(130,708.16)	1,723,795	5,575,812	0.005692	32,939	254,484	0.766497	332,008
2018	October	6,941,021	0.236149	(84,679.72)	1,639,115	5,301,906	0.005692	30,956	285,440	0.766497	372,395
2018	November	7,641,499	0.236149	165,417.36	1,804,532	5,836,967	0.005692	31,699	317,139	0.766497	413,751
2018	December	9,035,932	0.236149	329,293.83	2,133,826	6,902,106	0.005692	36,253	353,392	0.766497	461,049
								353,392			461,049

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1192
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2018

NC Non- Residential DSM		Total System NC DSM Program Costs Incurred	NC Non-Residential DSM Allocation %	NC Allocated DSM Non-Residential Program Costs	NC Non-Residential DSM Revenue Collected	NC Non-Residential DSM Program Collection %	Non-Residential DSM Program Costs Revenue Collected	(Over)/Under Collection
			See Miller Exhibit 5 pg. 4, Line 10					
2018	January	1,796,566	41.4712829%	745,059	517,085	78.9679563%	(408,332)	336,727
2018	February	1,530,759	41.4712829%	634,825	1,108,919	78.9679563%	(875,690)	(240,865)
2018	March	1,744,325	41.4712829%	723,394	976,678	78.9679563%	(771,263)	(47,859)
2018	April	1,806,257	41.4712829%	749,078	1,056,527	78.9679563%	(834,318)	(85,240)
2018	May	1,425,924	41.4712829%	591,349	1,064,087	78.9679563%	(840,268)	(248,939)
2018	June	3,051,553	41.4712829%	1,265,518	1,275,106	78.9679563%	(1,006,925)	258,593
2018	July	3,527,230	41.4712829%	1,462,788	1,327,182	78.9679563%	(1,048,049)	414,739
2018	August	3,581,196	41.4712829%	1,485,168	1,298,531	78.9679563%	(1,025,424)	459,744
2018	September	4,029,852	41.4712829%	1,671,231	1,432,259	78.9679563%	(1,131,025)	540,206
2018	October	3,506,777	41.4712829%	1,454,305	1,521,526	78.9679563%	(1,201,518)	252,788
2018	November	1,643,444	41.4712829%	681,557	1,048,352	78.9679563%	(827,863)	(146,305)
2018	December	2,765,522	41.4712829%	1,146,897	1,448,672	78.9679563%	(1,143,986)	2,911
		30,409,405		12,611,170	14,074,924		(11,114,680)	1,496,491

DSM Program Costs	12,611,170
DSM Revenue Requirement	15,969,985
% Revenue related to Program Costs	79%

NC Non-Residential DSM		Cumulative (Over)/Under Recovery	Current Income Tax Rate	Monthly Deferred Income Tax	Cumulative Deferred Income Tax	Net Deferred After Tax Balance	Monthly Return	Monthly A/T Return on Deferral	YTD After Tax Interest	Gross up of Return to Pretax Rate	Gross up of Return to Pretax
			2018				7.29%			0.766497	
							6.83%				
2018	January	336,727	0.236149	79,518	79,518	257,209	0.006075	781	781	0.766497	1,019
2018	February	95,862	0.236149	(56,880)	22,638	73,224	0.006075	1,004	1,785	0.766497	2,329
2018	March	47,993	0.236149	(11,304)	11,334	36,660	0.006075	334	2,119	0.766497	2,764
2018	April	(37,247)	0.236149	(20,129)	(8,796)	(28,451)	0.006075	25	2,144	0.766497	2,797
2018	May	(286,185)	0.236149	(58,787)	(67,582)	(218,603)	0.006075	(750)	1,393	0.766497	1,818
2018	June	(27,592)	0.236149	61,067	(6,516)	(21,076)	0.006075	(728)	665	0.766497	868
2018	July	387,147	0.236149	97,940	91,424	295,722	0.006075	834	1,499	0.766497	1,956
2018	August	846,891	0.236149	108,568	199,993	646,899	0.005692	2,683	4,182	0.766497	5,456
2018	September	1,387,097	0.236149	127,569	327,562	1,059,536	0.005692	4,856	9,038	0.766497	11,792
2018	October	1,639,885	0.236149	59,696	387,257	1,252,628	0.005692	6,580	15,618	0.766497	20,376
2018	November	1,493,580	0.236149	(34,550)	352,707	1,140,872	0.005692	6,812	22,430	0.766497	29,263
2018	December	1,496,491	0.236149	687	353,395	1,143,096	0.005692	6,500	28,930	0.766497	37,743
								28,930			37,743

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Fourteenth Revised Leaf No. 62
Superseding North Carolina Thirteenth Revised Leaf No. 62

Rider EE (NC)
ENERGY EFFICIENCY RIDER

APPLICABILITY (North Carolina Only)
Service supplied under the Company's rate schedules is subject to approved adjustments for new energy efficiency and demand-side management programs approved by the North Carolina Utilities Commission (NCUC). The Rider Adjustments are not included in the Rate Schedules of the Company and therefore, must be applied to the bill as calculated under the applicable rate.

As of January 1, 2020, cost recovery under Rider EE consists of the four-year term program, years 2014-2017, as well as rates under the continuation of that program for years 2018-2020 as outlined below. This Rider applies to service supplied under all rate schedules, except rate schedules OL, FL, PL, GL and NL for program years 2015-2020.

GENERAL PROVISIONS
This Rider will recover the cost of new energy efficiency and demand-side management programs beginning January 1, 2014, using the method approved by the NCUC as set forth in Docket No. E-7 Sub 1032, Order dated October 29, 2013, as revised by Docket No. E-7, Sub 1130, Order dated August 23, 2017.

TRUE-UP PROVISIONS
Rider amounts will initially be determined based on estimated kW and kWh impacts related to expected customer participation in the programs, and will be trued-up as actual customer participation and actual kW and kWh impacts are verified. If a customer participates in any vintage of programs, the customer is subject to the true-ups as discussed in this section for any vintage of programs in which the customer participated.

RIDER EE OPT OUT PROVISION FOR QUALIFYING NON-RESIDENTIAL CUSTOMERS
The Rider EE increment applicable to energy efficiency programs and/or demand-side management programs will not be applied to the energy charge of the applicable rate schedule for customers qualified to opt out of the programs where:

a. The customer has notified the Company that it has implemented, or has plans for implementing, alternative energy efficiency measures in accordance with quantifiable goals.
b. Electric service to the customer must be provided under:
   1. An electric service agreement where the establishment is classified as a "manufacturing industry" by the Standard Industrial Classification Manual published by the United States Government and where more than 50% of the electric energy consumption of such establishment is used for its manufacturing processes. Additionally, all other agreements billed to the same entity associated with the manufacturing industry located on the same or contiguous properties are also eligible to opt out.
   2. An electric service agreement for general service as provided for under the Company's rate schedules where the customer's annual energy use is 1,000,000 kilowatt hours or more. Additionally, all other agreements billed to the same entity with lesser annual usage located on the same or contiguous properties are also eligible to opt out.

The following additional provisions apply for qualifying customers who elect to opt out:

For customers who elect to opt out of energy efficiency programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's energy efficiency programs each calendar year only during the annual two-month enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1. (Qualifying new customers have sixty days after beginning service to opt out).
- Customers may not opt out of individual energy efficiency programs offered by the Company. The choice to opt out applies to the Company's entire portfolio of energy efficiency programs.
- If a customer participates in any vintage of energy efficiency programs, the customer, irrespective of future opt out decisions, remains obligated to pay the remaining portion of the lost revenues for each vintage of energy efficiency programs in which the customer participated.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's energy efficiency programs during the first 5 business days of March each calendar year. Customers making this election will be back-billed retroactively to the effective date of the new Rider EE.

For customers who elect to opt out of demand-side management programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's demand-side management program during the enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1 of the applicable year. (Qualifying new customers have sixty days after beginning service to opt out).

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Fourteenth Revised Leaf No. 62
Superseding North Carolina Thirteenth Revised Leaf No. 62

Rider EE (NC)
ENERGY EFFICIENCY RIDER

- If a customer elects to participate in a demand-side management program, the customer may not subsequently choose to opt out of demand-side management programs for three years.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's demand-side management program during the first 5 business days of March each calendar year. Customers making this election will be back-billed to the effective date of the new Rider EE.

Any qualifying non-residential customer that has not participated in an energy efficiency or demand-side management program may opt out during any enrollment period, and has no further responsibility to pay Rider EE amounts associated with the customer's opt out election for energy efficiency and/or demand-side management programs.

ENERGY EFFICIENCY RIDER ADJUSTMENTS (EEA) FOR ALL PROGRAM YEARS
The Rider EE amounts applicable to the residential and nonresidential rate schedules for the period January 1, 2019 through December 31, 2019 including utility assessments are as follows:

Residential	Vintage 2015[1],2016[1], 2017[1], 2018[1]	0.0944¢ per kWh
	Vintage 2017[2], 2018[2], 2019[2], 2020[2]	0.3891¢ per kWh
	Total Residential Rate	0.4835¢ per kWh
Nonresidential		
Vintage 2015[3]		
	Energy Efficiency	0.0064¢ per kWh
	Demand Side Management	0.0001¢ per kWh
Vintage 2016[3]		
	Energy Efficiency	0.0512¢ per kWh
	Demand Side Management	0.0001¢ per kWh
Vintage 2017[3]		
	Energy Efficiency	0.0957¢ per kWh
	Demand Side Management	0.0000¢ per kWh
Vintage 2018[3]		
	Energy Efficiency	0.0827¢ per kWh
	Demand Side Management	0.0077¢ per kWh
Vintage 2019[3]		
	Energy Efficiency	0.0509¢ per kWh
	Demand Side Management	0.0000¢ per kWh
Vintage 2020[3]		
	Energy Efficiency	0.3082¢ per kWh
	Demand Side Management	0.1101¢ per kWh
Total Nonresidential		0.7131¢ per kWh

[1] Includes the true-up of program costs, shared savings and lost revenues from Year 1 of Vintage 2018 and Year 2 of Vintage 2017, and Year 3 of 2016 and Year 4 of 2015.
[2] Includes prospective component of Vintage 2017, 2018, 2019 and 2020
[3] Not Applicable to Rate Schedules OL, FL, PL, GL, and NL.

Each factor listed under Nonresidential is applicable to nonresidential customers who are not eligible to opt out and to eligible customers who have not opted out. If a nonresidential customer has opted out of a Vintage(s), then the applicable energy efficiency and/or demand-side management charge(s) shown above for the Vintage(s) during which the customer has opted out, will not apply to the bill.

Supplemental - FIA

Evans Exhibit 1 pg. 1
NO CHANGE

Duke Energy Carolinas, LLC
Vintage 2015 Actual for January 1, 2015 to December 31, 2015
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

Residential Programs EE Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 1)	NC Residential Revenue Requirement D * E
1 Appliance Recycling Program	748	5,534,546	$ 1,901,321	$ 1,537,241	$ 41,869	$ 1,579,111	72.9564706%	$ 1,152,063
2 Energy Efficiency Education	830	4,417,898	$ 2,498,417	$ 2,054,672	$ 51,031	$ 2,105,702	72.9564706%	$ 1,536,246
3 Energy Efficient Appliances and Devices	14,743	129,350,071	$ 49,525,402	$ 12,050,485	$ 4,309,616	$ 16,360,100	72.9564706%	$ 11,935,752
4 HVAC Energy Efficiency	2,663	4,763,631	$ 6,816,479	$ 5,415,833	$ 160,959	$ 5,577,792	72.9564706%	$ 4,069,360
5 Income Qualified Energy Efficiency and Weatherization Assistance	608	3,125,184	$ 1,854,068	$ 2,238,776	$ -	$ 2,238,776	72.9564706%	$ 1,633,332
6 Multi-Family Energy Efficiency	1,339	13,988,109	$ 7,431,163	$ 2,092,935	$ 613,896	$ 2,706,831	72.9564706%	$ 1,974,808
7 Energy Assessments	1,275	10,293,765	$ 10,115,222	$ 3,086,173	$ 808,341	$ 3,894,514	72.9564706%	$ 2,841,300
8 Subtotal	22,205	171,473,205	$ 80,142,073	$ 28,477,114	$ 5,985,712	$ 34,462,825		$ 25,142,861
9 My Home Energy Report (1)	61,770	228,776,428	$ 16,583,325	$ 9,845,895	$ 774,805	$ 10,620,699	72.9564706%	$ 7,748,487
10 Total for Residential Energy Efficiency Programs	83,975	400,249,633	$ 96,725,398	$ 38,323,008	$ 6,760,516	$ 45,083,525		$ 32,891,348
							NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D11* E11
11 Total DSM Programs (2)	871,944	18,374	101,113,558	$ 31,958,782	$ 7,952,799	$ 39,911,582	32.5218612%	$ 12,979,589
12 Total Residential Revenue Requirement								$ 45,871,337

Non-Residential Programs EE Programs	System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 1)	NC Non-Residential Revenue Requirement D * E
13 Non Residential Smart Saver Custom Energy Assessments	87	765,903	$ 321,686	$ 660,420	$ (38,954)	$ 621,465	72.9564706%	$ 453,399
14 Non Residential Smart Saver Custom	11,108	76,142,627	53,882,448	9,932,877	5,054,201	14,987,078	72.9564706%	10,934,043
15 Non Residential Smart Saver Energy Efficient Food Service Products	140	1,672,329	1,099,734	194,425	104,111	298,535	72.9564706%	217,801
16 Non Residential Smart Saver Energy Efficient HVAC Products	1,611	5,405,220	6,221,217	1,142,522	584,050	1,726,572	72.9564706%	1,259,646
17 Non Residential Smart Saver Energy Efficient Lighting Products	11,523	67,083,512	42,227,035	11,935,798	3,552,492	14,888,290	72.9564706%	10,861,971
18 Non Residential Smart Saver Energy Efficient Pumps and Drives Products	423	3,354,574	1,924,058	466,478	167,622	634,100	72.9564706%	462,617
19 Non Residential Smart Saver Energy Efficient IT Products	540	5,196,710	1,130,386	716,542	47,592	764,134	72.9564706%	557,485
20 Non Residential Smart Saver Energy Efficient Process Equipment Products	112	630,354	517,342	88,823	49,280	138,103	72.9564706%	100,755
21 Small Business Energy Saver	14,417	77,515,622	47,989,975	13,968,790	3,912,436	17,881,226	72.9564706%	13,045,511
22 Smart Energy in Offices	9,109	14,938,552	1,666,306	1,463,240	23,353	1,486,592	72.9564706%	1,084,565
23 Business Energy Report	-	-	-	126,404	-	126,404	72.9564706%	92,220
24 Total for Non-Residential Energy Efficiency Programs	43,072	252,704,804	$ 156,980,188	$ 40,096,318	$ 13,456,181	$ 53,552,499		39,070,014
							NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D23*E23
25 Total DSM Programs(2)	871,944	18,374	$ 101,113,558	$ 31,958,782	$ 7,952,799	$ 39,911,582	42.4483655%	$ 16,941,814
26 Total Non-Residential Revenue Requirement								$ 56,011,828
Total DSM Program Breakdown							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 1)	D28* E28
27 Power Manager (Residential)	454,663	-	$ 52,718,688	$ 14,634,279	$ 4,379,707	$ 19,013,986		
28 EnergyWise for Business	6	18,374	$ 11,248	$ 1,549,305	$ (176,876)	$ 1,372,428		
29 Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
30 Power Share (Non-Residential)	417,276	-	$ 48,383,622	$ 15,779,050	$ 3,749,526	$ 19,528,576		
31 Disallowed Costs from 2013 Program Costs Audit (Order E-7 Sub 1103, dated 8/25/16)				$ (9,851)	$ 449	$ (9,403)		
32 Total DSM	871,944	18,374	101,113,558	31,958,782	7,952,799	39,911,582	74.9702266%	$ 29,921,803

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2016 Actual for January 1, 2016 to December 31, 2016
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 2)	NC Residential Revenue Requirement D * E
	Residential Programs								
	EE Programs								
1	Appliance Recycling Program	21	164,720	$ 59,758	$ (97,897)	$ 18,073	$ (79,824)	73.0962827%	$ (57,983)
2	Energy Efficiency Education	1,512	6,441,283	3,695,507	2,126,509	180,435	2,306,944	73.0962827%	1,686,290
3	Energy Efficient Appliances and Devices	14,518	120,226,223	82,262,218	24,069,774	6,692,131	30,761,905	73.0962827%	22,485,809
4	HVAC Energy Efficiency	2,462	6,294,837	7,476,100	7,839,566	(41,799)	7,797,767	73.0962827%	5,699,878
5	Income Qualified Energy Efficiency and Weatherization Assistance	649	4,801,478	2,984,760	4,792,436	-	4,792,436	73.0962827%	3,503,093
6	Multi-Family Energy Efficiency	1,572	15,235,497	8,950,706	2,518,983	739,648	3,258,636	73.0962827%	2,381,941
7	Energy Assessments	1,070	7,389,091	6,822,606	2,678,693	476,550	3,155,443	73.0962827%	2,306,512
8	Subtotal	21,804	160,553,127	$ 112,251,855	$ 43,928,769	$ 8,065,038	$ 51,993,807		$ 38,005,540
9	My Home Energy Report (1)	71,814	283,569,925	70,423,954	10,822,444	1,104,174	11,926,618	73.0962827%	8,717,914
10	Total for Residential Energy Efficiency Programs	93,618	444,123,052	$ 182,675,808	$ 54,751,213	$ 9,169,211	$ 63,920,424		$ 46,723,454
								NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D11* E11
11	Total DSM Programs (2)	825,492	718,623	98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	33.7973480%	$ 12,330,491
12	Total Residential Revenue Requirement								$ 59,053,945

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 2)	NC Non-Residential Revenue Requirement D * E
	Non-Residential Programs								
	EE Programs								
13	Non Residential Smart Saver Custom Energy Assessments	1,584	16,953,402	$ 9,572,687	$ 2,034,308	$ 866,914	$ 2,901,222	73.0962827%	$ 2,120,685
14	Non Residential Smart Saver Custom	7,934	52,154,624	39,025,086	7,356,509	3,629,838	30,986,347	73.0962827%	8,030,611
15	Non Residential Smart Saver Energy Efficient Food Service Products	356	3,809,316	2,474,312	324,117	247,272	571,389	73.0962827%	417,664
16	Non Residential Smart Saver Energy Efficient HVAC Products	808	3,316,901	3,344,669	1,473,991	215,128	1,689,119	73.0962827%	1,234,683
17	Non Residential Smart Saver Energy Efficient Lighting Products	29,268	167,942,422	120,392,639	39,622,944	9,288,515	48,911,459	73.0962827%	35,752,458
18	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	358	2,494,340	1,574,965	471,930	126,849	598,779	73.0962827%	437,685
19	Non Residential Smart Saver Energy Efficient IT Products	107	2,462,027	777,601	285,430	56,600	342,030	73.0962827%	250,011
20	Non Residential Smart Saver Energy Efficient Process Equipment Products	50	319,131	279,184	125,947	17,622	143,569	73.0962827%	104,944
21	Non Residential Smart Saver Performance Incentive	-	-	-	35,670	(4,102)	31,568	73.0962827%	23,075
22	Small Business Energy Saver	16,110	85,687,928	55,685,830	15,360,852	4,637,372	19,998,224	73.0962827%	14,617,959
23	Smart Energy in Offices	3,505	16,842,267	1,848,559	1,061,729	89,911	1,151,640	73.0962827%	841,806
24	Business Energy Report	388	5,561,949	302,497	263,169	-	263,169	73.0962827%	192,367
25	Total for Non-Residential Energy Efficiency Programs	60,480	356,937,707	$ 235,273,030	$ 68,416,596	$ 19,171,918	$ 87,588,514		$ 64,025,948
								NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D24*E24
26	Total DSM Programs(2)	825,492	718,623	$ 98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	40.8166437%	$ 14,891,384
27	Total Non-Residential Revenue Requirement								$ 78,915,332
	Total DSM Program Breakdown							NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 2)	D29* E29
28	Power Manager (Residential)	455,359	-	$ 54,179,776	$ 13,644,970	$ 4,661,503	$ 18,306,473		
27	EnergyWise for Business (Non-Residential)	1,199	718,623	$ 574,590	$ 470,304	$ 11,993	$ 482,297		
29	Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
30	Power Share (Non-Residential)	368,900	-	$ 43,889,394	$ 14,291,024	$ 3,403,812	$ 17,694,836		
31	Total DSM	825,492	718,623	$ 98,643,760	$ 28,406,298	$ 8,077,308	$ 36,483,606	74.6199917%	$ 27,221,875

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2017 Actual for January 1, 2017 to December 31, 2017
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 3)	NC Residential Revenue Requirement D * E
	Residential Programs								
	EE Programs								
1	Appliance Recycling Program	-	-	$ -	$ 5,307	$ (610)	$ 4,697	72.8087506%	$ 3,420
2	Energy Efficiency Education	1,593	5,932,086	8,597,724	2,077,611	174,813	2,252,424	72.8087506%	1,639,962
3	Energy Efficient Appliances and Devices	24,605	137,909,103	105,352,687	30,340,728	8,626,375	38,967,103	72.8087506%	28,371,461
4	Residential – Smart Saver Energy Efficiency Program	1,850	6,712,977	7,287,269	7,403,327	(19,347)	7,383,980	72.8087506%	5,380,552
5	Income Qualified Energy Efficiency and Weatherization Assistance	771	5,341,624	3,185,867	5,505,992	-	5,505,992	72.8087506%	4,008,844
6	Multi-Family Energy Efficiency	2,056	19,038,529	13,539,656	3,168,422	1,192,692	4,361,114	72.8087506%	3,175,272
7	Energy Assessments	1,040	7,720,549	6,602,773	2,909,098	424,773	3,333,871	72.8087506%	2,427,350
8	Subtotal	31,715	182,654,868	$ 189,565,970	$ 51,410,486	$ 10,404,695	$ 61,815,181		$ 45,006,861
9	My Home Energy Report (1)	79,070	311,368,855	21,728,369	13,812,250	910,354	14,722,603	72.8087506%	10,719,344
10	Total for Residential Energy Efficiency Programs	110,786	494,023,724	$ 161,294,399	$ 65,222,736	$ 11,315,049	$ 76,537,785		$ 55,726,205
								NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D11* E11
11	SubTotal DSM Programs (2)	846,941	2,943,906	105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	33.80751041%	$ 13,008,491
12	Total DSM Programs								13,008,491
13	Total Residential Revenue Requirement								$ 68,734,696

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 3)	NC Non-Residential Revenue Requirement D * E
	Non-Residential Programs								
	EE Programs								
14	Non Residential Smart Saver Custom Energy Assessments	1,627	15,791,732	$ 10,272,902	$ 2,159,875	$ 935,229	$ 3,095,104	72.8087506%	$ 2,238,945
15	Non Residential Smart Saver Custom	6,010	40,609,855	34,693,083	7,504,838	3,149,648	10,454,486	72.8087506%	7,611,781
16	Non Residential Smart Saver Energy Efficient Food Service Products	112	1,383,542	959,251	306,488	75,068	381,556	72.8087506%	277,806
17	Non Residential Smart Saver Energy Efficient HVAC Products	894	2,954,877	2,958,336	1,560,769	160,720	1,721,489	72.8087506%	1,253,395
18	Non Residential Smart Saver Energy Efficient Lighting Products	47,322	270,572,885	240,054,511	66,689,770	19,936,945	86,626,715	72.8087506%	63,071,829
19	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	687	4,806,849	3,070,044	528,937	292,227	821,164	72.8087506%	597,879
20	Non Residential Smart Saver Energy Efficient IT Products	-	2,945	523	61,215	(6,980)	54,235	72.8087506%	39,488
21	Non Residential Smart Saver Energy Efficient Process Equipment Products	99	651,289	530,295	162,413	42,306	204,719	72.8087506%	149,054
22	Non Residential Smart Saver Performance Incentive	3	12,373	8,958	920,559	(85,834)	284,725	72.8087506%	207,305
23	Small Business Energy Saver	17,263	90,297,362	63,169,894	17,950,972	5,269,176	22,620,148	72.8087506%	16,469,447
24	Smart Energy in Offices	2,138	10,272,154	1,067,480	891,010	20,294	911,304	72.8087506%	663,509
25	Business Energy Report	5	42,398	696	126,680	-	126,680	72.8087506%	92,234
26	Sub-Total for Non-Residential Energy Efficiency Programs	76,158	437,998,260	$ 356,785,573	$ 97,443,527	$ 29,838,800	$ 117,282,328		$ 92,672,672
27	Total for Non-Residential Energy Efficiency Programs								$ 92,672,672
								NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D24* E24
28	Total DSM Programs(2)	846,941	2,943,906	$ 105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	40.07470113%	$ 15,419,338
29	Total Non-Residential DSM Programs								15,419,338
30	Total Non-Residential Revenue Requirement								$ 108,092,661
								NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 3)	D29* E29
	Total DSM Program Breakdown								
31	Power Manager (Residential)	501,118	-	$ 61,074,105	$ 14,021,500	$ 5,411,050	$ 19,432,549		
32	EnergyWise for Business (Non-Residential)	5,453	2,943,906	$ 2,590,761	$ 2,484,618	$ 5,306	$ 2,489,924		
33	Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34	Power Share (Non-Residential)	340,369	-	$ 41,482,644	$ 13,316,535	$ 3,239,103	$ 16,555,638		
35	Total DSM	846,941	2,943,906	$ 105,087,510	$ 29,822,652	$ 8,655,459	$ 38,478,111	73.88221179%	$ 28,428,479

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2018 Actual for January 1, 2018 to December 31, 2018
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 3 pg. 4)	NC Residential Revenue Requirement D * E
	Residential Programs								
	EE Programs								
1	Appliance Recycling Program	-	-	$ -	$ -	$ -	$ -	72.7130507%	$ -
2	Energy Efficiency Education	1,148	4,889,354	2,713,620	1,992,260	82,956	2,075,216	72.7130507%	1,508,953
3	Energy Efficient Appliances and Devices	52,802	195,212,952	135,814,400	42,687,244	10,709,623	53,396,867	72.7130507%	38,826,491
4	Residential – Smart Saver Energy Efficiency Program	1,640	6,367,174	7,086,486	6,955,146	15,104	6,970,250	72.7130507%	5,068,281
5	Income Qualified Energy Efficiency and Weatherization Assistance	726	5,211,991	3,497,900	6,490,735	-	6,490,735	72.7130507%	4,718,611
6	Multi-Family Energy Efficiency	2,503	21,288,673	13,853,284	3,604,521	1,178,562	4,783,483	72.7130507%	3,478,216
7	Energy Assessments	929	7,715,668	5,754,998	2,836,229	835,658	3,171,887	72.7130507%	2,306,376
8	Subtotal	59,546	240,685,821	$ 168,720,688	$ 64,566,534	$ 12,821,904	$ 76,888,438		$ 55,907,929
9	My Home Energy Report (1)	81,409	320,613,567	21,204,651	12,765,286	970,527	13,735,813	72.7130507%	9,987,729
10	Total for Residential Energy Efficiency Programs	120,956	561,300,568	$ 189,925,339	$ 77,331,820	$ 13,792,431	$ 90,624,251		$ 65,895,657
								NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D11* E11
11	SubTotal DSM Programs (2)	876,165	2,498,948	100,367,844	$ 30,409,403	$ 8,045,221	$ 38,454,624	32.1574721%	$ 12,366,035
12	Total DSM Programs								12,366,035
13	Total Residential Revenue Requirement								$ 78,261,692

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 3 pg. 4)	NC Non-Residential Revenue Requirement D * E
	Non-Residential Programs								
	EE Programs								
14	Non Residential Smart Saver Custom Energy Assessments	19	83,588	$ 67,284	$ 407,293	$ (39,101)	$ 368,192	72.7130507%	$ 267,724
15	Non Residential Smart Saver Custom	4,054	30,333,040	23,314,525	6,068,902	1,983,247	8,052,148	72.7130507%	5,854,963
16	Non Residential Smart Saver Energy Efficient Food Service Products	106	1,151,114	741,344	235,605	58,160	293,765	72.7130507%	213,605
17	Non Residential Smart Saver Energy Efficient HVAC Products	893	2,908,386	2,808,366	1,620,748	136,691	1,757,439	72.7130507%	1,277,888
18	Non Residential Smart Saver Energy Efficient Lighting Products	31,537	178,360,156	146,553,308	25,872,380	13,878,307	39,750,687	72.7130507%	28,903,937
19	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	421	2,669,016	1,617,238	277,785	154,036	431,822	72.7130507%	313,991
20	Non Residential Smart Saver Energy Efficient IT Products	-	17,639	9,024	36,875	(3,893)	32,982	72.7130507%	23,982
21	Non Residential Smart Saver Energy Efficient Process Equipment Products	75	331,222	226,654	67,509	18,302	85,811	72.7130507%	62,396
22	Non Residential Smart Saver Performance Incentive	168	3,271,186	1,671,227	479,610	137,036	616,646	72.7130507%	448,382
23	Small Business Energy Saver	13,374	76,696,523	46,818,065	15,977,993	3,546,608	19,524,601	72.7130507%	14,196,933
24	Smart Energy in Offices	310	1,488,592	148,239	219,748	(8,799)	210,949	72.7130507%	153,388
25	Business Energy Report	-	-	-	-	-	-	72.7130507%	-
26	Sub-Total for Non-Residential Energy Efficiency Programs	50,950	297,310,461	$ 223,965,268	$ 51,264,448	$ 19,860,594	$ 71,125,042		$ 51,717,189
27	Total for Non-Residential Energy Efficiency Programs								$ 51,717,188
								NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D24* E24
28	Total DSM Programs(2)	876,165	2,498,948	$ 100,367,844	$ 30,409,403	$ 8,045,221	$ 38,454,624	41.4712829%	$ 15,947,626
29	Total Non-Residential DSM Programs								15,947,626
30	Total Non-Residential Revenue Requirement								$ 67,664,814
								NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D29* E29
	Total DSM Program Breakdown								
31	Power Manager (Residential)	535,418	-	$ 62,147,591	$ 14,425,610	$ 5,488,258	$ 19,911,868		
32	EnergyWise for Business (Non-Residential)	8,117	2,498,948	$ 2,235,498	$ 3,062,816	$ (95,142)	$ 2,967,675		
33	Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34	Power Share (Non-Residential)	332,631	-	$ 35,984,754	$ 12,922,977	$ 2,652,104	$ 15,575,082		
35	Total DSM	876,165	2,498,948	$ 100,367,844	$ 30,409,403	$ 8,045,221	$ 38,454,624	73.6287551%	$ 28,313,661

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC
Vintage 2020 Estimate for January 1, 2020 to December 31, 2020
Docket Number E-7, Sub 1192
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	A System NPV of Avoided Cost	B System Cost	C = (A-B) *11.5% Earned Utility Incentive	D= B+C System Cost Plus Incentive	E NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Residential Revenue Requirement D * E
	Residential Programs								
	EE Programs								
1	Appliance Recycling Program	-	-	$ -	$ -	$ -	$ -	72.7130507%	$ -
2	Energy Efficiency Education	1,652	7,034,771	3,268,716	2,621,628	74,415	2,696,043	72.7130507%	1,960,375
3	Energy Efficient Appliances and Devices	10,988	47,538,836	28,215,962	9,114,148	2,196,709	11,310,857	72.7130507%	8,224,469
4	Residential – Smart Saver Energy Efficiency Program	2,714	10,276,853	9,334,114	7,663,588	192,109	7,855,707	72.7130507%	5,712,125
5	Income Qualified Energy Efficiency and Weatherization Assistance	653	4,245,993	1,694,957	8,689,280	-	8,689,280	72.7130507%	6,318,240
6	Multi-Family Energy Efficiency	2,146	20,180,190	10,272,645	3,613,126	765,845	4,378,970	72.7130507%	3,184,083
7	Energy Assessments	725	6,119,618	3,579,246	2,785,258	90,159	2,885,417	72.7130507%	2,098,075
8	Subtotal	18,877	95,396,261	$ 56,365,639	$ 34,497,088	$ 3,319,236	$ 37,816,274		$ 27,497,367
9	My Home Energy Report (1)	77,745	306,337,865	20,734,326	11,645,405	1,045,226	12,690,631	72.7130507%	9,227,745
10	Total for Residential Energy Efficiency Programs	96,623	401,734,126	$ 77,099,965	$ 46,142,448	$ 4,364,462	$ 50,506,906		$ 36,725,112
								NC Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D11* E11
11	SubTotal DSM Programs (2)	976,260	2,557,590	124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	32.1574721%	$ 15,433,268
12	Total DSM Programs								15,433,268
13	Total Residential Revenue Requirement								$ 52,158,380

		System kW Reduction - Summer Peak	System Energy Reduction (kWh)	System NPV of Avoided Cost	System Cost	Earned Utility Incentive	System Cost Plus Incentive	NC Retail kWh Sales Allocation Factor (Miller Exhibit 5 pg. 4)	NC Non-Residential Revenue Requirement D * E
	Non-Residential Programs								
	EE Programs								
14	Non Residential Smart Saver Custom Energy Assessments	908	7,950,216	$ 4,114,401	$ 1,414,676	$ 310,468	$ 1,725,144	72.7130507%	$ 1,254,405
15	Non Residential Smart Saver Custom	7,658	67,082,262	34,716,460	10,756,254	2,755,424	13,511,678	72.7130507%	9,824,753
16	Non Residential Smart Saver Energy Efficient Food Service Products	288	4,363,034	1,892,593	1,435,926	52,517	1,488,443	72.7130507%	1,082,292
17	Non Residential Smart Saver Energy Efficient HVAC Products	756	2,546,658	2,005,587	1,358,750	74,386	1,433,137	72.7130507%	1,042,077
18	Non Residential Smart Saver Energy Efficient Lighting Products	23,878	131,137,431	87,238,062	21,546,401	7,554,541	29,100,942	72.7130507%	21,160,183
19	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	730	4,603,201	2,264,851	653,139	185,348	838,487	72.7130507%	609,689
20	Non Residential Smart Saver Energy Efficient IT Products	-	323,520	40,508	71,858	(5,605)	68,253	72.7130507%	49,629
21	Non Residential Smart Saver Energy Efficient Process Equipment Products	85	547,055	348,206	172,146	20,247	192,393	72.7130507%	139,895
22	Non Residential Smart Saver Performance Incentive	2,797	22,097,800	11,816,217	3,810,989	920,601	4,731,590	72.7130507%	3,440,484
23	Small Business Energy Saver	8,756	50,048,128	27,132,868	10,638,607	1,896,783	12,535,390	72.7130507%	9,114,864
24	Smart Energy in Offices	-	-	-	-	-	-	72.7130507%	-
25	Business Energy Report	-	-	-	-	-	-	72.7130507%	-
26	Sub-Total for Non-Residential Energy Efficiency Programs	45,856	290,699,344	$ 171,569,263	$ 51,858,747	$ 19,766,709	$ 65,625,456		$ 47,718,271
27	Total for Non-Residential Energy Efficiency Programs								$ 47,718,271
								NC Non-Residential Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D24* E24
28	Total DSM Programs(2)	976,260	2,557,590	$ 124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	41.4712829%	$ 19,903,226
29	Total Non-Residential DSM Programs								19,903,226
30	Total Non-Residential Revenue Requirement								$ 67,621,497
								NC Retail Peak Demand Allocation Factor (Miller Exhibit 5 pg. 4)	D29* E29
	Total DSM Program Breakdown								
31	Power Manager (Residential)	616,237	-	$ 77,685,921	$ 19,591,626	$ 6,708,844	$ 26,095,470		
32	EnergyWise for Business (Non-Residential)	17,357	2,557,590	$ 3,451,278	$ 5,098,177	$ (189,393)	$ 4,908,784		
33	Power Share CallOption (Non-Residential)	-	-	$ -	$ -	$ -	$ -		
34	Power Share (Non-Residential)	342,625	-	$ 43,192,988	$ 13,583,438	$ 3,405,098	$ 16,988,536		
35	Total DSM	976,260	2,557,590	$ 124,330,187	$ 38,073,241	$ 9,919,549	$ 47,992,790	73.6287551%	$ 35,336,494

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Supplemental

Duke Energy Carolinas, LLC
For the Period January 1, 2018 - December 31, 2018
Docket Number E-7, Sub 1192
North Carolina Net Lost Revenue Estimates for Vintages 2015 - 2020

Line	Residential	Vintage 2015 2015	2016	2017[a]	2018	2019	2020	Total
1	Residential Energy Assessments	$ 283,798	$ 477,738	$ 473,182	$ 163,880			$ 1,398,597
2	My Home Energy Report	10,047,270	-	-	-			10,047,270
3	Energy Efficient Appliances and Devices	5,690,771	6,169,129	6,116,216	2,163,569			18,139,680
4	HVAC Energy Efficiency	152,089	284,967	282,892	91,744			691,692
5	Appliance Recycle Program	150,786	279,840	277,068	115,671			823,394
6	Income Qualified Energy Efficiency and Weatherization Assistance	69,833	152,201	150,742	68,856			441,633
7	Multi-Family Energy Efficiency	396,658	681,177	676,879	285,091			1,979,805
8	Energy Efficiency Education	89,806	220,572	218,470	89,897			618,746
9	Total Lost Revenues	14,801,010	8,215,618	8,145,479	2,978,708			$4,140,816
10	Found Residential Revenues *	-	-	-	-			-
11	Net Lost Residential Revenues	$ 14,801,010	$ 8,215,618	$ 8,145,479	$ 2,978,708			$ 34,140,816

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
12	Nonresidential Smart Saver Custom Energy Assessments	$ 5,659	$ 22,194	$ 21,744	$ 12,719			$ 62,316
13	Non Residential Smart Saver Custom	1,432,898	2,477,128	2,416,573	830,053			7,156,453
14	Energy Management Information Services	-	-	-	-			-
15	Non Residential Smart Saver Energy Efficient Food Service Products	33,714	65,479	64,761	25,584			189,538
16	Non Residential Smart Saver Energy Efficient HVAC Products	109,819	196,207	193,346	73,963			573,335
17	Non Residential Smart Saver Energy Efficient Lighting Products	1,439,011	2,400,931	2,289,093	769,611			6,898,646
18	Non Residential Smart Saver Energy Efficient Pumps and Drives Products	51,265	82,153	80,494	25,843			239,755
19	Non Residential Smart Saver Energy Efficient IT Products	58,585	173,258	170,131	83,735			485,709
20	Non Residential Smart Saver Energy Efficient Process Equipment Products	14,723	25,414	24,674	8,676			73,487
21	Smart Business Energy Saver	1,832,775	3,599,216	3,572,716	1,515,918			10,520,625
22	Smart Energy in Offices	178,960	887,139	-	-			566,099
23	EnergyWise for Business	-	-	-	-			
24	Total Lost Revenues	5,157,409	9,429,119	8,833,331	3,346,104			26,765,963
25	Found Non-Residential Revenues *	-	-	-	-			-
26	Net Lost Non-Residential Revenues	$ 5,157,409	$ 9,429,119	$ 8,833,331	$ 3,346,104			$ 26,765,963

Line	Residential	Vintage 2018 2015	2016	2017[a]	2018	2019	2020	Total
27	Residential Energy Assessments		$ 193,357	$ 336,600	$ 194,978		$	724,934
28	My Home Energy Report		13,052,806	-	-		-	13,052,806
29	Energy Efficient Appliances and Devices		2,665,348	5,787,926	3,353,196			11,806,469
30	HVAC Energy Efficiency		132,531	334,414	193,675			660,620
31	Appliance Recycle Program		5,096	8,147	4,713			17,951
32	Income Qualified Energy Efficiency and Weatherization Assistance		115,500	242,117	140,230			497,847
33	Multi-Family Energy Efficiency		347,362	698,540	403,459			1,449,361
34	Energy Efficiency Education		142,689	301,026	174,350			618,064
35	Total Lost Revenues	-	16,654,687	7,708,770	4,464,606			28,828,063
36	Found Residential Revenues *		-	-	-			-
37	Net Lost Residential Revenues	$ -	$ 16,654,687	$ 7,708,770	$ 4,464,606		$	28,828,063

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
38	Nonresidential Smart Saver Custom Energy Assessments		$ 199,079	$ 389,585	$ 318,658		$	907,321
39	Non Residential Smart Saver Custom		914,009	1,703,790	1,398,545			4,016,348
40	Energy Management Information Services		-	-	-			-
41	Non Residential Smart Saver Energy Efficient Food Service Products		24,889	66,328	54,035			145,252
42	Non Residential Smart Saver Energy Efficient HVAC Products		46,952	103,028	83,640			233,620
43	Non Residential Smart Saver Energy Efficient Lighting Products		2,925,514	6,589,455	5,321,493			14,836,462
44	Non Residential Smart Saver Energy Efficient Pumps and Drives Products		38,898	66,558	54,453			159,908
45	Non Residential Smart Saver Energy Efficient IT Products		59,904	75,403	61,613			196,920
46	Non Residential Smart Saver Energy Efficient Process Equipment Products		4,731	10,652	8,811			24,194
47	Small Business Energy Saver		2,143,932	4,346,981	3,511,109			10,004,022
48	Smart Energy in Offices		227,062	418,553	-			645,616
49	Business Energy Report		-	-	-			-
75	EnergyWise for Business		15,922	36,788	29,639			82,348
76	Total Lost Revenues		6,602,893	13,807,121	10,841,999			31,252,013
77	Found Non-Residential Revenues *		-	-	-			-
78	Net Lost Non-Residential Revenues		$ 6,602,893	$ 13,807,121	$ 10,841,999		$	31,252,013

Line	Residential	Vintage 2017 2015	2016	2017[a]	2018	2019	2020	Total
78	Residential Energy Assessments			$ 198,264	$ 274,951	$ 366,789	$ 75,609	$ 915,563
79	My Home Energy Report			14,455,527	-	-	-	14,455,527
80	Energy Efficient Appliances and Devices			3,386,885	5,134,538	6,635,996	1,569,818	16,727,238
81	Residential – Smart Saver Energy Efficiency Program			197,134	264,823	439,059	69,705	964,720
82	Appliance Recycle Program			-	-	-	-	-
83	Income Qualified Energy Efficiency and Weatherization Assistance			141,450	210,612	242,487	63,120	657,669
84	Multi-Family Energy Efficiency			535,154	745,597	946,417	204,745	2,429,913
85	Energy Efficiency Education			165,283	221,902	279,889	57,994	724,468
86	Total Lost Revenues	-	-	19,079,697	6,849,823	8,904,587	2,040,991	36,875,097
87	Lost Revenue Decrement Pending Rate Case Implementation						289,930	289,930
88	Found Residential Revenues *			-	-	-	-	-
89	Net Lost Residential Revenues	$ -	$ -	$ 19,079,697	$ 6,849,823	$ 8,904,587	$ 2,751,061	$ - 36,585,168

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
90	Nonresidential Smart Saver Custom Energy Assessments			$ 220,191	$ 358,289	$ 355,020	$ 139,226	$ 1,072,725
91	Non Residential Smart Saver Custom			435,407	871,334	916,764	435,511	2,658,016
92	Energy Management Information Services			-	-	-	-	-
93	Non Residential Smart Saver Energy Efficient Food Service Products			28,410	40,771	69,365	12,596	151,142
94	Non Residential Smart Saver Energy Efficient HVAC Products			61,639	110,255	191,612	48,778	352,284
95	Non Residential Smart Saver Energy Efficient Lighting Products			6,200,869	10,299,904	8,730,546	4,144,248	29,374,967
96	Non Residential Smart Saver Energy Efficient Pumps and Drives Products			58,808	127,509	93,363	68,742	348,421
97	Non Residential Smart Saver Energy Efficient IT Products			82	162	186	81	512
98	Non Residential Smart Saver Energy Efficient Process Equipment Products			8,160	12,172	10,555	4,015	34,902
99	Non Residential Smart Saver Performance Incentive			66	774	818	686	2,344
100	Small Business Energy Saver			2,203,537	3,774,927	4,099,390	1,591,993	11,669,648
101	Smart Energy in Offices			209,510	149,382	-	-	358,892
102	Business Energy Report			-	-	-	-	-
103	EnergyWise for Business			85,268	158,514	162,762	74,100	480,644
104	Total Lost Revenues		-	9,511,547	15,903,993	14,570,381	6,519,975	46,505,896
105	Lost Revenue Decrement Pending Rate Case Implementation						926,185	926,185
106	Found Non-Residential Revenues *			-	-	-	-	-
107	Net Lost Non-Residential Revenues		$ -	$ 9,511,547	$ 15,903,993	$ 14,570,381	$ 5,593,790	$ - 45,579,110

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2018 2015	2016	2017[a]	2018	2019	2020	Total
108	Residential Energy Assessments				$ 204,104	$ 353,963	$ 353,514	$ 911,581
109	My Home Energy Report				15,088,601	-	-	15,088,601
110	Energy Efficient Appliances and Devices				4,299,478	4,054,825	9,080,869	17,435,172
111	Residential – Smart Saver Energy Efficiency Program				161,446	213,538	318,537	693,520
112	Appliance Recycle Program				-	-	-	-
113	Income Qualified Energy Efficiency and Weatherization Assistance				150,598	246,384	252,956	629,937
114	Multi-Family Energy Efficiency				500,522	1,163,290	1,086,338	2,752,151
115	Energy Efficiency Education				122,869	260,025	231,584	614,478
116	Total Lost Revenues	-	-	-	20,507,618	6,294,025	11,923,797	38,125,440
117	Lost Revenue Decrement Pending Rate Case Implementation						1,608,585	1,608,585
118	Found Residential Revenues *				-	-	-	-
119	Net Lost Residential Revenues	$ -	$ -	$ -	$ 20,507,618	$ 6,294,025	$ 9,715,212	$ 36,516,855

	Non-Residential .	2015	2016	2017[a]	2018	2019	2020	Total
120	Nonresidential Smart Saver Custom Energy Assessments				$ 212	$ 549,855	$ 849	$ 550,916
121	Non Residential Smart Saver Custom				461,343	2,688,812	740,662	3,890,816
122	Energy Management Information Services				-	-	-	-
123	Non Residential Smart Saver Energy Efficient Food Service Products				15,485	26,794	21,497	61,776
124	Non Residential Smart Saver Energy Efficient HVAC Products				50,511	134,931	114,693	300,135
125	Non Residential Smart Saver Energy Efficient Lighting Products				4,078,660	2,987,074	6,538,710	13,604,445
126	Non Residential Smart Saver Energy Efficient Pumps and Drives Products				66,649	49,390	84,066	200,106
127	Non Residential Smart Saver Energy Efficient IT Products				185	117,948	859	118,991
128	Non Residential Smart Saver Energy Efficient Process Equipment Products				8,501	11,082	10,246	27,829
129	Non Residential Smart Saver Performance Incentive				20,243	160,962	82,058	263,263
129	Small Business Energy Saver				1,772,873	3,493,885	3,374,219	8,640,976
130	Smart Energy in Offices				39,735	-	-	39,733
131	Business Energy Report				-	-	-	-
132	EnergyWise for Business				64,755	51,234	113,468	229,458
133	Total Lost Revenues		-	-	6,575,151	10,271,966	11,081,327	27,928,443
134	Lost Revenue Decrement Pending Rate Case Implementation						1,574,142	1,574,142
135	Found Non-Residential Revenues *				-	-	-	-
136	Net Lost Non-Residential Revenues	$ -	$ -	$ -	$ 6,575,151	$ 10,271,966	$ 9,507,185	$ 26,354,302

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2019 2015	2016	2017[a]	2018	2019	2020	Total
137	Residential Energy Assessments					$ 178,309	$ 287,735	$ 466,044
138	My Home Energy Report					15,206,604	-	15,206,604
139	Energy Efficient Appliances and Devices					2,553,978	4,301,203	6,854,581
140	Residential – Smart Saver Energy Efficiency Program					129,065	158,765	287,830
141	Appliance Recycle Program					-	-	-
142	Income Qualified Energy Efficiency and Weatherization Assistance					99,398	185,634	285,032
143	Multi-Family Energy Efficiency					496,951	903,943	1,400,894
144	Energy Efficiency Education					119,499	261,545	381,044
145	Total Lost Revenues	-	-	-		18,783,204	6,098,825	24,882,029
146	Lost Revenue Decrement Pending Rate Case Implementation						866,960	866,960
147	Found Residential Revenues *					-	-	-
148	Net Lost Residential Revenues	$ -	$ -	$ -		$ 18,783,204	$ 5,232,468	$ 24,015,670

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
149	Nonresidential Smart Saver Custom Energy Assessments					$ 145,699	$ 300,502	$ 446,201
150	Non Residential Smart Saver Custom					1,059,600	2,335,850	3,395,450
151	Energy Management Information Services					-	-	-
152	Non Residential Smart Saver Energy Efficient Food Service Products					146,435	153,750	300,185
153	Non Residential Smart Saver Energy Efficient HVAC Products					193,528	322,214	515,742
154	Non Residential Smart Saver Energy Efficient Lighting Products					1,921,414	3,497,532	5,418,946
155	Non Residential Smart Saver Energy Efficient Pumps and Drives Products					77,800	214,313	292,113
156	Non Residential Smart Saver Energy Efficient IT Products					77,654	125,792	203,445
157	Non Residential Smart Saver Energy Efficient Process Equipment Products					18,722	39,115	57,837
158	Non Residential Smart Saver Performance Incentive					375,261	656,829	1,032,089
158	Small Business Energy Saver					1,529,101	2,471,538	3,994,639
159	Smart Energy in Offices					-	-	-
160	Business Energy Report					-	-	-
161	EnergyWise for Business					51,234	76,675	127,908
162	Total Lost Revenues	-	-			5,590,446	10,194,109	15,784,556
163	Lost Revenue Decrement Pending Rate Case Implementation						1,448,109	1,448,109
164	Found Non-Residential Revenues *					-	-	-
165	Net Lost Non-Residential Revenues	$ -	$ -	$ -		$ 5,590,446	$ 8,746,000	$ 14,336,447

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Line	Residential	Vintage 2020 2015	2016	2017[a]	2018	2019	2020	Total
166	Residential Energy Assessments						161,966	$ 161,966
167	My Home Energy Report						14,686,468	14,686,468
168	Energy Efficient Appliances and Devices						1,237,431	1,237,431
169	Residential – Smart Saver Energy Efficiency Program						263,183	263,183
170	Appliance Recycle Program						-	-
171	Income Qualified Energy Efficiency and Weatherization Assistance					-	103,534	103,534
172	Multi-Family Energy Efficiency						496,249	496,249
173	Energy Efficiency Education						146,751	146,751
174	Total Lost Revenues	-	-	-		-	17,095,583	17,095,583
175	Lost Revenue Decrement Pending Rate Case Implementation						2,428,488	2,428,488
176	Found Residential Revenues *						-	-
177	Net Lost Residential Revenues	$ -	$ -	$ -		$ -	$ 14,667,095	$ 14,667,095

	Non-Residential	2015	2016	2017[a]	2018	2019	2020	Total
178	Nonresidential Smart Saver Custom Energy Assessments						$ 136,414	$ 136,414
179	Non Residential Smart Saver Custom						1,201,984	1,201,984
180	Energy Management Information Services						-	-
181	Non Residential Smart Saver Energy Efficient Food Service Products						93,624	93,624
182	Non Residential Smart Saver Energy Efficient HVAC Products						61,819	61,819
183	Non Residential Smart Saver Energy Efficient Lighting Products						3,029,908	3,029,908
184	Non Residential Smart Saver Energy Efficient Pumps and Drives Products						94,651	94,651
185	Non Residential Smart Saver Energy Efficient IT Products						6,639	6,639
186	Non Residential Smart Saver Energy Efficient Process Equipment Products						12,061	12,061
187	Non Residential Smart Saver Performance Incentive						402,902	402,902
187	Small Business Energy Saver						955,245	955,245
188	Smart Energy in Offices						-	-
189	Business Energy Report						-	-
190	EnergyWise for Business						46,148	46,148
191	Total Lost Revenues		-	-		-	6,041,394	6,041,394
192	Lost Revenue Decrement Pending Rate Case Implementation.						858,201	858,201
193	Found Non-Residential Revenues *						-	-
194	Net Lost Non-Residential Revenues	$ -	$ -	$ -		$ -	$ 5,183,193	$ 5,183,193

* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

E/A

Supplemental Evans Exhibit 3

Duke Energy Carolinas, LLC
For the Period January 1, 2018 - December 31, 2018
Docket Number E-7 Sub 1192
Actual Program Costs for Vintage Years 2014, 2015, 2016, 2017 and 2018

		Carolinas System - 12 Months Ended 12/31/2014	Carolinas System - 12 months Ended 12/31/2015	Carolinas System - 12 months Ended 12/31/2016	Carolinas System - 12 months Ended 12/31/2017	Carolinas System - 12 months Ended 12/31/2018
1	Residential Energy Assessments	$ 5,605,737	$ 3,036,173	2,678,893	2,909,098	2,836,229
2	My Home Energy Report	8,285,066	9,845,895	10,822,444	13,812,250	12,765,286
3	Energy Efficient Appliances and Devices	14,738,129	12,050,485	24,069,774	30,340,728	42,687,244
4	Residential – Smart Saver Energy Efficiency Program	4,786,807	5,416,833	7,839,566	7,403,327	6,955,146
5	Appliance Recycle Program	1,515,867	1,537,241	(97,397)	5,307	-
6	Income Qualified Energy Efficiency and Weatherization Assistance	1,917,192	2,238,776	4,792,436	5,505,992	6,490,735
7	Multi Family Energy Efficiency	1,442,533	2,092,935	2,518,988	3,168,422	3,604,921
8	Energy Efficiency Education	1,963,153	2,054,672	2,126,909	2,077,611	1,992,260
9	Nonresidential Smart Saver Custom Energy Assessments	1,458,195	660,420	2,034,308	2,139,875	407,293
10	Energy Management Information Systems	74,855	-	-	-	-
11	Non-Residential Smart Saver Custom	8,136,712	9,932,877	7,956,509	7,904,838	6,068,902
12	Non-Residential Smart Saver Performance Incentive			35,670	320,559	479,610
13	Non-Residential Energy Efficient Food Service Products	199,350	194,425	324,117	306,488	235,605
14	Non-Residential Smart Saver Energy Efficient HVAC Products	815,399	1,142,522	1,479,991	1,560,769	1,620,748
15	Non-Residential Smart Saver Energy Efficient Lighting Products	6,727,675	11,335,798	39,622,944	66,689,770	25,872,380
16	Nonresidential Energy Efficient Pumps and Drives Products	584,874	466,478	471,930	528,937	277,785
17	Nonresidential Energy Efficient ITEE	25,730	716,542	285,480	61,215	36,875
18	Nonresidential Energy Efficient Process Equipment Products	89,809	88,823	125,947	162,413	67,508
19	Smart Energy In Offices	1,156,497	1,463,240	1,061,729	891,010	219,748
20	Small Business Energy Saver	1,026,607	13,968,790	15,360,852	17,350,972	15,977,993
21	Business Energy Report	-	126,404	263,169	126,680	-
22	Power Manager	15,662,693	14,634,279	13,644,970	14,021,500	14,423,610
23	EnergyWise for Business	-	1,549,305	470,304	2,484,618	3,062,816
24	Power Share	15,520,492	15,779,050	14,291,024	13,316,535	12,922,977
25	Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, dated 8/25/16)		(3,851)			
26	Total Energy Efficiency & Demand Side Program Costs	$ 89,733,913	$ 110,378,109	$ 151,574,107	$ 192,488,915	$ 159,005,671
27	NC Allocation Factor for EE programs	72.9600473%	72.9564706%	73.0962827%	72.8087506%	72.7130507%
28	NC Allocation Factor for DSM programs-Residential	34.0209980%	32.5218612%	33.7973480%	33.8075104%	32.1574721%
29	NC Allocation Factor for DSM programs-Non-Residential	41.2108021%	42.4483855%	40.8166437%	40.0747013%	41.4712829%

		NC Allocated - 12 Months Ended 12/31/2014	NC Allocated - 12 Months Ended 12/31/2015	NC Allocated - 12 Months Ended 12/31/2016	2	NC Allocated - 12 Months Ended 12/31/2018
30	Residential Energy Assessments	$ 2,630,748	$ 2,251,563	$ 1,958,171	$ 2,118,078	$ 2,063,023
31	My Home Energy Report	6,044,788	7,183,217	7,910,805	10,056,526	9,294,245
32	Energy Efficient Appliances and Devices	10,752,946	8,791,608	17,594,110	22,090,705	31,080,049
33	Residential – Smart Saver Energy Efficiency Program	3,492,457	3,951,930	5,730,431	5,390,270	5,063,955
34	Appliance Recycle Program	1,105,977	1,121,517	(71,194)	3,864	-
35	Income Qualified Energy Efficiency and Weatherization Assistance	1,398,784	1,633,332	3,503,093	4,008,844	4,725,823
36	Multi family Energy Efficiency	1,052,473	1,526,931	1,841,287	2,306,888	2,624,698
37	Energy Efficiency Education	1,432,317	1,499,016	1,554,399	1,512,683	1,450,589
38	Nonresidential Smart Saver Custom Energy Assessments	1,063,900	481,819	1,487,003	1,558,016	296,545
39	Energy Management Information Systems	54,614	-	-	-	-
40	Non-Residential Smart Saver Custom	5,936,549	7,246,677	5,577,335	5,318,561	4,418,691
41	Non-Residential Smart Saver Performance Incentive			26,075		
42	Non-Residential Energy Efficient Food Service Products	145,446	141,845	236,918	223,150	171,541
43	Non-Residential Smart Saver Energy Efficient HVAC Products	594,872	833,543	1,077,433	1,136,376	1,180,046
44	Non-Residential Smart Saver Energy Efficient Lighting Products	4,908,515	8,270,198	28,962,899	48,555,988	18,837,357
45	Nonresidential Energy Efficient Pumps and Drives Products	426,724	340,326	344,963	385,112	202,252
46	Nonresidential Energy Efficient ITEE	18,773	522,764	208,639	44,570	26,848
47	Nonresidential Energy Efficient Process Equipment Products	65,525	64,802	92,062	118,251	49,153
48	Smart Energy In Offices	843,781	1,067,528	776,084	648,734	159,996
49	Small Business Energy Saver	749,013	10,191,136	11,228,212	12,633,026	11,633,977
50	Business Energy Report	-	92,220	192,366	92,234	-
51	Power Manager	10,608,831	10,394,843	9,600,575	10,082,296	9,778,895
52	EnergyWise for Business		1,213,062	369,407	1,879,262	2,416,251
53	Power Share	12,850,841	12,354,553	11,225,091	10,072,077	10,194,918
54	Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, dated 8/25/16)		(2,887)			
55	Total Energy Efficiency & Demand Side Program Costs	$ 66,177,873	$ 81,171,544	$ 111,226,163	$ 140,235,514	$ 115,670,203

Forest Bradley-Wright

4532 Bancroft Dr. New Orleans, LA 70122
(504) 208-7597; forest@forestwright.com

FBW Exhibit 1

I/A

PROFESSIONAL EXPERIENCE

Energy Efficiency Director: Southern Alliance for Clean Energy, Knoxville, TN **April 2018 – Present**

- Regulatory filings, testimony, strategy, and stakeholder management on integrated resource planning, energy efficiency program design, cost recovery and related matters throughout the Southeast.

Senior Policy Director: Alliance for Affordable Energy, New Orleans, LA **February 2017 – April 2018**

- Regulatory filings, strategy, and stakeholder management on integrated resource planning and energy efficiency rulemaking, power plant proposals and related matters at the city and state level.

Consultant: Utility Regulation and Energy Policy **December 2014 – February 2017**

- Technical and strategic guidance on clean energy policy and utility regulation for Opower, Gulf States Renewable Energy Industries Association, the Alliance, and Mississippi PSC candidate Brent Bailey.

Candidate: Louisiana Public Service Commission **July - December 2014**

- Won the open primary and secured 49.15% of the vote in the general election against a highly favored, well-funded incumbent.
- Raised nearly $500,000 in campaign contributions while publicly pledging not to accept money from monopoly companies regulated by the PSC.
- Campaign focused on ethical leadership, reducing bills, energy efficiency, the rights of customers to generate solar energy, and government transparency.

Utility Policy Director: Alliance for Affordable Energy, New Orleans, LA **October 2005 – June 2014**

- Directed successful policy efforts for energy efficiency, renewable energy, and integrated resource planning at the Louisiana PSC and New Orleans City Council, spurring every major Louisiana utility investment in clean energy over the past decade.
- Reviewed and filed intervenor comments, met with commissioners, utilities, and technical consultants, assembled and managed relationships with a broad coalition of stakeholders, worked with media, and served as the organization's public face.
- Launched and managed energy efficiency and solar workforce training programs, public education campaigns, and direct service projects to improve energy performance in over 100 homes following the city's rebuild post-Katrina.

Owner and Director: EcoPark LLC (d.b.a. The Building Block), New Orleans, LA **February 2008 – Present**

Created an innovative co-location business center to serve as a catalyst for moving green commerce and social entrepreneurship to the mainstream.

- Developed the business concept and plan, brought initial funding to the project, hired staff, established brand identity, and secured tenants.

Sustainable Development Team Facilitator: Shell International, New Orleans, LA **May 2001 – June 2004**

- Worked to facilitate a paradigm shift within corporate management's core business practices toward social and environmental issue management.
- Engaged a diverse team of professionals across the company to identify energy and resource inefficiencies and methods to reduce carbon emissions from venting and flaring in oil and natural gas exploration and production.
- Analyzed ways to incorporate sustainability accounting into each stage of new venture development for major drilling projects.

EDUCATION

Tulane University

- **Master of Arts in Latin American Studies, 2011**
  Concentration in environmental law, business, and international development
- **Bachelor of Arts with Honors in Latin American Studies, 2001**

ADDITIONAL PROFESSIONAL/PUBLIC SERVICE

Board President for the Louisiana Green Corps, Gulf States Renewable Energy Industry Association; Mayor's Sustainability Task Force; founder of Groundwork NOLA

FBW Exhibit 2

I/A

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7, SUB 1164

In the Matter of: Application of Duke Energy Carolinas, LLC, for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider Pursuant to G.S. 62-133.9 and Commission Rule R8-69	)	**TESTIMONY OF CHRIS NEME ON BEHALF OF THE NORTH CAROLINA JUSTICE CENTER, NATURAL RESOURCES DEFENSE COUNCIL, AND SOUTHERN ALLIANCE FOR CLEAN ENERGY**

EXHIBITS

CN-1 Christopher Neme CV

CN-2 Advanced Energy, Duke Energy, Lockheed Martin, and North Carolina Community Action Association, *Evaluation of Duke Energy's Helping Home Fund*, p. 2 (October 2017)

Table of Contents

I. Introduction and Qualifications

Q: PLEASE STATE YOUR NAME, EMPLOYER, AND BUSINESS ADDRESS.

A: My name is Chris Neme. I am a co-founder and Principal of Energy Futures Group, a consulting firm that provides specialized expertise on energy efficiency and renewable-energy markets, programs, and policies. My business address is P.O. Box 587, Hinesburg, VT 05461.

Q: PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A: I received a Master of Public Policy degree from the University of Michigan (Ann Arbor) in 1986. That is a two-year, multi-disciplinary degree focused on applied economics, statistics, and policy development. I also received a Bachelor's degree in Political Science from the University of Michigan (Ann Arbor) in 1985. My first year of graduate school counted towards both my Master's and Bachelor's degrees.

Q: PLEASE SUMMARIZE YOUR BUSINESS AND PROFESSIONAL EXPERIENCE.

A: As a Principal of Energy Futures Group, I play lead roles in a variety of energy-efficiency consulting projects. Recent examples include:

- Representing the Natural Resources Defense Council (NRDC) in Illinois, Michigan, and Ohio consultations with utilities (including Duke Energy Ohio) and other parties on efficiency-program and portfolio design, cost-effectiveness screening, evaluation, shareholder incentive structures, and other related topics;

- Helping the National Association of Regulatory Utility Commissioners and the Michigan Public Service Commission staff assess the relative merits of alternative approaches to defining savings goals for utility efficiency programs (focusing on lifetime rather than just first-year savings);
- Serving as an appointed expert representative on the Ontario Energy Board's Evaluation and Audit Committee for natural gas demand-side management, as well as on related committees to provide expertise on the conduct of gas and electric efficiency-potential studies;
- Serving on the Management Committee and leading strategic planning and program design for a team of firms, led by Applied Energy Group, that was hired by the New Jersey Board of Public Utilities to deliver the electric and gas utility-funded New Jersey Clean Energy Programs;
- Serving on a five-person national drafting committee for development of a new National Standard Practice Manual for cost-effectiveness screening of energy-efficiency measures, programs, and portfolios, which was published in May 2017;
- Providing technical support to the Arkansas energy-efficiency collaborative (commonly known as the "Parties Working Collaboratively") in assessing (at the Arkansas Commission's direction) how well the State's current practices in assessing cost-effectiveness aligns with national best practices; and
- Drafting policy reports for the Regulatory Assistance Project on a variety of energy-efficiency and related regulatory policy issues, such as whether 30 percent electric savings is achievable in 10 years, the history of efforts across

the United States to use geographically targeted efficiency programs to cost-effectively defer transmission and distribution system investments, and the history of bidding of efficiency resources into the PJM and New England capacity markets.

Prior to co-founding Energy Futures Group in 2010, I worked for 17 years for the Vermont Energy Investment Corporation ("VEIC"), the last 10 as Director of its Consulting Division managing a group of 30 professionals with offices in three states. Most of our consulting work involved critically reviewing, developing, and/or supporting the implementation of electric, gas, and multi-fuel energy-efficiency programs for clients across North America and beyond. During my more than 25 years in the in the energy-efficiency industry, I have worked in numerous jurisdictions to develop or review energy-efficiency potential studies; develop or review Technical Reference Manuals ("TRM") of deemed savings assumptions; support utility-stakeholder collaboratives; negotiate or support development of efficiency-program performance incentive mechanisms; review or develop efficiency programs; and/or review or develop energy-efficiency evaluation frameworks and related studies. All told, I have worked on these and/or other policy and program issues for clients in more than 30 states, half a dozen Canadian provinces, and several European countries. I have also led courses on efficiency program design, published widely on a range of efficiency topics, and served on numerous national and regional efficiency committees, working groups, and forums. A copy of my curriculum vitae is attached as Exhibit CN-1.

Q: HAVE YOU PREVIOUSLY FILED EXPERT WITNESS TESTIMONY IN OTHER PROCEEDINGS BEFORE THE NORTH CAROLINA COMMISSION?

A: No. I have not.

Q: HAVE YOU BEEN AN EXPERT WITNESS ON ENERGY-EFFICIENCY MATTERS BEFORE OTHER REGULATORY COMMISSIONS?

A: Yes, I have filed expert witness testimony on approximately 50 occasions before similar regulatory bodies in 10 other states and provinces, including most recently in Michigan, Ohio, Illinois, and Ontario.

Q: ARE YOU SPONSORING ANY EXHIBITS?

A: Yes.

- CN-1 Christopher Neme CV
- CN-2 Advanced Energy, Duke Energy, Lockheed Martin, and North Carolina Community Action Association, *Evaluation of Duke Energy's Helping Home Fund*, p. 2 (October 2017) (hereinafter "Helping Home Fund Evaluation")

II. Testimony Overview

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A: My testimony addresses the reasonableness of both Duke Energy Carolinas' (DEC's) energy-efficiency savings estimates and the composition of its energy-efficiency program portfolio.

Q: WHAT MATERIAL HAVE YOU REVIEWED TO INFORM YOUR TESTIMONY ON THESE ISSUES?

A: I have reviewed DEC's application, as well as its related responses to discovery questions. Generally speaking, my review is a high-level one, focusing on bigger-picture issues. I have selectively investigated details of the Company's programs when my review raised questions that merited a more thorough review.

Q: WHAT ARE YOUR SUMMARY FINDINGS WITH REGARD TO DEC'S ENERGY-EFFICIENCY SAVINGS ESTIMATES?

A: The evaluation measurement and verification ("EM&V") framework under which DEC has developed and annually adjusted estimates of its program savings is well-conceived. While I have not reviewed every detail of each of the program-evaluation studies filed by DEC in this proceeding, my high-level review suggests that they have been conducted professionally.

That said, I have a few potential concerns:

- **No published Technical Reference Manual ("TRM").** Most jurisdictions have a TRM to document publicly all current assumptions regarding efficiency-measure energysavings, peak-demand savings, savings life, and incremental costs – as well as references for the sources of those assumptions. When evaluation studies suggest that an assumption needs to be updated, the TRM is also updated. The absence of such a single reference document makes it more difficult to review the reasonableness of DEC's savings and net benefits claims properly.
- **Potential for overstating of My Home Energy Report savings.** DEC is apparently assuming that My Home Energy Report program savings last only as long as a residential customer is enrolled in the program. As a result, DEC

effectively assumes that those savings are reacquired by re-running the program each year for the same participants. However, there is evidence that a significant portion of the savings produced from any set of customers participating in year one would continue to persist in subsequent years even if program delivery were ended for those customers. Thus, DEC may be significantly over-estimating the *new* savings this program produces each year. The persistence of savings and implications for annual savings claims and future program design and delivery strategy are issues that should be evaluated.

- **Potential for overstating lifetime savings (and economic net benefits) of residential lighting measures.** DEC is assuming that the annual savings produced by a residential LED light bulb installed as a result of its efficiency programs will be realized every year—at the same level experienced in the first year—for each of the next 12 years. These projections do not take into account new federal efficiency standards imposed by the Energy Independence and Security Act (EISA) for most residential light bulbs. Those standards will essentially mean roughly 80 percent of the savings realized from most LED light bulbs installed before 2020 will not be attributable to utility programs after 2020.

I discuss each of these issues in greater detail in Section III of my testimony.

Q: DID DEC MEET ITS ONE PERCENT ANNUAL ENERGY SAVINGS TARGET IN 2017?

A: Yes, DEC delivered its highest DSM/EE portfolio savings in 2017, saving 854 gigawatt-hours (GWh) at its customers' meters.[1] This level of savings corresponds to 1.07 percent of prior-year sales,[2] exceeding the one percent annual energy savings target to which the Company agreed in a settlement in the then-proposed merger of Duke Energy and Progress Energy ("Merger Settlement").[3]

Q: PLEASE SUMMARIZE YOUR ASSESSMENT OF DEC'S PROPOSED 2019 EFFICIENCY PROGRAM PORTFOLIO.

A: There are a number of admirable elements in DEC's 2019 planned portfolio. To begin with, DEC's forecast of the amount of new annual savings its programs will produce in 2019 are equal to about 0.95 percent of total forecast sales and 1.38 percent of sales to non-opt-out customers – both significant milestones. Second, the program portfolio is very cost-effective, producing $2.46 in supply-cost savings for every dollar DEC has spent. Since 2014, DEC's efficiency programs have saved enough energy at the time of system peak to eliminate the need for the equivalent of more than four natural gas "peaker" power plants. Third, the portfolio includes a wide range of efficiency measures and programs. Fourth, there are some national state-of-the-art program design features,

[1] DEC reported 906.9 GWh of annual savings at the generator in 2017. That is a value for savings across both its North Carolina and South Carolina service territories. Adjusting for an average line loss rate of 6.2187 percent (DEC response to SACE 2-6) produces 853.8 GWh savings at customers' meters.

[2] Total DEC retail sales in both North Carolina and South Carolina were 79,643 GWh in 2016 [U.S. Energy Information Administration Form 861 Data, Table 10 (https://www.eia.gov/electricity/sales_revenue_price/index.php)].

[3] The Merger Settlement with SACE, South Carolina Coastal Conservation League, and Environmental Defense Fund calls for annual energy savings of at least 1% of prior-year retail sales beginning in 2015 and cumulative savings of at least 7% over the period from 2014 through 2018. The Merger Settlement was approved by the Public Service Commission of South Carolina ("PSCSC") in Docket No. 2011-158-E.

particularly the Company's recent launch of a midstream channel for promoting non-residential HVAC, lighting, food service, and IT measures.

That said, I also have some over-arching concerns about the portfolio:

- **Too much emphasis on short-lived savings.** About 70 percent of residential annual savings and 40 percent of the total portfolio savings in 2019 are forecast to come from DEC's My Home Energy Report program. Savings from such behavioral programs are very short-lived, though longer than the one year DEC is currently assuming.

- **Inadequate promotion of longer-lived major measures or comprehensive treatment of buildings.** The Residential Smart$aver Energy-Efficiency Program, through which DEC promotes major measures such as heat pumps, central air conditioners, heat pump water heaters, attic insulation, and duct sealing, is forecast to produce only about one percent of its total residential sector savings.

- **Insufficient planning to offset what will be a significant loss of residential-lighting savings potential once the 2020 federal EISA efficiency standards go into effect.** DEC's filing does not demonstrate how the Company will make up for the loss of lighting savings following full implementation of the federal efficiency standards for lightbulbs. DEC's over-emphasis on short-term savings and under-emphasis on longer-lived major measures is a structural problem with the Company's portfolio. Greater promotion of longer-lived measures will diversify DEC's program portfolio, which will be an acute need following the loss of lighting savings.

- **Need for increased investment in lower-income communities and in programs that reach rental units.**

Q: HOW COULD DEC MODIFY ITS 2019 PORTFOLIO OF PROGRAMS TO ADDRESS THESE SHORTCOMINGS?

A: I have four recommendations for improvement:

- First, DEC should endeavor to improve participation in its Residential Smart$aver program significantly through establishment of a midstream channel for promoting some of the measures through equipment distributors (and possibly retailers and/or other parts of the supply chain), increasing incentives, enhancing marketing, and/or other means to reach more customers.
- Second, DEC should consider greater promotion of whole-building retrofits, including support for both (A) improvements to building envelopes (e.g. insulation and air leakage reduction); and (B) retrofitting single-family and multi-family buildings that currently have electric-resistance heating with high-efficiency heat pumps. Such efforts could initially be targeted to lower-income communities, but should ultimately aim to address all such cost-effective opportunities within the residential sector. One option would be to emulate an Energy Arkansas program that is weatherizing manufactured homes. Another would be to consider a new pilot-program in Illinois that is promoting heat-pump retrofits in electric-resistance-heated multi-family buildings.

- Third, DEC should build on recent success and progress in promoting efficiency measures for business customers through the midstream channel of its non-residential Smart$aver prescriptive rebate program. DEC's current forecast that lighting savings will be reduced to half in 2019 of what they were in 2017 raises questions about whether the Company is planning to make some unfortunate changes to one of its best-performing programs. It should instead be endeavoring to increase these savings.
- Fourth, DEC should assess the potential to reduce the number of customers who opt out of its programs by improving business customers' understanding of its programs and/or improving the designs of its programs to make them more attractive to such customers.

Q: HOW DO YOU RECOMMEND THAT THE UTILITIES COMMISSION ADDRESS YOUR RECOMMENDATIONS?

A: Both the EM&V issues and the efficiency-portfolio design issues that I raise are complicated and would probably best be addressed, at least initially, through in-depth discussions between the utilities and other parties, with solutions ultimately brought back to the Utilities Commission. Thus, I recommend that the Utilities Commission refer the issues to the DEC Collaborative, with a requirement that DEC report back on decisions in their 2019 Rider proceeding. Note that this may require more intensive engagement between DEC and other parties than has historically been the case, or than is even possible through quarterly Collaborative meetings alone. However, my experience with collaboratives in other jurisdictions suggests that this can be accomplished by establishing

subcommittees or working groups that meet as often as required to reach resolution on specific issues and to identify any points of disagreement that cannot be bridged.

III. DEC's Energy-Efficiency Savings Estimates

Q: WHAT IS YOUR UNDERSTANDING OF HOW DEC ESTIMATED SAVINGS FOR ITS EFFICIENCY PROGRAMS IN THIS PROCEEDING?

A: DEC witness Evans explains that the Company applied the EM&V Agreement developed by DEC, SACE, and Public Staff, and approved by the Commission in November 2011, in Docket No. E-7, Sub 979. As I understand it, that agreement essentially states that:

- The Company uses "initial estimates" of savings – i.e. estimates developed from sources other than direct impact of evaluation of its programs in the Carolinas – until such impact-evaluation results are available;
- Once the first set of impact-evaluation results are available, the Company uses those results both retrospectively – to adjust past savings estimates based on "initial estimates" – and prospectively; and
- When any subsequent impact-evaluation results become available (i.e., from the second or third or subsequent evaluation of a program), such subsequent evaluation results are only applied prospectively.

These principles apply to all programs except for the Non-Residential Smart$aver Custom Rebate Program and the Low-Income Energy-Efficiency and Weatherization Assistance Program.

Q: IS THIS A REASONABLE FRAMEWORK FOR ESTIMATING SAVINGS?

A: Yes. This is a well-conceived framework, particularly in the context of policies that compensate the utility for lost revenues and provide shareholder incentives based on estimates of economic net benefits. As long as the program impact evaluations follow industry standards and are sufficiently rigorous, it ensures that all lost revenue and shareholder incentive payments are ultimately based on local evaluation of efficiency-program impacts.

There are trade-offs inherent in policy choices between EM&V requirements, particularly regarding retrospective application (or not) of EM&V results. At one extreme, retrospective application of all EM&V results minimizes risk to ratepayers of paying for results that did not occur, though they can also end up paying more than expected if results are better than expected. At another extreme, only applying EM&V results prospectively rewards utilities for performance relative to plans. Since they cannot control how some efficiency measures perform in the field (other than in limited cases such as custom business measures), limiting application of EM&V results to future programs ensures that shareholder incentives are based on performance utilities can control. The approach developed for DEC is a defensible middle ground between these two ends of the spectrum. It seems particularly reasonable given that shareholder incentives are based on estimated net economic benefits to the system rather than to achievement of specific savings targets which were established under a fixed set of planning assumptions.

Q: HAVE YOU FOUND THE IMPACT-EVALUATION STUDIES SPONSORED BY DEC TO FOLLOW INDUSTRY STANDARDS AND BE SUFFICIENTLY RIGOROUS?

A: While I have not reviewed every detail of each of the program-evaluation studies filed by DEC in this proceeding, my high-level review suggests that they have generally been conducted professionally, using appropriate methodologies and with sufficient rigor.

Q: BASED ON YOUR REVIEW, ARE YOU IN A POSITION TO ENDORSE THE SAVINGS ESTIMATES PUT FORWARD BY DEC IN THIS PROCEEDING?

A: No, but not because I have reason to think that there are widespread problems. Such a thorough review is beyond the scope of my engagement with NC Justice Center, et al., and would take more time and resources than I could devote to this case. It would be a less burdensome task to undertake such a review, however, if DEC or the State as whole made use of a Technical Reference Manual ("TRM").[4]

1. Value of Technical Reference Manual (TRM)

Q: WHAT IS A TRM?

A A TRM publicly documents all current estimates of efficiency-measure energy-savings, peak-demand savings, other fuel savings, savings life, incremental costs and, other related assumptions – as well as references for the sources of each assumption. When evaluation studies suggest that an assumption needs to be updated, the TRM is also updated. This typically takes place annually. TRMs also sometimes document protocols and/or EM&V methods that should be used

[4] Note that in some jurisdictions, this is called a Technical *Resources* Manual instead of Technical *Reference* Manual.

to estimate savings from custom projects for which prescriptive assumptions are not appropriate.

Q: WHAT IS THE VALUE OF A TRM?

A: TRMs provide a single reference that regulators and other parties can use to ensure that utility savings estimates are based on the correct assumptions. They also provide transparency for regulators and other parties regarding the basis for all utility-savings estimates, as well as other key inputs to cost-effectiveness calculations. That makes it easier for all parties to identify quickly when key assumptions may be outdated and/or when targeted evaluation activity may be needed to update assumptions. That includes assumptions, such as savings life and incremental cost, that are often not addressed by impact evaluations. Such assumptions are important inputs to cost-effectiveness calculations and shareholder-incentive calculations.

Q: DO MOST STATES HAVE A TRM?

A: Yes. In my experience, the vast majority of states – especially those with fairly robust efficiency-program offerings – have TRMs. For example, in the South there are TRMs currently in use in Arkansas (currently on their seventh iteration),[5] New Orleans (currently on its first iteration),[6] Texas (currently on its fifth iteration),[7] and by TVA (currently on its seventh iteration).[8] TRMs have also been developed and used by utilities in Illinois, Indiana, Michigan, Ohio, Pennsylvania, Missouri, New Jersey, other mid-Atlantic states, New York, the

[5] http://www.apscservices.info/EEInfo/TRMv7.0.pdf.
[6] No on-line link is available.
[7] http://www.texasefficiency.com/index.php/emv.
[8] https://www.tva.gov/Energy/EnergyRightSolutions.

New England states, the Pacific Northwest states, California, and at least half a dozen other states.[9]

2. My Home Energy Report Program Savings Life

Q: WHAT IS YOUR UNDERSTANDING OF DEC'S ASSUMPTION REGARDING THE LIFE OF SAVINGS FROM ITS MY HOME ENERGY REPORT PROGRAM?

A: DEC is assuming that the savings from this program last one year.[10]

Q: WHAT ARE THE IMPLICATIONS OF THAT ASSUMPTION?

A: DEC assumes that in each year, in addition to sometimes reaching new participants, it needs to "re-reach" the previous year's participants in order to reacquire savings procured the previous year, which are assumed to have "expired." Thus, each year, DEC counts the savings from all program participants, regardless of the year in which they started participating, as part of its estimates of the new annual savings it is producing each year.

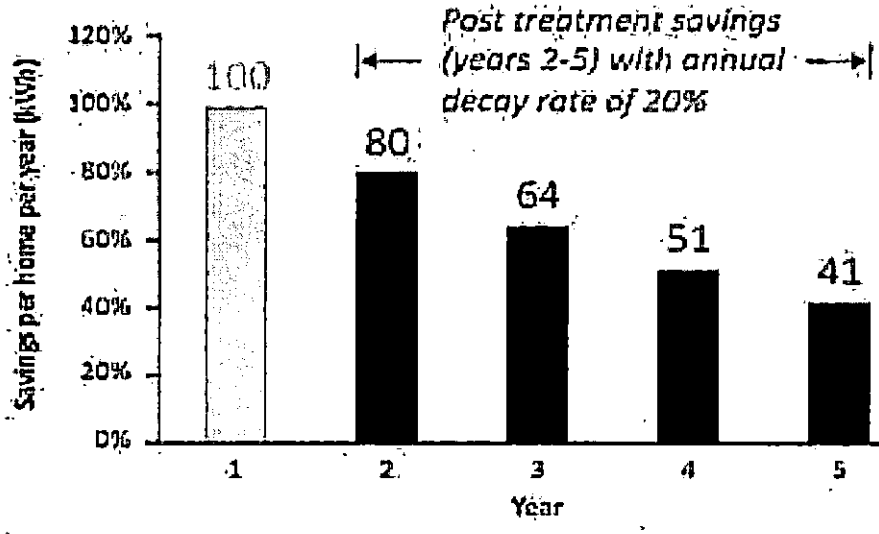
Q: IS THAT A REASONABLE ASSUMPTION?

A: Probably not. A number of studies of residential behavior programs have shown that savings produced from a given year of program delivery do not expire after one year if the program is stopped. Instead, a significant portion of the savings will persist into the years following program termination, though the amount that persists declines over the course of several years. One commonly referenced study suggests that, on average, savings achieved during a program year decay

[9] For a list of jurisdictions with TRMs as of a year ago see U.S. Department of Energy, *SEE Action Guide for States: Guidance on Establishing and Maintaining Technical Reference Manuals for Energy Efficiency Measures*, Evaluation, Measurement and Verification Working Group, June 2017 (https://www4.eere.energy.gov/seeaction/system/files/documents/TRM%20Guide_Final_6.21.17.pdf).
[10] Evans Exhibit C, p. 70 of 138.

(or decline) by about 20 percent every year following program termination.[11] As Figure 1 illustrates, that would mean that 80 percent of the program-year savings persist into the first year following program termination, 64 percent persist into the second year following program termination, 51 percent persist into the third year following program termination, etc.

Figure 1: Home Energy Report Savings Persistence 20 Percent Annual Decay Rate[12]



Q: DO ANY OTHER JURISDICTIONS ADJUST SAVING ASSUMPTIONS TO ACCOUNT FOR THIS UNDERSTANDING OF SAVINGS PERSISTENCE FROM RESIDENTIAL BEHAVIOR PROGRAMS?

A: Some states have adjusted the way that they estimate savings from such programs. For example, the Illinois TRM now requires electric utilities in the state to assume that 80 percent of savings achieved in a program-participation year persist into the first year following program termination, 54 percent into the

[11] Khawaja, Sami and James Stewart, Long-Run Savings and Cost-Effectiveness of Home Energy Report Programs, published by The Cadmus Group, Inc., Winter 2014/2015 (http://www.cadmusgroup.com/wp-content/uploads/2014/11/Cadmus_Home_Energy_Reports_Winter2014.pdf).
[12] This is a copy of Figure 3 from the Cadmus paper.

second year, 31 percent into the third year and 15 percent into the fourth year.[13] Thus, if a utility measures annual savings of 100 kWh per participating customer each year, it can only claim 20 kWh of new incremental annual savings in the second consecutive year of delivery to the same set of customers.[14]

Q: CAN THAT APPROACH TO ACCOUNTING FOR THE PERSISTENCE OF SAVINGS FROM RESIDENTIAL BEHAVIOR PROGRAMS AFFECT PROGRAM-DELIVERY STRATEGY?

A: Yes, it can, for a couple of related reasons. First, it significantly reduces the amount of *new* annual savings a utility can count from repeat participants towards any annual savings goals. And because the cost of the program per participant does not change, the cost per unit of new annual savings from repeat participants goes up considerably. That, in turn, at least has the potential to make program delivery to repeat participants comparatively more expensive per new annual kWh saved than other programs to which efficiency portfolio budgets can be allocated. Second, it can even render it not cost-effective to deliver the program to repeat participants.

As a result, it may make sense to adjust program design and delivery strategy. One option is to rotate delivery of residential behavior programs to different sets of customers each year, and not return to a group of customers until at least three or four years have passed since they were last treated. That is the strategy that

[13] Illinois TRM Version 6.0, Volume 4, p. 9 (http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-TRM_Effective_010118_v6.0_Vol_4_X-Cutting_Measures_and_Attach_020817_Final.pdf).

[14] Unless savings per customer increase, which they sometimes do after more than one year of participation. For example, if average savings per customer were 100 kWh in the first year and grew to 120 kWh in the second year, the utility could claim 40 kWh of new incremental annual savings per repeat participant, or the difference between the 120 kWh measured in the second year and the 80 kWh that would have persisted into the second year had the program not been offered again to the same customers.

Ameren Illinois has adopted for its 2018-2021 plan. There are undoubtedly other options that merit consideration as well.

Q: ARE YOU SUGGESTING THAT DEC NEEDS TO CHANGE ITS ASSUMPTION OF A ONE-YEAR LIFE FOR SAVINGS FROM ITS MY HOME ENERGY REPORT PROGRAM, WITH ATTENDANT CHANGES IN THE AMOUNT OF NEW SAVINGS IT COUNTS EACH YEAR?

A: I think it likely that it will be appropriate to change that assumption. However, I would recommend that more analysis be done, considering the applicability of the results of other studies' estimates of savings decay/persistence to DEC's program, before making any specific changes. It may also be appropriate to stop delivering the program for a set of participants and to perform an evaluation of savings persistence over time for those participants to refine any assumption changes. Finally, it will be important to consider whether and the extent to which any change in assumption regarding measure life – as well as other concerns I discuss further below – supports changes to program emphasis and delivery strategy. This is an issue that the Utilities Commission may wish to refer to the DEC Collaborative for discussion, analysis, and ultimately recommendations on how to proceed.

3. EISA Impact on Residential Light Bulb Savings Life

Q: WHAT MEASURE-LIFE ASSUMPTION IS DEC USING FOR RESIDENTIAL LED LIGHT BULBS ITS PROGRAMS ARE CURRENTLY PROMOTING?

A: Based on the evaluation report for DEC's Free LED program, it appears as if DEC is assuming that most LED light bulbs have an average life of about 12 years.[15]

Q: IS 12 YEARS A REASONABLE ASSUMPTION FOR THE MEASURE LIFE OF AN LED LIGHT BULB?

A: Depending on the specific LED products DEC is promoting, 12 years could be a reasonable assumption for the equipment life of the bulbs, or how long the LED light bulbs will physically last. However, at least for most LEDs, it is not a reasonable assumption regarding the average life of the first-year savings – i.e., the *savings life*. Put another way, multiplying the first-year savings of a standard LED by its assumed 12-year measure life will be produce an unrealistically high estimate of lifetime savings for the measure.

Q: WHY IS THE SAVINGS LIFE SHORTER THAN THE EQUIPMENT LIFE?

A: For most measures they are the same. But they can be different in cases in which the equipment life of the efficiency measure and the equipment life of the baseline measure being replaced or displaced are different. That is the case with LED light bulbs.

An LED light bulb that is purchased today – or next year – is assumed to be purchased instead of a halogen light bulb. The electricity savings produced by an LED in its first year of operation will therefore be equal to the difference between

[15] A 12-year life is the assumption for between 85% and 90% of the light bulbs DEC is forecasting for its 2019 Residential Energy Efficient Appliances and Devices program in North Carolina. The remaining bulbs have an assumed measure life of 15 years (DEC confidential response to SACE et al Data Request 2-3b). Though the underlying data source for this analysis was from a spreadsheet marked "confidential" by DEC, counsel for the Company has confirmed that no confidential material is included in my summary of the average useful life of lighting measures.

its electricity consumption and that of the halogen that would have otherwise been purchased and installed. In addition to consuming less energy, LEDs last a lot longer than halogens. Depending on the product and other factors, it can be reasonable to assume that LEDs last an average of 12 years. In contrast, halogens that are replaced by LEDs typically last only a year or two.[16] Thus, in the baseline scenario, the customer would be buying a new light bulb roughly every year or every other year, for as long as the baseline product remains a halogen bulb. If it were reasonable to assume that the baseline product would remain a halogen bulb for the next 12 years, the savings in each of the next 12 years of the LED equipment life would be the same as in the first year. In that case, the LED savings life would be equal to the LED equipment life. But that is not a reasonable assumption for standard LEDs because federal efficiency standards under the Energy Independence and Security Act (EISA) that will go into effect in 2020 will effectively require all new general service, screw-based lamps – i.e., those that "standard LEDs" would replace – to be as efficient as compact fluorescent light bulbs (CFLs). Thus, the annual savings estimated for standard LEDs will decline significantly starting in 2020. Put another way, rather than assuming that the current annual savings of an LED will last 12 years, the annual savings for an LED installed in 2017 should only have been assumed to continue at the 2017 level for three or four years, followed by eight or nine years of much lower levels of savings.[17] Similarly, for a standard LED light bulb installed in

[16] Based on review of a variety of screw based halogen light bulbs for sale from Home Depot (https://www.homedepot.com/s/halogen%2520light%2520bulb?NCNI-5).

[17] Similarly, for a standard LED installed in 2019, the current annual savings estimate would be appropriate for only one or two years, followed by 10 or 11 years of much lower levels of savings. And

2019, the current annual savings estimate may be appropriate for only the first year or two of the LED bulb's physical life, with lower savings assumed for the remaining 10 or 11 years.

Q: IS THAT KIND OF ADJUSTMENT APPROPRIATE FOR ALL LED LIGHT BULBS?

A: No, this kind of adjustment is only appropriate for the kinds of light bulbs that are governed by the EISA product-efficiency standards. That means all of what are commonly known in the industry as "standard LEDs," particularly "A-Line LEDs," but also likely directional and decorative lamps that are included in a recently expanded definition of "general service lamp" adopted by the U.S. Department of Energy. DEC's programs may include savings from both LEDs that are covered by EISA and LEDs that are not. The savings from the LEDs not covered by EISA would be unaffected by the shifting baseline efficiency associated with EISA. I do not know what fraction of the LED light bulbs promoted by all of DEC's programs fall into each category, though at first blush it appears as if all of the bulbs proposed to be promoted in 2019 through its Residential Energy Efficient Appliances and Devices program will be affected by EISA.[18]

Q: IS THE KIND OF ADJUSTMENT TO STANDARD LED SAVINGS LIVES THAT YOU ARE SUGGESTING CONSISTENT WITH NATIONAL BEST PRACTICE?

---

the savings for any standard LED installed in 2020 or later will be much smaller in every year of its operation (i.e. requiring a lower first year savings value as well as lower savings in subsequent years).

[18] Based on my review of product types listed in DEC's Excel attachment to its confidential response to SACE 2-3b.

A: Yes. This is kind of savings adjustment was recommended a couple of years ago by the national "Uniform Methods Project," a national effort designed to bring best practice consistency to energy-savings estimation and evaluation:

> *Bulbs expected to be in use in 2020 and beyond will be affected by the EISA backstop provision mentioned in Section 1. The life cycle savings of CFLs, therefore, should either terminate for any remaining years in the expected life beginning in mid-2020, or be substantially reduced after 2020 to account for the backstop provision. Similarly, the life cycle savings for LEDs should incorporate this upcoming baseline change.*[19]

Q: ARE THERE OTHER STATES THAT MAKE SUCH SAVINGS ADJUSTMENTS FOR STANDARD LEDS STARTING IN OR AROUND 2020?

A: Yes. Illinois is an example of a state that makes this adjustment. The Illinois TRM explains the LED "mid-life baseline adjustment" as follows:

> *During the lifetime of a standard Omnidirectional LED, the baseline incandescent/halogen bulb would need to be replaced multiple times. Since the baseline bulb changes over time (except for <300 and >2600+ lumen lamps) the annual savings claim must be reduced within the life of the measure to account for this baseline shift.*

[19] Dimetrosky, Scott, Katie Parkinson and Noah Lieb, "Chapter 21: Residential Lighting Evaluation Protocol," The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, published by the National Renewable Energy Laboratory, February 2015, http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter21-residential-lighting-evaluation-protocol.pdf.

For example, for 60W equivalent bulbs installed in 2014, the full savings...should be claimed for the first six years, but a reduced annual savings (...[initial first year energy savings]...multiplied by the adjustment factor in the table below) claimed for the remainder of the measure life.[20]

Minimum Lumens	Maximum Lumens	LED Wattage (WattsEE)	Delta Watts 2014-2019 (WattsEE)	Delta Watts Post 2020 (WattsEE)	Mid Life adjustment (made from June 2020) to first year savings
1490	2600	37.2	34.8	8.3	23.8%
1050	1489	23.1	29.9	5.1	17.1%
750	1049	16.4	26.6	3.6	13.5%
310	749	9.6	19.4	2.1	10.8%

As one can see from the table, the portion of initial LED savings that no longer apply after 2020 varies by lamp light output level. The average remaining savings across the four categories shown is 16 percent, representing an 84-percent reduction from pre-2020 annual savings levels.

The Arkansas TRM uses the same conceptual approach, but with slightly different assumptions. Specifically, it assumes that the baseline shift for standard LEDs does not change until 2022 instead of after 2020, so it assumes that there are a couple more years of the higher levels of savings and a couple fewer years

[20] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 5.0, Volume 3: Residential Measures, Final; February 11th, 2016; effective June 1st, 2016; p. 261, http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_5/Final/IL-TRM_Effective_060116_v5.0_Vol_3_Res_021116_Final.pdf.f

of lower levels of savings.[21] That difference is a function of different assumptions regarding the average life of a current baseline halogen lamp.

Q: WHAT ARE THE IMPLICATIONS OF ACCOUNTING FOR THIS EISA-DRIVEN BASELINE SHIFT WHEN ESTIMATING SAVINGS FROM LED LIGHT BULBS?

A: The EISA-driven baseline shift, by definition, does not affect estimated first year savings from LEDs, at least not until 2020 when the prohibition on sale of products not meeting EISA standards goes into effect. However, because it affects estimated savings for a significant portion of the assumed physical life of the average LED governed by such standards, it will reduce estimates of the net economic benefits of such light bulbs.

Q: ARE YOU SUGGESTING THAT ANY PART OF DEC'S APPLICATION IN THIS PROCEEDING BE ADJUSTED TO ACCOUNT FOR SUCH IMPACTS?

A: No. There are several issues that would need to be worked out in detail before making adjustments to DEC's economic net benefit calculations, including the nature of the specific baseline shifts to be made, assumptions regarding the products for which they should be made,[22] assumptions regarding the assumed life of the average halogen baseline lamp being displaced today (the longer the halogen life, the longer the average period before the baseline shift occurs), etc.

[21] Arkansas Public Service Commission, Arkansas Technical Reference Manual, Version 7.0, Approved in Docket 10-100-R, filed 8/31/2017 (http://www.apscservices.info/EEInfo/TRMv7.0.pdf).

[22] The U.S. Department of Energy's expanded definition of general service lamp is being challenged by some parties. While it appears likely to withstand such challenges, it may be appropriate to assess that likelihood thoroughly before making definitive decisions regarding the products for which adjustments should be made.

That said, this is an important issue for a measure that accounts for a significant portion of DEC's estimated annual savings. Thus, as with the issue of the My Home Energy Report program savings decay/persistence, the Utilities Commission should consider referring this issue to the DEC Collaborative for discussion, analysis, and ultimately recommendations on how to proceed.

IV. DEC's Efficiency Program Mix

1. Overview

Q: WHAT IS YOUR VIEW OF DEC'S PLANNED ENERGY-EFFICIENCY PROGRAM PORTFOLIO FOR 2019?

A: There are some admirable elements to the portfolio:

- First, it appears as if DEC is planning to achieve annual savings of 0.95 percent of total annual sales and an even higher percentage of annual sales to non-opt-out customers – 1.38 percent – in 2019.[23] Though it is possible to acquire greater levels of cost-effective savings than that, 0.95 percent of total sales and 1.38 percent of sales to non-opt-out customers still represent significant milestones.
- Second, the efficiency-program portfolio is very cost-effective, demonstrating that efficiency programs are a least-cost resource for meeting consumers' electricity needs. For every dollar that DEC spends on its programs, it is

[23] The Company is forecasting that it will achieve 451.9 GWh of residential efficiency program savings and 327.0 GWh of non-residential efficiency program savings for a total efficiency program savings of 778.9 GWh at the generator in 2019 (Evans Exhibit 1, p. 5). Approximately 72.81 percent of those savings – or 567 GWh – is allocated to North Carolina (Evans Exhibit 5, p. 1). Adjusted for 6.2187 percent line losses (Duke response to SACE 2-6), the North Carolina savings are about 534 GWh at customers' meters. DEC's forecast 2019 sales are 56,057 GWh (Miller Exhibit 6). DEC is forecasting that business customers with annual sales of 17,253 GWh will opt out of its programs, so sales to non-opt-out customers will be 38,804 GWh in 2019.

eliminating the need to spend $2.46 on new power plants, the fuel to run those power plants, new power lines, and other investments otherwise needed to supply electricity to inefficient homes and businesses. This calculation is based on DEC's estimated UCT benefit-cost ratio as reported in Evans Exhibit 7. DEC's analysis also suggests that the programs are very cost-effective under the TRC test (benefit-cost ratio of roughly 2 to 1).[24] It is notable that in just the four years from 2014 through 2017 DEC's efficiency programs provided enough peak demand savings to eliminate the need for more than four average-sized natural gas "peaker" power plants.[25]

- Third, DEC's efficiency program portfolio is fairly broad. That is, it promotes a fairly wide range of efficiency measures through a range of programs that at least theoretically could be accessed a by wide range of residential and non-residential customers.
- Fourth, I am impressed by the sophistication and advanced nature of some of the DEC programs or program elements. In particular, the Company deserves

[24] And this is a very conservative estimate of TRC cost-effectiveness because, as I understand it, DEC's application of the TRC test excludes many benefits – including natural gas and other fuel savings, water savings, and various participant non-energy benefits – that a TRC test should include if it is to assess properly the cost-effectiveness of the impacts on the utility system plus program participants, which is the conceptual construct of the TRC (see Woolf, Tim, et al., *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*, Edition 1, Spring 2017 (https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf).

[25] The sum of the incremental annual peak savings for each year for all DEC's efficiency programs other than the My Home Energy Report program is 298 MW. Since virtually all of the savings from those programs had a life of at least four years, that is a reasonable estimate of the persisting peak savings after four years. On top of that, the My Home Energy Report program had a peak savings of 79 MW in 2017 (since this is a program that is estimated to have just a one-year life, I only include the peak savings from 2017), bringing the total for the efficiency program portfolio to 377 MW by the end of 2017. (DEC confidential response to SACE et al Data Request 2-3b). Though the underlying data source for this analysis was from a spreadsheet marked "confidential" by DEC, counsel for the Company has confirmed that no confidential material is included in my summary of annual peak savings. Note that this analysis is for efficiency programs only; the peak savings from DEC's demand-response programs are additional to that amount. According to U.S. Energy Information Administration data, in 2016 DEC had 32 natural-gas-fired combustion turbines, with summer capacities ranging between 42 MW and 160 MW and an average summer capacity of 86 MW.

great credit for initiating a new midstream channel to its Non-Residential Smart$aver Prescriptive program for promoting a range of efficient products (HVAC, lighting, food service, and IT measures) to business customers. This is a national state-of-the-art practice.

That said, I do have several concerns regarding the composition of the portfolio of programs and, perhaps even more importantly, the relative contributions of different programs to the Company's estimated savings.

Q: WHAT ARE THOSE CONCERNS?

A: I have several inter-related concerns:

- Too much relative emphasis on programs that deliver only very short-lived savings.
- Insufficient promotion of long-lived major measures and comprehensive treatment of buildings. This is a corollary to the point above.
- Insufficient planning to offset what will be a significant loss of residential-lighting savings potential once the 2020 federal EISA efficiency standards go into effect.
- Need for expanded focus on delivering energy-saving programs in lower-income communities.

Though I express these concerns at the portfolio level, they are most pronounced for the residential sector.

2. Short-Lived Savings vs. Longer-Lived Savings

Q: WHAT DO YOU CONSIDER TO BE "SHORT-LIVED" SAVINGS?

A: If I had to draw a line, it would be savings from measures with a life of less than 7 to 10 years. However, I think it is more appropriate to take a more nuanced view by looking at the mix of savings lives.[26]

Q: WHAT IS THE BASIS FOR YOUR CONCERN REGARDING DEC'S LEVEL OF EMPHASIS ON SHORT-LIVED SAVINGS?

A: To begin with, nearly 70 percent of DEC's residential annual savings and roughly 40 percent of the DEC's *total* forecast 2019 incremental annual savings are forecast to come from just its Residential My Home Energy Report behavioral program. Those are extremely high percentages.

Second, it appears as if the vast majority of other savings DEC is forecasting to acquire from the residential sector is lighting savings.[27] As I discussed in the previous section to this testimony, most residential lighting savings will not persist past 2020 (or maybe 2021) because of the baseline shift resulting from the 2020 federal EISA efficiency standards.

Finally, data from the American Council for an Energy Efficient Economy's (ACEEE's) 2017 Utility Energy Efficiency Scorecard, which rated the efficiency performance of 51 utilities across the country, also suggest that the average savings life of DEC's efficiency programs is much lower than average. Specifically, though DEC's average *annual* savings was only just below average

[26] For example, if 60 percent of savings are from measures that have a life of less than seven years, but most of those have lives of six years, that would be much better than if 50 percent of savings are from measures that have a life of less than seven years, but most of those have a life of one year.

[27] Most of the balance of DEC's forecast 2019 residential savings are from its Energy Efficient Appliances and Devices program. Light bulbs likely dominate savings from that program, with roughly 1.6 million free LED light bulbs and 2.1 million lighting measures – mostly light bulbs – rebated through the "retail lighting" program component in 2017 (Evans Exhibit 6, pp. 8-9 of 126). Energy-efficient lighting is also a key focus of almost all of the other residential programs targeted to the residential sector in 2019. For example, 67 percent of the measures installed in the Multi-Family program were lighting measures (Evans Exhibit 6, p. 53 of 126).

for the 51 utilities analyzed, its average *lifetime* savings was only about half of the average lifetime savings achieved by the same utilities.[28]

Q: HOW DOES THE 40 PERCENT OF TOTAL PORTFOLIO SAVINGS THAT DEC IS FORECASTING TO ACHIEVE THROUGH ITS RESIDENTIAL BEHAVIOR (MY HOME ENERGY REPORTS) PROGRAM COMPARE TO OTHER UTILITIES?

A: I am unaware of any other investor-owned electric utility (other than DEC's affiliated company, Duke Ohio) that is planning to get that much of its total savings from a residential behavior program. To illustrate that point, I have compiled estimates of the percentage of both residential and total savings that residential-behavior programs provide for 19 electric utilities in the eastern half of the United States, including nine Southern utilities. Though this is not an exhaustive review, I have endeavored to collect data for the largest utilities in most Southern, mid-Atlantic and Midwestern states. Those estimates are provided in Table 1 below. Where possible, I have provided planned numbers to compare to DEC's plan for 2019; otherwise I have provided actual performance numbers for a recent year (mostly 2017). None of these utilities come close to achieving as large a portion of total electric portfolio savings from their Residential Behavior programs as does DEC, which projects that 40 percent of its overall savings in 2019 will come from My Home Energy Report. In fact, the average non-DEC utility is getting only 9 percent of total portfolio electric savings from its residential behavior programs – less than one-quarter as much as DEC – and the average of the other southern utilities for which I obtained data is

[28] Relf, Grace et al., 2017 Utility Energy Efficiency Scorecard, ACEEE Report U1707, June 2017.

even less. Only one utility – Baltimore Gas & Electric – is planning to get even half as much of its savings from its Residential Behavior program as DEC.[29]

Table 1: Percentage of Total Savings from Residential Behavior Programs[30]

Utility	State	Plan or Actual	Year	MWh Savings			Behavior Savings %	
				Res. Behavior Program	All Res. Sector Programs	All Programs, All Sectors	% of Res. Sector Savings	% of Total Savings (All Sectors)
Duke Energy Carolinas	**NC/SC**	**Plan**	**2019**	**312,934**	**451,520**	**778,508**	**69%**	**40%**
Entergy New Orleans	LA	Plan	2019	8,000	19,416	53,894	41%	15%
Entergy Gulf States	LA	Actual	2017	0	10,419	17,057	0%	0%
Entergy Louisiana	LA	Actual	2017	0	18,101	28,456	0%	0%
Entergy Mississippi	MS	Actual	2017	0	13,227	26,294	0%	0%
Mississippi Power	MS	Actual	2017	3,421	7,611	18,333	45%	19%
Entergy Arkansas	AR	Actual	2017	7,901	104,051	264,992	8%	3%
SWEPCO	AR	Actual	2017	0	12,617	33,667	0%	0%
Georgia Power	GA	Actual	2017	12,366	94,119	375,375	13%	3%
Florida Power and Light	FL	Actual	2017	0	23,600	71,400	0%	0%
PEPCO	MD	Plan	2019	48,710	130,189	262,357	37%	19%
Baltimore Gas & Electric	MD	Plan	2019	138,200	335,267	500,267	41%	28%
PECO	PA	Plan	2016-20	304,999	844,412	2,091,301	36%	15%
All MA Utilities	MA	Actual	2016	140,547	723,392	1,569,661	19%	9%
Commonwealth Edison	IL	Plan	2018	275,502	575,606	1,619,028	48%	17%
Ameren Illinois	IL	Plan	2018	6,290	92,971	347,176	7%	2%
First Energy	OH	Plan	2017-19	125,788	632,302	1,781,833	20%	7%
American Electric Power	OH	Plan	2019	75,000	212,600	611,500	35%	12%
DTE	MI	Plan	2019	73,668	291,013	702,850	25%	10%
Consumers Energy	MI	Plan	2019	31,442	157,846	479,471	20%	7%
Avg of Southern Utilities	Various	Mix	Mix				**12%**	**4%**
Avg of All Utilities	Various	Mix	Mix				**21%**	**9%**

Q: YOU TESTIFIED THAT THE AMOUNT OF NEW INCREMENTAL ANNUAL SAVINGS PRODUCED BY DEC'S MY HOME ENERGY REPORT PROGRAM MAY BE OVER-STATED. IF THAT PROVES TO TRUE, AND PERSISTENT SAVINGS WERE INSTEAD ACCOUNTED

[29] The 28 percent provided in the table for BG&E includes only efficiency programs designed to promote efficiency actions by customers. BG&E also gets significant customer savings from conservation voltage regulation, which I did not include in the total savings into which I divided their residential-behavior program savings. If CVR savings were included, the BG&E average would drop to 21 percent.

[30] All values are from publicly available sources, either filed utility plans or utility annual reports. Specific references are available upon request.

FOR, WOULD THAT ELIMINATE YOUR CONCERN ABOUT TOO MUCH OF THE COMPANY'S SAVINGS BEING SHORT-LIVED SAVINGS?

A: No. Though it is true that such an adjustment would reduce the percentage of annual portfolio savings coming from the My Home Energy Report program, this isn't just an accounting issue. As I note above, I have a corollary concern that DEC is not acquiring enough longer-lived savings. Moreover, if the My Home Energy Report *annual* savings declined because it was determined to be more appropriate to account for persistence of savings from participants over multiple years, DEC would need to acquire additional savings from other measures and programs in order to get back up to (or exceed) the 1.0 percent of prior-year sales target. Those additional savings should ideally come from longer-lived measures because they provide more lasting benefits both to consumers and to the utility system.

Q: CAN YOU GIVE EXAMPLES OF THE KINDS OF ADDITIONAL LONGER-LIVED SAVINGS DEC COULD ACQUIRE IN THE RESIDENTIAL SECTOR?

A: I would begin by suggesting efforts to increase significantly the number of customers participating in rebate offers for high-efficiency heat pumps, central air conditioners, heat-pump water heaters, pool pumps, attic insulation, air sealing, and duct sealing. There should be significant savings potential from these measures as they address the largest electricity end-uses in homes. However, DEC's Residential Smart$aver Energy Efficiency Program – the program through which all of these measures are promoted – is forecast to produce only about one

percent of the Company's annual residential savings in 2019. Participation rates for these measures could potentially be increased in a variety of ways. In short, though DEC includes many of the major residential measures with big savings potential in its program, it is not getting nearly enough uptake or participation with those measures. Perhaps most notably, they could be dramatically increased by moving some of the measure incentives (e.g., those for heat pumps, central air conditioners, and heat pump water heaters) upstream to distributors, as the Company has recently done for a number of non-residential prescriptive incentives. Utilities that have made such transitions have achieved dramatic increases in participation. For example, United Illuminating in Connecticut saw a more than six-fold increase in participation in its heat pump water heater rebates when it moved rebates upstream to distributors.[31] Changes in rebate levels, marketing strategies, paperwork requirements, options for financing investments (for example, through on-bill financing), and/or other program elements may also enable increases in participation.

In addition, the Company could increase longer-lived savings through greater promotion of whole-building retrofits, for residential and potentially small business customers too. Such whole-building retrofits should include both (A) improvements to building envelopes (e.g. insulation and air leakage reduction), and (B) retrofitting efficient heat pumps in single-family and multi-family homes

[31] Jennifer Parsons (UI, SCG and CNG), "Energize Connecticut Upstream Residential HVAC Program," presented at the 2015 ACEEE National Conference on Energy Efficiency as a Resource in Little Rock, Arkansas, September 2015 (http://aceee.org/sites/default/files/pdf/conferences/eer/2015/Jennifer_Parsons_Session4A_EER15_9.22.15.pdf).

currently using inefficient electric-resistance heat. There may be quite a large number of such inefficiently electrically heated housing units.[32]

Q: CAN YOU GIVE EXAMPLES OF THE KINDS OF ADDITIONAL LONGER-LIVED SAVINGS DEC COULD ACQUIRE IN THE NON-RESIDENTIAL SECTOR?

DEC reports that in 2017, incentive payments in its prescriptive rebate program increased (relative to 2016 levels) by 69 percent for lighting, 24 percent for pumps and motors, 71 percent for process equipment, and five percent for HVAC equipment.[33] One key reason for the growth is the increased interest in LED lighting, which is likely tied to both fast improving product quality and declining costs. Another key to the increase was improvements to the midstream channel through which 56 percent of program savings were processed in 2017. Absent any changes to the program to dampen participation, I would expect participation and savings to increase further in the future as LED lighting products become even more attractive and as distributors' comfort with the midstream channel continues to increase. However, it appears as if DEC is actually forecasting a nearly 50 percent decline in lighting savings from this program – from 230 GWh in 2017 to just 123 GWh in 2019.

[32] I do not have statistics specific to DEC's North Carolina service territory. However, 62 percent of North Carolina homes use electricity as their primary heating fuel [U.S. Census, Selected Housing Characteristics, 2012-2016 American Community Survey 5-Year Estimates (https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk)]. Census data also suggest that more than half of electrically heated homes in the South Atlantic region rely upon some form of electric-resistance heating system, whether a furnace, electric baseboard, or portable electric heaters (U.S. Energy Information Administration, Residential Energy Consumption Survey, Table HC6.8: "Space heating in homes in the South and West Regions, 2015" (https://www.eia.gov/consumption/residential/data/2015/#sh)).

[33] Evans Exhibit 6, p. 77.

In addition, customers responsible for approximately half of DEC's forecast commercial and industrial sales have opted out and/or are forecast to opt out of its efficiency programs for 2019. In my experience, business customers opt out of efficiency-program offerings (when they have the option) for a variety of reasons. Some of those reasons are outside the control of the utility. Others are not. For example, some business customers opt out because they do not feel that the utility's efficiency-program offerings adequately address their needs. Sometimes this feeling is a function of the business customer not fully understanding the efficiency programs that the utility offers. Other times, business customers have legitimate concerns about the structure and nature of available program designs. I cannot speak to the extent to which either of those issues exists with respect to DEC's programs. However, if DEC could improve awareness of how its programs can help business customers while also improving its offerings to better serve customers that are otherwise inclined to opt out, the Company could tap into another source of substantial energy savings. Many of these savings would likely be long-lived and very cost-effective and would further reduce the amount of more expensive supply-side resources the Company would need to procure.

I understand that last year the Utilities Commission instructed DEC to explore how it could reduce opt-outs. DEC witness Evans very briefly discusses this issue in his testimony, simply stating that the Company continues to assess ways to improve is non-residential programs and to use its Large Account Management

Team to ensure customers are aware of product offerings and opt-in windows.[34] However, a more extensive and structured approach to assessing options for decreasing opt-outs – perhaps including a formal study involving solicitation of feedback from those customers who have opted out (to the extent that has not yet been undertaken) – may be appropriate.

3. Preparing for the Impact of the 2020 EISA Federal Lighting Efficiency Standards

Q: WOULD THESE KINDS OF CHANGES TO THE COMPANY'S PROGRAM PORTFOLIO THAT YOU HAVE IDENTIFIED ADDRESS YOUR CONCERN REGARDING THE COMING 2020 EISA STANDARDS AND THE NEED TO REPLACE RESIDENTIAL LIGHTING AS A SIGNIFICANT SOURCE OF ENERGY SAVINGS?

A: Yes. The kinds of program additions, changes, and enhancements I have suggested should not only lead to longer-lasting savings and benefits, but also help diversify the sources of DEC's energy savings.

Q: WHY IS SUCH DIVERSIFICATION IMPORTANT?

A: As I noted earlier, the 2020 EISA standards are going to eliminate much of the residential energy savings that appears to currently make up a large majority of DEC's non-behavior program savings in the residential sector. There is unlikely to be a single measure or even a single program that, by itself, could fill the "savings gap" that EISA will create – at least not in the residential sector. Thus, it is important that DEC consider several different new programs and/or changes to existing programs that may collectively fill the gap.

[34] Evans testimony, p. 34, lines 13-19.

Q: IS IT IMPORTANT THAT SUCH DIVERSIFICATION EFFORTS BEGIN SOON?

A: Yes, it is very important. 2020, when the new lightbulb standards go into effect, is only two years away. Depending on the program and market, it can take a year or two to launch new initiatives and then begin to gain significant traction in the market with them. Thus, the Company should be ramping up efforts now to acquire other important sources of savings.

4. Equitably Serving Lower Income Communities

Q: WHY IS IT IMPORTANT FOR DEC'S ENERGY-EFFICIENCY PROGRAM PORTFOLIO TO INCLUDE AN EXPANDED FOCUS ON LOW-INCOME COMMUNITIES?

A: There are at least three related reasons. The first is equity. Low-income customers are generally less likely to participate in programs marketed to the residential sector as a whole because such programs usually offer financial incentives to defray, but not totally eliminate, the incremental cost of efficiency measures. Low-income customers rarely have the financial means to make any contribution to efficiency-measure costs. They can also be more likely to be renters, who face greater barriers to efficiency program participation than home owners. Second, low-income customers need energy-efficiency improvements more than other customers. This is because the portion of their income devoted to paying for energy tends to be much higher than for non-low-income customers. In addition, because of their limited means, paying their energy bills can force trade-offs with other necessities of life like food and health care. Finally, because of their financial constraints, low-income households are generally more likely to

have problems paying their bills. DEC, like all utilities, incurs costs managing relationships with customers with bill-payment problems. To the extent that low-income efficiency programs can lower such costs, there are added utility-system benefits that do not accrue to other programs (at least not to the same level).

Q: WHY DO RENTERS FACE GREATER BARRIERS TO EFFICIENCY PROGRAM PARTICIPATION THAN HOME OWNERS?

A: In rental properties (including in multi-family buildings) in which tenants pay the energy bills, there is what is commonly known as a split-incentive problem. Specifically, the party who incurs the costs of making any major investments in building envelop, HVAC, and appliance-efficiency measures – the landlord – is different than the party who will see the resulting savings on their energy bills – the tenant.

Q: COULD ANY OF THE IDEAS YOU PUT FORWARD IN YOUR TESTIMONY FOR INCREASING LONGER-LIVED SAVINGS ALSO BE TAILORED TO ADDRESS THE NEEDS OF LOWER INCOME CUSTOMERS?

A: Yes. For example, a new residential, whole-building retrofit program could be targeted first to electrically heated low-income neighborhoods[35] and/or offered with a tiered incentive structure, with income-eligible customers receiving the retrofit services for free when necessary to enable them to participate.[36] Depending on capabilities, relationships, and other factors, such a program could

[35] Although for equity reasons, there would be value to initially targeting such a program offering to electrically heated low-income customers, such a program should ultimately aim (over time) to address all cost-effective opportunities for all customers, regardless of income.

[36] There can be situations, particularly in the case of multi-family buildings, where it may not be necessary to offer efficiency upgrades for free (e.g., where building owners are paying the energy bills and/or when building owners see enough value in lowering energy costs, reducing turnover rates, etc., that they are willing to bear a portion of the cost).

even be delivered on DEC's behalf by community action agencies (CAAs) that already perform low-income home retrofits using federal and/or state dollars. DEC has experience with this kind of partnership following its investment in the Helping Home Fund.[37] I recommend that the Commission direct the Collaborative to analyze the Helping Home Fund for cost-effectiveness and determine whether any aspects of the program could serve as a model for an additional DSM/EE program offering.

There are a variety of other options that could also be considered. Later this year, Commonwealth Edison will launch a pilot program promoting heat-pump retrofits exclusively in electric-resistance-heated, low-income, multi-family buildings in the Chicago area.[38] Entergy Arkansas is currently running a program weatherizing manufactured homes, 37 percent of which were occupied by low-income households and another 29 percent either "likely" to be or "potentially" low-income.[39] That program had a remarkable 8.56-to-1 TRC benefit-to-cost ratio in 2017. These programs could be models for similar future DEC initiatives.

5. Process for Consideration of New Program Ideas

Q: ARE YOU SUGGESTING THAT THE UTILITIES COMMISSION REQUIRE DEC TO LAUNCH SPECIFIC NEW EFFICIENCY PROGRAMS IN THE AREAS YOU HAVE IDENTIFIED?

[37] CN Ex. 2, Helping Home Fund Report.
[38] Illinois Commerce Commission, Order, Docket 17-0312, September 11, 2017 (https://www.icc.illinois.gov/docket/files.aspx?no=17-0312&docId=256554).
[39] Energy Arkansas, Arkansas Energy Efficiency Program Portfolio Annual Report, Docket No. 07-085-TF, 2017 Program Year, May 1, 2018 (http://www.apscservices.info/EEInfo/EEReports/Entergy%202017.pdf).

A: No. Before a commitment to new program design or even a significant change to an existing program design is made, one would need to: flesh out the details of the proposed approach; assess the market; estimate likely participation and savings; develop a specific budget; and conduct a cost-effectiveness analysis.[40]

Q: WHAT DO YOU SUGGEST THE UTILITIES COMMISSION DO WITH RESPECT TO THE NEED FOR CHANGES TO DEC'S EFFICIENCY-PROGRAM PORTFOLIO?

A: As with the potential concerns I have raised regarding DEC's current savings assumptions, I suggest that the Utilities Commission direct DEC to explore program options for decreasing emphasis on short-lived savings, increasing investment in longer-lived measures, filling the "savings gap" that will be created by the elimination of most residential-lighting savings potential in 2020, and increasing program offerings to low-income communities. This direction should include, but not be limited to, a requirement to consider the program ideas I have put forward. Analysis and consideration of all such program ideas should be pursued through the DEC Collaborative in order to involve stakeholders. Note that this will require more than a quarterly meeting; it will likely require significant subcommittee or "working group" discussions in between such meetings.

Q: HAVE YOU PARTICIPATED IN UTILITY-STAKEHOLDER COLLABORATIVE PROCESSES?

[40] The program concepts that I have proposed have been shown to be quite cost-effective in other jurisdictions, including jurisdictions in the South. That is a good indicator that they could be cost-effective in DEC's North Carolina service territory. However, a DEC-specific analysis should ultimately be required.

A: Yes. I have participated as a technical advisor in numerous utility-stakeholder collaborative processes in a wide range of jurisdictions. For example, since 2010, I have actively participated in virtually every collaborative meeting of Illinois's Stakeholder Advisory Group (SAG), which typically meets monthly, as well as in much more numerous and more regular SAG subcommittee or working-group discussions. In recent years, I have also participated in a number of similar regular collaborative discussions in Michigan, the Canadian province of Ontario, and, to a lesser degree, in Ohio. I am also currently working with the Arkansas collaborative, called the "Parties Working Collaboratively" ("PWC"), to support an effort that the Arkansas Commission directed to assess how its current cost-effectiveness test aligns with the best practice principles of the *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*.

Q: IN YOUR EXPERIENCE, CAN SUCH COLLABORATIVE DISCUSSIONS BETWEEN UTILITIES AND STAKEHOLDERS EFFECTIVELY ADDRESS COMPLEX PROGRAM DESIGN AND EM&V ISSUES?

A: Yes. In fact, they are often much more effective venues for addressing such issues than regulatory proceedings.

Q: WHY IS THAT?

A: Because the complex and often arcane nature of the issues demands both specialized expertise and significant "back-and-forth" dialogue to fully explore concerns and options for addressing them. In jurisdictions where well-functioning collaborative processes have become institutionalized, regulators

often choose to focus their efforts on higher-level policy issues, such as savings targets and budgets, and direct the collaboratives to work out EM&V, program design, and other operational issues.

Q: CAN YOU ELABORATE ON THE KINDS OF ISSUES THAT COMMISSIONS HAVE DEFERRED TO COLLABORATIVES TO RESOLVE?

A: Because I am most familiar with Illinois, I will use it as an example. The Illinois Commerce Commission ("ICC") has directed the Illinois SAG to address the following issues, among others:

- **Statewide TRM.** Development of a statewide TRM that documents all savings, cost, measure life, and other relevant assumptions for estimating savings from the two electric utilities' and three gas utilities' efficiency programs. The SAG developed the first such statewide TRM in 2012. It also developed a process for annually updating and filing the TRM with the ICC.[41] To date, every TRM filed has been a consensus document. However, the SAG also has a process for filing any updates when there is disagreement.
- **Net-to-gross (NTG) program assumptions.** The SAG has a similar annual process for engaging with all parties, including the utilities' independent evaluators, to develop NTG assumptions for every program the utilities are operating.
- **Energy-Efficiency Policy Manual.** A couple of years ago, the SAG developed a policy manual which it now also updates annually and files with

[41] For the current version (6.0), which is in four volumes, see (http://www.ilsag.info/il_trm_version_6.html).

the ICC. The policy manual explains how the SAG works as well as the TRM and NTG processes discussed above. The manual also spells out how TRC cost-effectiveness calculations are to be performed; sets forth schedules and processes for developing EM&V plans and reviewing and finalizing EM&V reports; dictates consistent statewide utility quarterly and annual reporting requirements; and covers related issues.

- **Cost-effectiveness testing parameters.** In the past, when there were disagreements between parties over the parameters of cost-effectiveness analyses, the ICC directed the SAG to flesh out the issues and attempt to resolve them. There was partial resolution with a couple of remaining disagreements that the ICC was going to address (but subsequent legislation addressed them first).
- **Large industrial self-direct program design.** Several years ago there was disagreement in a contested proceeding over the effectiveness of a utility's program offerings for large industrial customers. Following a directive from the ICC, the SAG worked by consensus to develop a self-direct program for large industrial customers.
- **Low-income program design and delivery.** The ICC has directed the SAG to work to identify ways to increase the effectiveness (particularly savings) of low-income efficiency programs.
- **Calculation of weighted average measure life (WAML).** Illinois's electric utilities now amortize the cost of their efficiency programs over the weighted average life of the efficiency measures installed. Interestingly, three different

parties initially put forward three different ways of calculating WAML. The ICC directed the SAG to attempt to reach consensus on the most appropriate way to calculate WAML.

- **Program budget reallocations.** The ICC has required that whenever a utility plans to change an approved program budget by more than 20 percent, it must report and discuss that proposed change to the SAG, with the goal that consensus on such changes (and the rationale for them) be reached without requiring Commission involvement.

The SAG has also taken upon itself efforts to negotiate details of the utilities' multi-year plans prior to their filing with the ICC. In the vast majority of cases in the last two multi-year planning cycles, consensus plan filings have been achieved.

Q: IN YOUR EXPERIENCE, WHAT FACTORS ALLOW THE ILLINOIS SAG, AND OTHER WELL-FUNCTIONING COLLABORATIVES, TO SUCCEED?

A: In my experience, there are several key factors that allow collaboratives to function well:

- **A genuine willingness on the part of all parties to work together.** That does not mean that there will be no disagreement. There will be. But in my experience, the number and importance of such disagreements decline over time as parties work together, begin to appreciate the others' perspectives, and look to find compromises that work for everyone.
- **A commitment to meet often enough to effectively work through complex issues.** In my experience, this means eight to 10 times a year, almost

monthly, for larger group discussions, as well as more numerous sub-group working sessions focused on specific topics (for example, examination and analysis of a particular program design, or updating the TRM).

- **All parties having a voice in establishing priorities for discussion,** including specific meetings agendas.
- **Independent facilitation of Collaborative meetings.** In Illinois, an independent facilitator has been hired to manage the SAG process. In Arkansas, an individual hired by the Commission to serve as an Independent Evaluation Monitor facilitates the Collaborative meetings. In Michigan, a Commission staff person manages the monthly Collaborative meetings and related subcommittee or working-group meetings. An independent facilitator ensures that all voices are heard, including in the setting of agendas for meetings, and enables participants in the Collaborative to focus on the topic at hand rather than the actual running of meetings.
- **Institutionalization of working processes.** This starts with simple things like establishing a schedule for meetings and what those meetings will cover; distributing agendas; and distributing meeting notes, summaries of agreements/ disagreements, and lists of next steps. All of these steps must be taken with enough advance notice for parties to be able to meaningfully prepare and participate in the meetings. Over time, more formal processes should be developed (e.g., annual processes for reviewing and updating and documenting savings assumptions – ideally in a TRM). The institutionalization evolves over time as the collaborative parties get used to

working together and develop an increasing list of work products that require periodic updating.

- **Accountability**. Well-functioning collaboratives are expected to produce results and to report back to regulators, increasingly in the form of consensus filings, on progress made on key issue

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

CERTIFICATE OF SERVICE

I certify that the parties of record on the service list have been served with the Direct Testimony of Chris Neme on Behalf of the North Carolina Justice Center, Natural Resources Defense Council, and Southern Alliance for Clean Energy either by electronic mail or by depositing in the U.S. Mail, first-class postage prepaid.

This the 22nd day of May, 2018.

/s Robin G. Dunn

Robin G. Dunn

CHRISTOPHER NEME, PRINCIPAL

EDUCATION

M.P.P., University of Michigan, 1986
B.A.., Political Science, University of Michigan, 1985

EXPERIENCE

2010-present: Principal (and Co-Founder), Energy Futures Group, Hinesburg, VT
1999-2010: Director of Planning & Evaluation, Vermont Energy Investment Corp., Burlington, VT
1993-1999: Senior Analyst, Vermont Energy Investment Corp., Burlington, VT
1992-1993: Energy Consultant, Lawrence Berkeley National Laboratory, Gaborone, Botswana
1986-1991: Senior Policy Analyst, Center for Clean Air Policy, Washington, DC

PROFESSIONAL SUMMARY

Chris specializes in analysis of markets for energy efficiency, renewable energy and strategic electrification measures and the design and evaluation of programs and policies to promote them. During his 25+ years in the clean energy industry, Mr. Neme has worked for energy regulators, utilities, government agencies and advocacy organizations in nearly 30 states, 5 Canadian provinces and several European countries. He has defended expert witness testimony before regulatory commissions in ten different jurisdictions; he has also testified before several state legislatures.

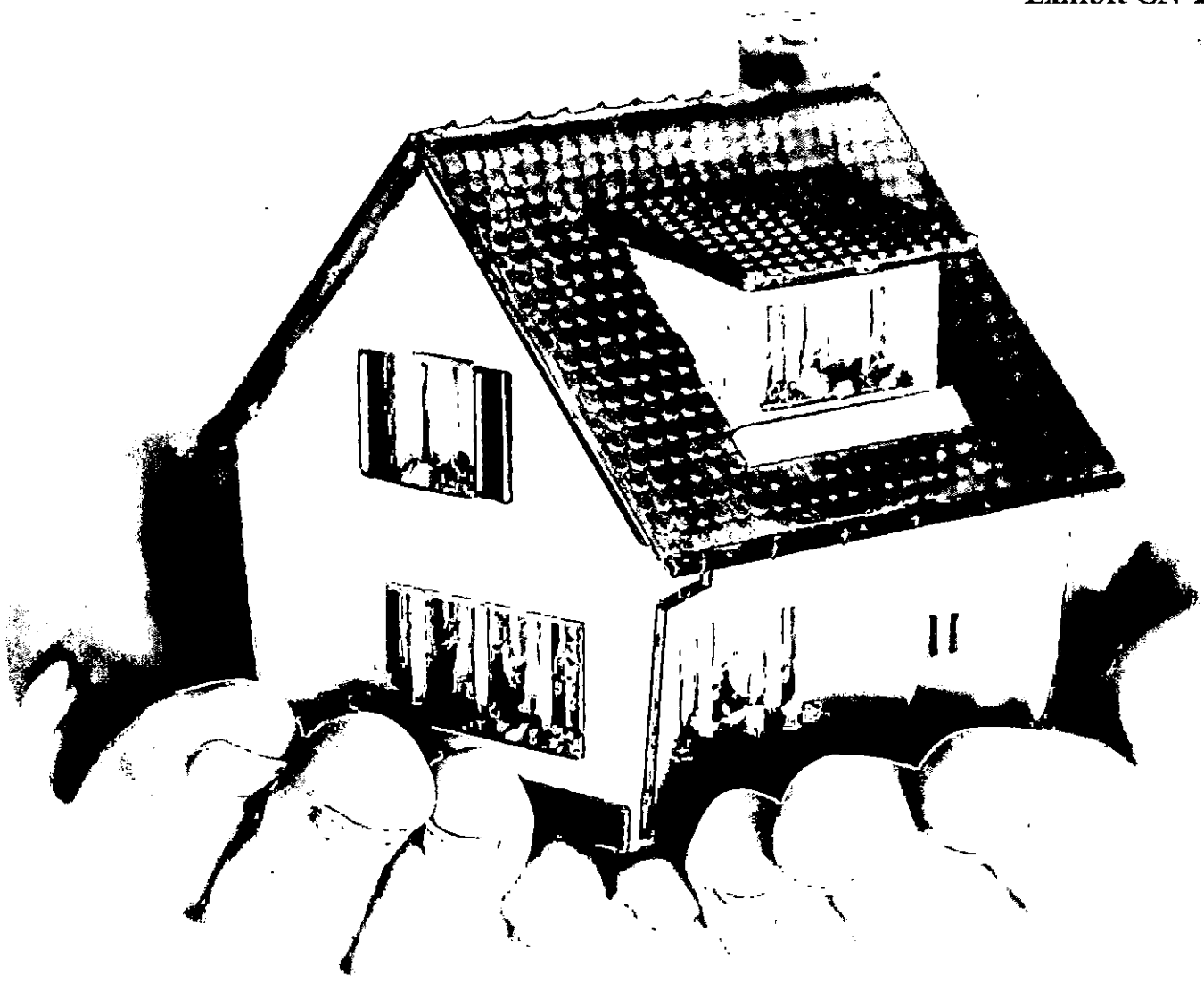
SELECTED PROJECTS

- ***Green Mountain Power (Vermont).*** Support development and implementation of GMP's plan for reducing customers' direct consumption of fossil fuels. Also developed 10-year forecast different levels of promotion of residential heat pumps and electric vehicles. (2016 to present)
- ***Ontario Energy Board:*** Serve on gas DSM Evaluation Committee, advisory committee on gas efficiency potential study and advisory committee on carbon price forecast. (2015-present)
- ***Alberta Energy Efficiency Alliance.*** Drafting white paper on key ways in which consideration of "efficiency as a resource" could be institutionalized. Paper followed presentations to government agencies and others on behalf of the Pembina Institute. (2017 to present)
- ***Green Energy Coalition (Ontario).*** Represent coalition of environmental groups in regulatory proceedings, utility negotiations and stakeholder meetings on DSM policies (including integrated resource planning on pipeline expansions) and utility proposed DSM Plans. (1993 to present)
- ***New Jersey Board of Public Utilities.*** Serve on management team responsible for statewide delivery of New Jersey Clean Energy Programs. Lead strategic planning; support regulatory filings, cost-effectiveness analysis & evaluation work. (2015 to present)
- ***Natural Resources Defense Council (Illinois, Michigan and Ohio).*** Critically review multi-year DSM plans and IRPs of Illinois, Michigan and Ohio utilities. Draft and defend regulatory testimony. Represent NRDC in stakeholder-utility processes governing development of efficiency policy manuals, annual TRM updates, annual NTG updates, etc. (2010 to present)
- **Toronto Atmospheric Fund.** Helped draft an assessment of efficiency potential from retrofitting of cold climate heat pumps into electrically heated multi-family buildings (2017).

CHRISTOPHER NEME, PRINCIPAL

- ***E4TheFuture.*** One of five authors of a new 2017 National Standard Practice Manual for cost-effectiveness analysis of energy efficiency and other distributed resources. (2016-present)
- ***Regulatory Assistance Project - U.S.*** Provide guidance on efficiency policy and programs. Lead author on strategic reports on achieving 30% electricity savings in 10 years, using efficiency to defer T&D system investments, & bidding efficiency into capacity markets. (2010 to present)
- ***Regulatory Assistance Project - Europe.*** Provide support on efficiency policies in the UK, Germany, and other countries. Reviewed EU policies on Energy Savings Obligations, EM&V protocols, and related issues. Drafted policy brief on efficiency feed-in-tariffs. (2009 to present)
- ***Northeast Energy Efficiency Partnerships.*** Helped manage Regional EM&V forum project estimating savings for emerging technologies, including field study of cold climate heat pumps. Led assessment of best practices on use of efficiency to defer T&D investment. (2009 to 2015)
- ***Ontario Power Authority.*** Managed jurisdictional scans on leveraging building efficiency labeling requirements and non-energy benefits. Led staff workshop on efficiency as an alternative to T&D investment. (2012-2015)
- ***Vermont Public Interest Research Group.*** Conducted comparative analysis of the economic and environmental impacts of fuel-switching from oil/propane heating to either natural gas or efficient, cold climate electric heat pumps. Filed regulatory testimony on findings. (2014-2015)
- ***National Association of Regulatory Utility Commissioners (NARUC).*** Assessed alternatives to first year savings goals to better promote longer-lived savings. (2013)
- ***California Investor-Owned Utility.*** Senior advisor on EFG project to compare the cost of saved energy across ~10 leading U.S. utility portfolios. The research sought to determine if there are discernable differences in the cost of saved energy related to utility spending in specific non-incentive categories, including administration, marketing, and EM&V. (2013)
- ***New York State Energy Research and Development Authority (NYSERDA).*** Led residential & renewables portions of several statewide efficiency potential studies. (2001 to 2010)
- ***DC Department of the Environment (Washington DC).*** Part of VEIC team administering the DC Sustainable Energy Utility (SEU). Helped characterize the DC efficiency market and supported the design of efficiency programs that the SEU will be implementing. (2011 to 2012)
- ***Ohio Public Utilities Commission.*** Senior Advisor to a project to develop a web-based Technical Reference Manual (TRM). The TRM includes deemed savings assumptions, deemed calculated savings algorithms and custom savings protocols. It was designed to serve as the basis for all electric and gas efficiency program savings claims in the state. (2009 to 2010)
- ***Vermont Electric Power Company.*** Led residential portion of efficiency potential study to assess alternatives to new transmission line. Testified before Public Service Board. (2001-2003)
- ***Efficiency Vermont.*** Served on Sr. Management team. Supported initial project start-up. Oversaw residential planning, input to regulators on evaluation, input to regional EM&V forum, development of M&V plan and other aspects of bidding efficiency into New England's Forward Capacity Market (FCM), and development and updating of nation's first TRM. (2000 to 2010)

Exhibit CN-2



EVALUATION OF DUKE ENERGY'S HELPING HOME FUND

October 15, 2017

advanced energy

DUKE ENERGY®

Connect. Advocate. Innovate.
N.C. Community Action Association

LOCKHEED MARTIN

EXECUTIVE SUMMARY

Between 2015 and 2017, Duke Energy worked with the North Carolina Community Action Association (NCCAA) and Lockheed Martin to administer the Helping Home Fund, a program helping low-income customers improve their health and safety and manage their energy costs.

Duke Energy was the funding sponsor, with Duke Energy Carolinas and Duke Energy Progress providing a total of $20 million to support appliance replacement, health and safety measures, weatherization, and heating/cooling replacement and repair in participating homes. NCCAA was chosen as the program administrator and contracted with Lockheed Martin to assist with implementation.

In all, the Helping Home Fund reached 3,516 homes with an average of $5,151 in performed work per home. The Helping Home Fund was designed to leverage additional funding as well, including the State Weatherization Assistance Program (NCWAP), which consists of U.S. Department of Energy (DOE) Weatherization Assistance Program (WAP) and Low Income Home Energy Assistance Program (LIHEAP) funds, the PNC Home Beautification Fund, and funds from the North Carolina Housing Finance Agency (NCHFA). Without the Helping Home Fund, more than 40 percent of the participating homes would have been deferred due to funding limitations and program guidelines in the NCWAP. During the time period that the Helping Home Fund was operating, the program spent $20 million. Leveraged funding included:

- **NCWAP: $17 million**
- **PNC Home Beautification: $250,000**
- **NCHFA: $234,000**

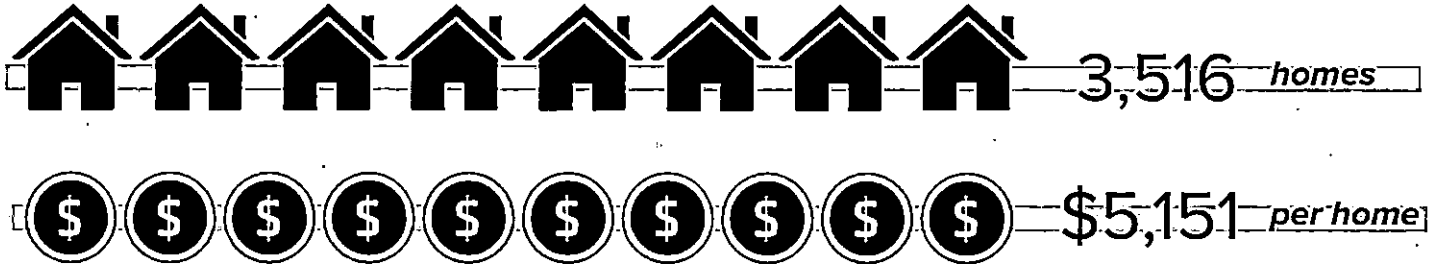
Funds were also leveraged from other private funding sources, such as the City of Raleigh and City of Charlotte Urgent Repair Programs, but we were unable to obtain data on their funding levels.

Duke Energy had an interest in understanding the full impact of the program, including leveraging opportunities, and economic and non-energy impacts, such as health, safety and comfort. A number of approaches were taken for this effort. First, the team developed two surveys that were distributed to participating homeowners and service providers. The surveys gauged views of the Helping Home Fund and how people thought the program impacted the lives of families and the larger community. Second, a review of prior research evaluated the monetized values of potential energy and non-energy benefits associated with the program.

Results from the surveys demonstrated that both homeowners and service providers had a very favorable view of the Helping Home Fund. Homeowners noted that they felt safer, more comfortable and healthier in their homes, and reported financial savings that would allow them to pay for other necessities. Service providers applauded the program for its flexibility, staff and communication. Furthermore, the literature review of other low-income weatherization programs revealed that homeowners experienced a variety of non-energy benefits. Conservative estimates in the literature found monetized values for these benefits to be between $4,500 and $10,000 per home.

With the success of the program and the merger between Duke Energy and Piedmont Natural Gas, an additional $2.5 million will be used for a similar program to provide assistance to even more income-qualified families in North Carolina.

The Helping Home Fund reached 3,516 homes with an average of $5,151 in performed work per home.



INTRODUCTION

As a result of the Duke Energy North Carolina rate cases in 2013, Duke Energy allocated $20 million ($10 million from Duke Energy Carolinas [DEC] and $10 million from Duke Energy Progress [DEP]) to assist low-income customers. For both utilities, the $10 million was allocated in the following ways: $3 million was used for health and safety measures and appliance replacement (for DEP, some of these funds also went toward weatherization; DEC has a separate weatherization program), and $7 million was used for heating/cooling system replacement and repair. The actual breakdown of the funds at the time of this report can be seen in **Table 1**.

The program provided income-qualified customers with repairs and energy efficiency upgrades at no cost.

This program, known as the Helping Home Fund, ran from January 2015 to May 2017. The goal of the funding was to assist low-income customers. Duke Energy saw an opportunity to provide assistance that did not currently exist by providing health and safety repairs, new energy-efficient appliances, and heating systems to help homeowners manage energy costs and increase their disposable income. To meet this goal, the Helping Home Fund worked primarily through weatherization service providers as well as other non-profit agencies that serve families at or below 200 percent of federal poverty guidelines. The program provided income-qualified customers with repairs and energy efficiency upgrades at no cost.

The Helping Home Fund was funded by Duke Energy and administered by the North Carolina Community Action Association (NCCAA). NCCAA partnered with Lockheed Martin, who provided the database for data tracking and reporting, and quality assurance (QA) and quality control (QC). The Helping Home Fund was designed to leverage the State Weatherization Assistance Program (NCWAP) and other public/private funding sources. The funds were allocated to local North Carolina weatherization service providers and several non-profit agencies who completed the projects and were reimbursed once the work was completed. The program was allowed to use 10 percent of the funding for administrative purposes, with 5 percent going to the administrator and 5 percent to the service providers.

The monies were transmitted in total to the NCCAA to manage and deposited at PNC Bank. As a result, PNC Bank suggested that the NCCAA apply for a grant from their foundation, which ultimately provided another $250,000 for Helping Home Fund recipients for external beautification or maintenance, such as painting, roof repairs or landscaping.

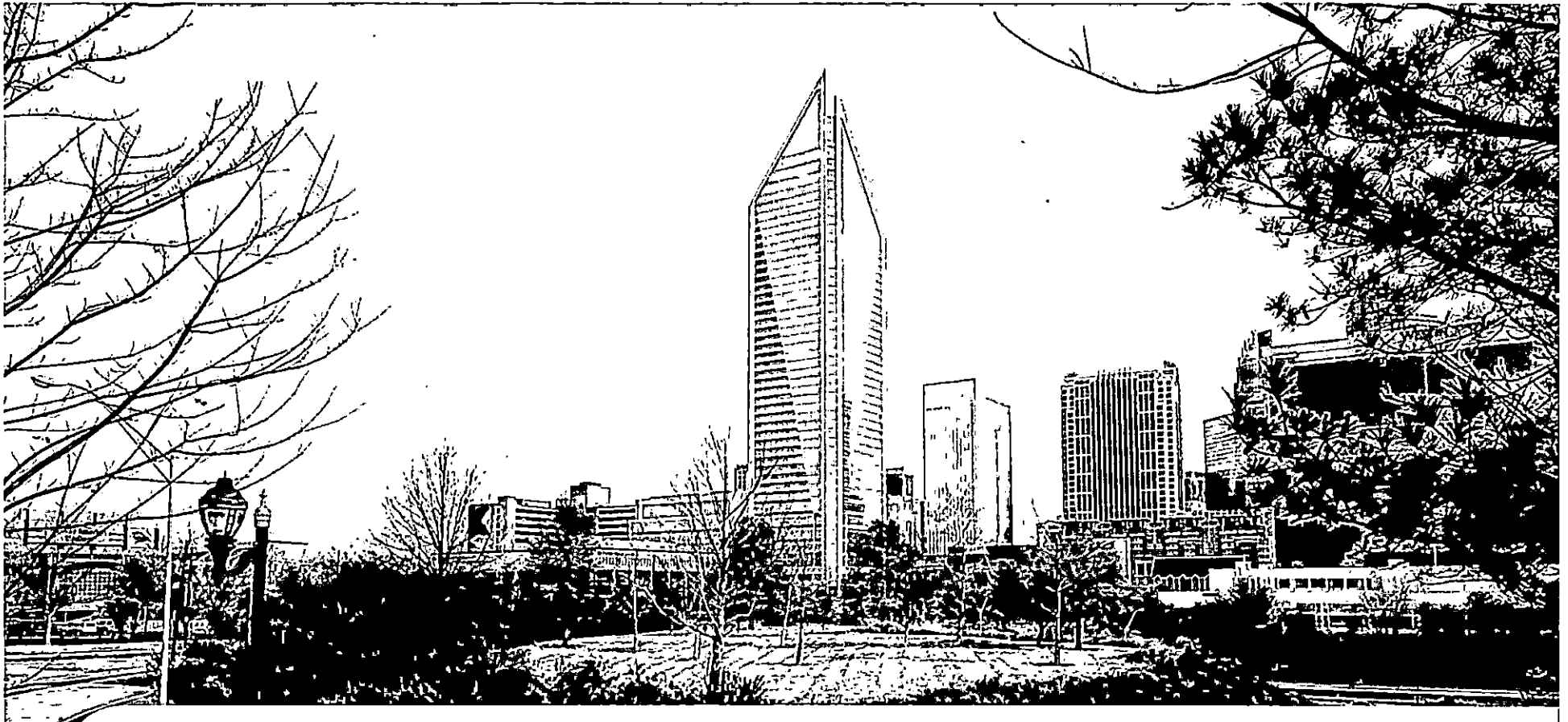
TABLE 1 • HELPING HOME FUND BREAKDOWN

	DEC	DEP	TOTAL
APPLIANCE REPLACEMENT	$950,343	$620,399	$1,570,742
HEALTH & SAFETY	$1,765,387	$873,998	$2,639,385
HEATING/COOLING REPLACEMENT/REPAIR	$6,395,779	$6,388,239	$12,784,018
WEATHERIZATION TIER 1		$100,217	$100,217
WEATHERIZATION TIER 2		$1,018,932	$1,018,932
PROJECT TOTAL	**$9,111,509**	**$9,001,785**	**$18,113,294**
AVERAGE PER HOUSE			$5,151
ADMINISTRATION	$928,344	$928,344	$1,856,688
OVERALL TOTAL	**$10,039,853**	**$9,930,129**	**$19,969,982**

pg. 1 of 91 pgs
filed in docket

FBW Exhibit 3

I/11

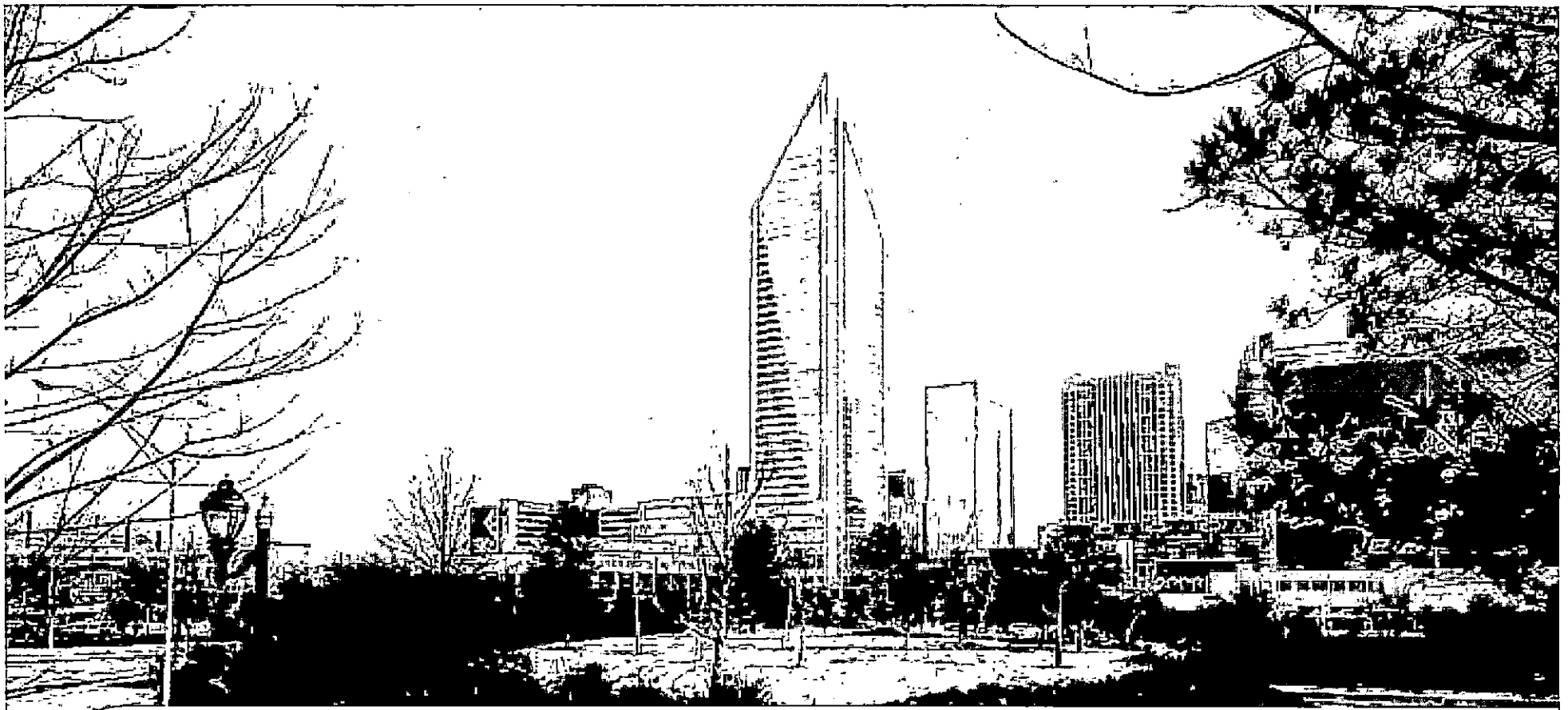


Duke Energy Carolinas Collaborative Meeting

January 31, 2019

DUKE ENERGY®

F/A



Duke Energy Carolinas Collaborative Meeting

January 31, 2019

DUKE ENERGY®

Community Outreach Programs

Overview – Program Participation

Program Participation	Customers <$50,000						Customers <$30,000					
Low Income Targeted Program	All Customers	LI Customers	% Low Income*	DEC Customers	DEC LI Customers	% Low Income	All Customers	LI Customers	% Low Income*	DEC Customers	DEC LI Customers	% Low Income
Neighborhood Energy Saver	80,631	65,028	80.6%	25,934	20,465	78.9%	80,631	43,049	53.4%	25,934	13,996	54.0%
	Programs with Customer Investment						Programs with Customer Investment					
Smart Saver	147,239	31,767	21.6%	75,087	17,613	23.5%	147,239	11,213	7.6%	75,087	6,404	8.5%
Online Lighting Store	167,299	45,937	27.5%	102,356	29,682	29.0%	167,299	17,309	10.3%	102,356	11,515	11.2%
Home Energy Imp	135,133	40,063	29.6%				135,133	6,360	4.7%			
	449,671	117,767	26.2%	177,443	47,295	26.7%	449,671	34,882	7.8%	177,443	17,919	10.1%
	Rebates to Customer						Rebates to Customer					
Appliance Recycle	64,193	25,066	39.0%	20,614	8,508	41.3%	64,193	11,858	18.5%	20,614	3,968	19.2%
Power Manager	898,574	369,823	41.2%	215,547	82,105	38.1%	898,574	177,393	19.7%	215,547	37,129	17.2%
	962,767	394,889	41.0%	236,161	90,613	38.4%	962,767	189,251	19.7%	236,161	41,097	17.4%
	Free Programs to Customer						Free Programs to Customer					
Home Energy House Call	254,096	88,917	35.0%	54,079	18,101	33.5%	254,096	37,194	14.6%	54,079	7,696	14.2%
K-12 Education	201,857	83,995	41.6%	114,632	50,738	44.3%	201,857	40,014	19.8%	114,632	24,602	21.5%
MyHER	2,746,125	1,182,166	43.0%	1,330,875	604,097	45.4%	2,746,125	595,658	21.7%	1,330,875	310,200	23.3%
Residential Lighting	1,928,721	838,810	43.5%	1,216,878	567,107	46.6%	1,928,721	412,785	21.4%	1,216,878	290,793	23.9%
Multi-Family EE	78,209	48,236	61.7%	44,173	27,938	63.2%	78,209	32,688	41.8%	44,173	19,031	43.1%
	4,954,912	2,153,207	43.5%	1,261,051	595,045	47.2%	4,954,912	1,081,145	21.8%	1,261,051	309,824	24.6%

*From REZ tool, based in incomes <$50K and <$30K - 2017

FBW Exhibit 5

I/A

Arkansas Public Service Commission

Standardized Annual Reporting Workbook *v4.0 August 2017*

General	Energy Efficeny Portolio Data and Information
Instructions Glossary	2017 EE Portfolio Information 2017 Program Year Evaluation Historical Information **Entergy Arkansas, Inc.**

Annual Report Tables					Reports			Data	
EE Portfolio Summary	EE Portfolio Expenditures by Program	EE Portfolio Expenditure Summary by Cost Type	Company Statistics	Program Budget, Energy Savings & Participants	Portfolio Results Detail by Program	Portfolio Results Detail by Sector	Best Practices	Program Year Data	Next Annual Report Load Data
View	View	View	View	View	View	View	View	View	View

Main Menu

Table 1

Next >>

2017 Portfolio Summary

Net Energy Savings		Costs			Cost-Effectiveness			Goal Achievement		
Demand MW	Energy MWh	Actual Expenditures	LCFC	Performance Incentives	TRC Net Benefits (NPV)	TRC Ratio	PAC Ratio	Commission Established Target % of Baseline	Actual Savings Achieved % of Baseline	% of Target Achieved (%)
104	264,992	$ 57,141,646	$ -	$ 4,962,781	$ 111,287,286	2.52	2.79	0.90%	1.49%	165%

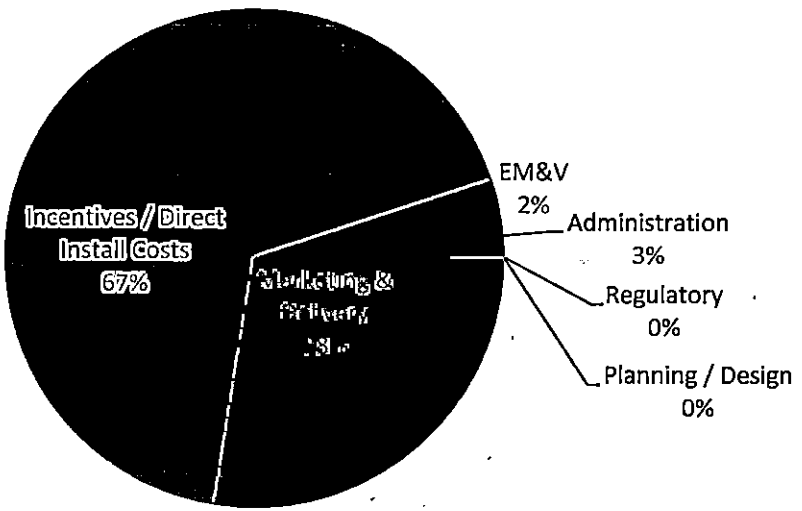
Work Book is Incomplete
- Click Here For Details-

EE Portfolio Expenditures by Program

Program Name	Target Sector	Program Type	2017 Budget ($)	2017 Actual ($)	% of Budget
Bring Own T-stat Pilot	Residential	Demand Response	130,676	68,912	53%
Efficient Cooling Solutions	Residential	Measure/Technology Focus	2,608,580	2,209,519	85%
Energy Solutions for Manufactured Homes	Residential	Market Specific/Hard to Reach	1,066,973	1,013,729	95%
Energy Solutions for Multi-Family	Residential	Market Specific/Hard to Reach	1,087,309	964,280	89%
Home Energy Solutions	Residential	Whole Home	11,798,620	11,736,577	99%
Lighting & Appliances	Residential	Consumer Product Rebate	4,708,434	4,521,562	96%
Residential Benchmarking Program	Residential	Behavior/Education	557,798	468,626	84%
Residential Direct Load Control	Residential	Demand Response	3,044,555	2,064,063	68%
Small Business	Small Business	Market Specific/Hard to Reach	4,184,886	4,269,781	102%
C&I Solutions Program	Commercial & Industrial	Custom	23,644,196	21,195,549	90%
City Smart	Commercial & Industrial	Market Specific/Hard to Reach	3,664,805	3,638,872	99%
Commercial Midstream	Commercial & Industrial	Consumer Product Rebate	1,228,253	1,116,444	91%
Agricultural Energy Solutions	Agriculture	Prescriptive/Standard Offer	1,018,569	765,606	75%
Agricultural Irrigation Load Control	Agriculture	Demand Response	3,092,606	2,837,698	92%
Energy Efficiency Arkansas	Residential	Other	198,507	197,986	100%
Regulatory	-	-	-	72,440	-
		Total	62,034,767	57,141,646	92%

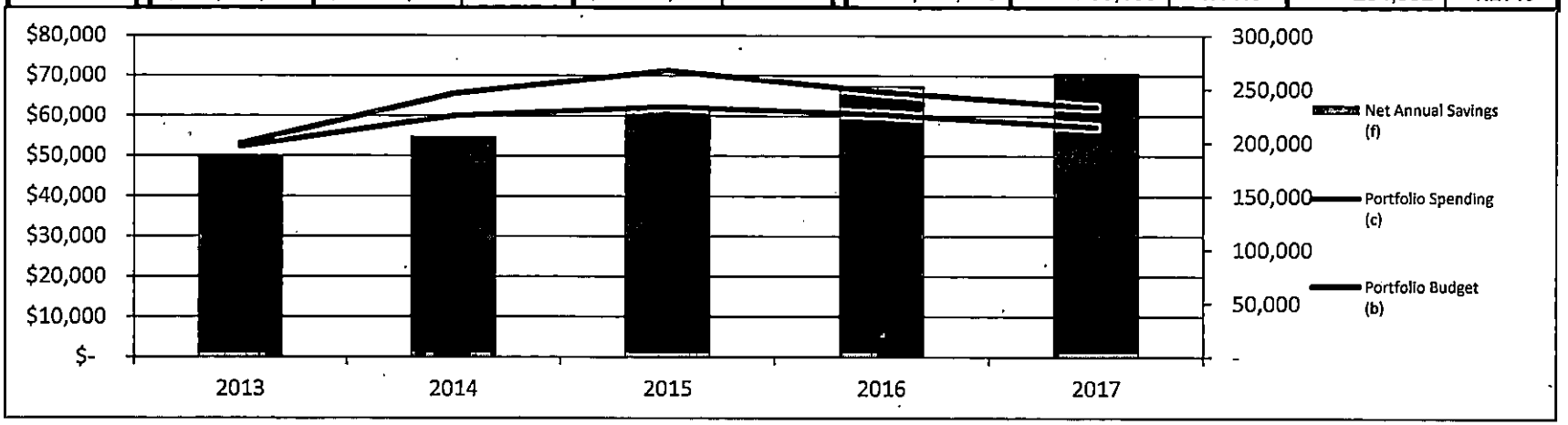
EE Portfolio Expenditure Summary by Cost Type

Cost Type	2017 Total Expenditures			
	% of Total	Budget ($)	Actual ($)	% of Total
Planning / Design	0%	170,174	9,672	0%
Marketing & Delivery	27%	16,806,585	15,701,465	27%
Incentives / Direct Install Costs	65%	40,172,674	38,517,076	67%
EM&V	3%	2,073,388	1,285,628	2%
Administration	5%	2,811,946	1,555,365	3%
Regulatory	0%	-	72,440	0%
	100%	**62,034,767**	**57,141,646**	100%



Company Statistics

Program Year	Revenue and Expenditures					Energy				
		Budget		Actual			Plan		Evaluated	
	Total Revenue (a) ($000's)	Portfolio Budget (b) ($000's)	% of Revenue (%=b/a)	Portfolio Spending (c) ($000's)	% of Revenue (%=c/a)	Total Annual Energy Sales (d) (MWh)	Net Annual Savings (e) (MWh)	% of Energy Sales (%=e/d)	Net Annual Savings (f) (MWh)	% of Energy Sales (%=f/d)
2013	$ 1,678,683	$ 53,032	3.2%	$ 52,285	3.1%	20,859,130	165,469	0.79%	188,468	0.90%
2014	$ 1,642,896	$ 65,454	4.0%	$ 59,914	3.6%	21,001,325	197,564	0.94%	205,507	0.98%
2015	$ 1,820,805	$ 71,178	3.9%	$ 62,190	3.4%	21,160,228	186,555	0.88%	229,268	1.08%
2016	$ 1,733,733	$ 65,964	3.8%	$ 60,270	3.5%	20,639,386	194,165	0.94%	253,201	1.23%
2017	$ 1,739,545	$ 62,035	3.6%	$ 57,142	3.3%	20,888,455	238,130	1.14%	264,992	1.27%



Main Menu

Table 5

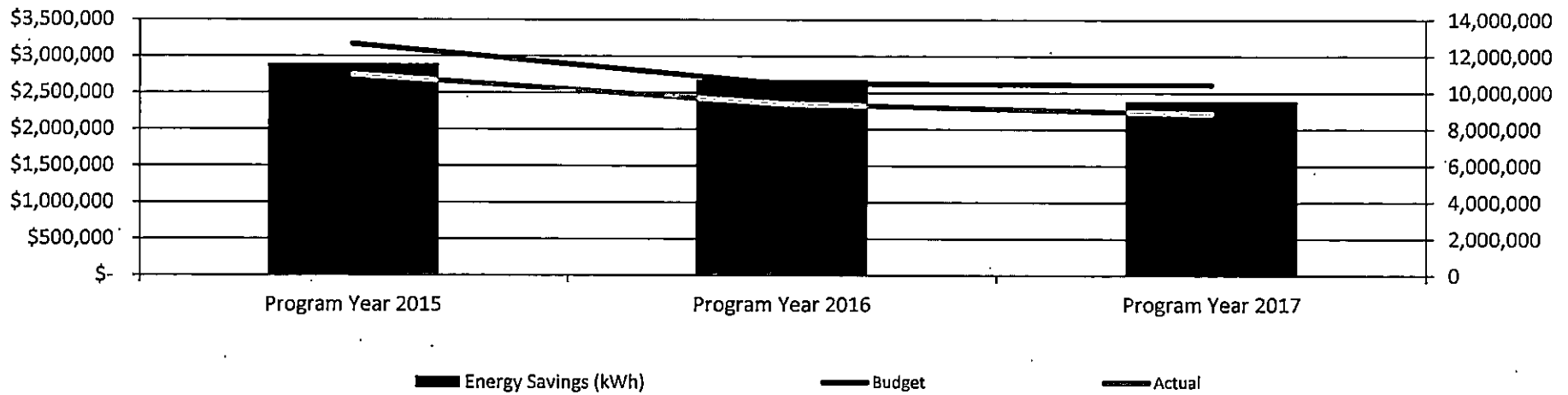
<< Back

Efficient Cooling Solutions

Select program from dropdown menu to view details.

Efficient Cooling Solutions

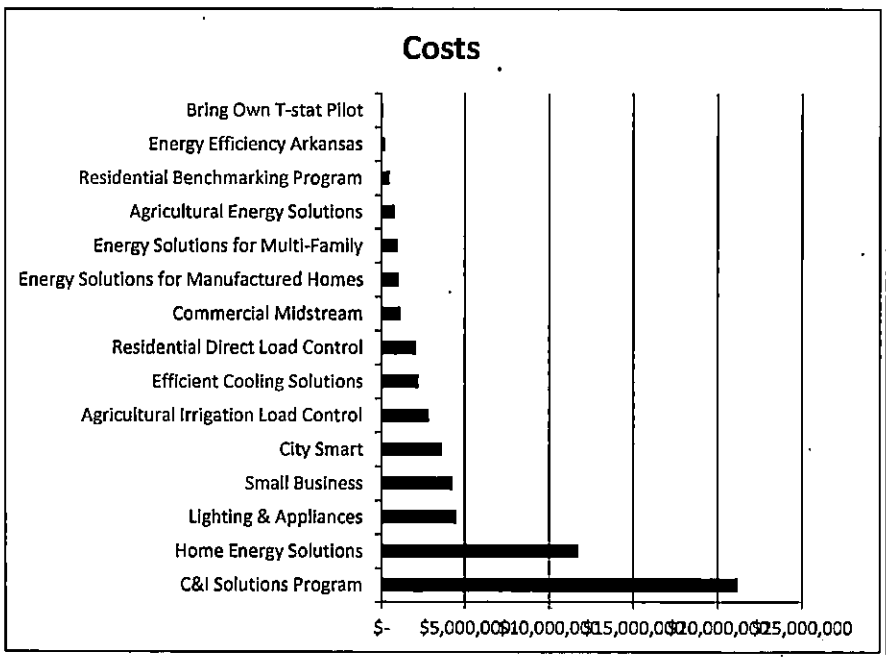
	Expenditures			Energy Savings (kWh)			Demand Savings (kW)			Participants		
Program	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2015	$ 3,165,940	$ 2,745,610	87%	9,100,000	11,572,605	127%	4,105	4,789	117%	10,061	7,478	74%
Program Year 2016	$ 2,620,953	$ 2,344,395	89%	16,141,000	10,724,845	66%	8,600	3,348	39%	10,061	4,324	43%
Program Year 2017	**$ 2,608,580**	**$ 2,209,519**	**85%**	**17,446,000**	**9,548,026**	**55%**	**10,228**	**2,908**	**28%**	**5,999**	**2,548**	**42%**

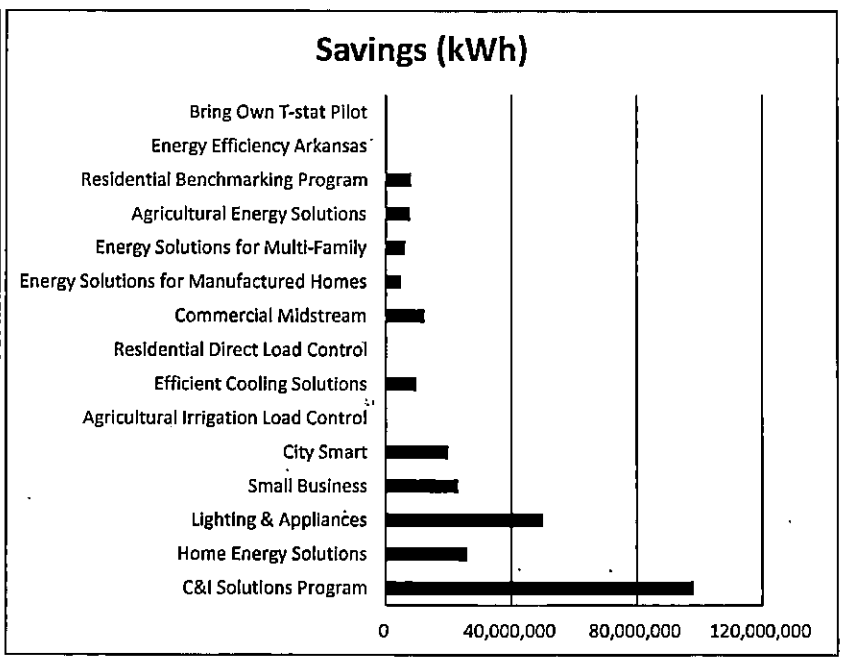


Main Menu | Report 1 | Next >>

2017 Portfolio Results Detail

Program Name	Target Sector	Costs			Savings (kWh)			Participants			TRC Ratio
		Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%	
Bring Own T-stat Pilot	Residential	$ 130,676	$ 68,912	53%	0	0	-	750	55	7%	0.00
Efficient Cooling Solutions	Residential	$ 2,606,580	$ 2,209,519	85%	17,446,000	9,548,026	55%	5,999	2,548	42%	1.96
Energy Solutions for Manufactured Homes	Residential	$ 1,066,973	$ 1,013,729	95%	1,996,069	4,690,095	235%	900	641	71%	8.56
Energy Solutions for Multi-Family	Residential	$ 1,087,309	$ 964,280	89%	3,011,306	6,111,955	203%	4,000	1,898	47%	9.82
Home Energy Solutions	Residential	$ 11,798,620	$ 11,736,577	99%	22,638,739	25,757,464	114%	7,222	7,733	107%	2.82
Lighting & Appliances	Residential	$ 4,708,434	$ 4,521,562	96%	29,927,961	50,040,143	167%	2,261,358	291,634	13%	7.13
Residential Benchmarking Program	Residential	$ 557,798	$ 468,626	84%	9,118,435	7,901,231	87%	208,264	336,309	161%	0.87
Residential Direct Load Control	Residential	$ 3,044,555	$ 2,064,063	68%	0	1,734	-	22,184	23,075	104%	3.16
Small Business	Small Business	$ 4,184,886	$ 4,269,781	102%	13,247,024	23,005,941	174%	1,100	744	68%	1.92
C&I Solutions Program	Commercial & Industrial	$ 23,644,196	$ 21,195,549	90%	109,920,001	98,073,142	89%	850	764	90%	1.76
City Smart	Commercial & Industrial	$ 3,664,805	$ 3,638,872	99%	12,806,791	19,940,702	156%	85	367	432%	1.54
Commercial Midstream	Commercial & Industrial	$ 1,228,253	$ 1,116,444	91%	11,466,158	12,312,436	107%	849	912	107%	3.77
Agricultural Energy Solutions	Agriculture	$ 1,018,569	$ 765,606	75%	6,551,697	7,609,051	116%	118	51	43%	4.42
Agricultural Irrigation Load Control	Agriculture	$ 3,092,606	$ 2,837,698	92%	0	0	-	1,271	1,035	81%	1.43
Energy Efficiency Arkansas	Residential	$ 198,507	$ 197,986	100%	0	0	-	0	0	-	0.00
Regulatory		$ -	$ 72,440								
	TOTAL:	$ 62,034,767	$ 57,141,646	92%	238,130,182	264,991,920	111%	2,514,950	667,766	27%	2.52





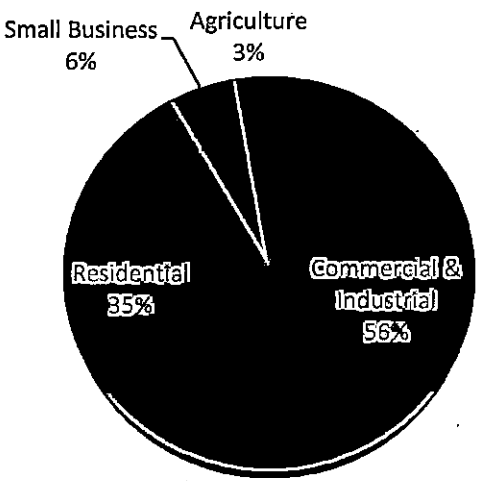
2017 Portfolio Results Detail by Target Sector

Target Sector	Costs			Savings (kWh)			Participants			TRC Ratio
	Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%	
Residential	$ 25,201,452	$ 23,245,255	92%	84,138,511	104,050,648	124%	2,510,677	663,893	26%	4.03
Small Business	$ 4,184,886	$ 4,269,781	102%	13,247,024	23,005,941	174%	1,100	744	68%	1.92
Commercial & Industrial	$ 28,537,253	$ 25,950,865	91%	134,192,950	130,326,280	97%	1,784	2,043	115%	1.84
Municipalities/Schools	$ -	$ -	-	0	0	-	0	0	-	n/a
Agriculture	$ 4,111,175	$ 3,603,305	88%	6,551,697	7,609,051	116%	1,389	1,086	78%	1.96
Other	$ -	$ -	-	0	0	-	0	0	-	n/a
Res/Small Business	$ -	$ -	-	0	0	-	0	0	-	n/a
Res/C&I	$ -	$ -	-	0	0	-	0	0	-	n/a
Small Business/C&I	$ -	$ -	-	0	0	-	0	0	-	n/a
All Classes	$ -	$ -	-	0	0	-	0	0	-	n/a
	-	-	-	-	-	-	-	-	-	-
TOTAL	**$ 62,034,767**	**$ 57,069,206**	92%	**238,130,182**	**264,991,920**	111%	**2,514,950**	**667,766**	27%	**2.52**

Select the Data to be Displayed in Chart

Savings (kWh)

Savings (kWh)



Main Menu

Report 3

Level of Adoption of NAPEE "Best Practic

Item #	1a.		1b.	1c.		2a.	
Program Year	FTEs	FTEs / $1M of EE Spending	Training Sessions Attended	Training Sessions Man-Hours	EE Total Portfolio Expenditures (A) ($000's)	Planning & Design (B) ($000's)	As % of Total Portfolio Expenditures (%=B/A)
2017	70	1.2	175	12,704	$ 57,142	$ 10	0.0%

Index to Docket No. 10-010-U Issue #8 Items	
Item #	Description
1	Program Staffing and Training Requirements
2	DSM Program Design & Implementation
3	DSM Program Evaluation
4	Estimation of DSM Resource Potential
5	Shareholder Incentives for Program Performance
6	Resource Planning with Energy Efficiency
7	Utility Best Practices Guidance for Providing Business Customers with Energy Use·Cost Dat
8	Customer Incentives for Energy Efficiency Through Electric and Natural Gas Rate Design

<< Back

es" (Issue #8)

2b.		3a.	
Implementa-tion (C) (C=A-B-D) ($000's)	As % of Total Portfolio Expenditures (%=C/A)	EM&V (D) ($000's)	As % of Total Portfolio Expenditures (%=D/A)
$ 55,846	97.7%	$ 1,286	2.2%

	Where Available?
	Above
	Above
	Above
	Narrative Section 1.0
	Incentives Section
	Narrative Section 1.0
:a	Narrative Section 3.3
	Narrative Section 3.3

Main Menu

Program Name	Target Sector	Program Type	Delivery Channel
Lighting & Appliances	Residential	Consumer Product Rebate	Retail Outlets
Home Energy Solutions	Residential	Whole Home	Implementing Contractor
Efficient Cooling Solutions	Residential	Measure/Technology Focus	Implementing Contractor
Energy Solutions for Multi-Family	Residential	Market Specific/Hard to Reach	Direct Install
Energy Solutions for Manufactured Homes	Residential	Market Specific/Hard to Reach	Direct Install
Residential Benchmarking Program	Residential	Behavior/Education	Implementing Contractor
Residential Direct Load Control	Residential	Demand Response	Implementing Contractor
Energy Efficiency Arkansas	Residential	Other	Statewide Administrator
Commercial Midstream	Commercial & Industrial	Consumer Product Rebate	Retail Outlets
C&I Solutions Program	Commercial & Industrial	Custom	Trade Ally
Small Business	Small Business	Market Specific/Hard to Reach	Trade Ally
City Smart	Commercial & Industrial	Market Specific/Hard to Reach	Trade Ally
Agricultural Energy Solutions	Agriculture	Prescriptive/Standard Offer	Implementing Contractor
Agricultural Irrigation Load Control	Agriculture	Demand Response	Utility Outreach (email/direct mail)
Bring Own T-stat Pilot	Residential	Demand Response	Trade Ally
Empty			
Empty			
Empty			
Empty			
Empty			

Main Menu

Program Year Data

2017 Portfolio Data

Program Name	Expenses		Energy Savings (kWh)		Demand Savings (kW)		Participants	
	Budget	Actual	Plan	Evaluated	Plan	Evaluated	Plan	Actual
Lighting & Appliances	$ 4,708,434	$ 4,521,562	29,927,961	50,040,143	6,533	9,908	2,261,358	291,634
Home Energy Solutions	$ 11,798,620	$ 11,736,577	22,638,739	25,757,464	10,440	10,122	7,222	7,733
Efficient Cooling Solutions	$ 2,608,580	$ 2,209,519	17,446,000	9,548,026	10,228	2,908	5,999	2,548
Energy Solutions for Multi-Family	$ 1,087,309	$ 964,280	3,011,306	6,111,955	1,716	2,526	4,000	1,898
Energy Solutions for Manufactured Homes	$ 1,066,973	$ 1,013,729	1,996,069	4,690,095	393	1,083	900	641
Residential Benchmarking Program	$ 557,798	$ 468,626	9,118,435	7,901,231	6,718	5,351	208,264	336,309
Residential Direct Load Control	$ 3,044,555	$ 2,064,063	0	1,734	35,000	37,612	22,184	23,075
Energy Efficiency Arkansas	$ 198,507	$ 197,986	0	0	0	0	0	0
Commercial Midstream	$ 1,228,253	$ 1,116,444	11,466,158	12,312,436	1,654	3,452	849	912
C&I Solutions Program	$ 23,644,196	$ 21,195,549	109,920,001	98,073,142	17,364	12,174	850	764
Small Business	$ 4,184,886	$ 4,269,781	13,247,024	23,005,941	2,841	2,817	1,100	744
City Smart	$ 3,664,805	$ 3,638,872	12,806,791	19,940,702	2,598	3,203	85	367
Agricultural Energy Solutions	$ 1,018,569	$ 765,606	6,551,697	7,609,051	937	1,040	118	51
Agricultural Irrigation Load Control	$ 3,092,606	$ 2,837,698	0	0	31,000	12,216	1,271	1,035
Bring Own T-stat Pilot	$ 130,676	$ 68,912	0	0	580	0	750	55
Empty	$ -	$ -	0	0	0	0	0	0
Empty	$ -	$ -	0	0	0	0	0	0
Empty	$ -	$ -	0	0	0	0	0	0
Empty	$ -	$ -	0	0	0	0	0	0
Empty	$ -	$ -	0	0	0	0	0	0

Main Menu

	TRC					
Program Name	Lifetime Savings (MWh)	Total Cost	Total Benefits	Net Benefits	Ratio	Levelized cost
Lighting & Appliances	718,052	$ 5,767	$ 41,147	$ 35,379	7.1	$ 0.0122
Home Energy Solutions	421,459	$ 11,737	$ 33,081	$ 21,344	2.8	$ 0.0444
Efficient Cooling Solutions	88,580	$ 2,217	$ 4,346	$ 2,128	2.0	$ 0.0333
Energy Solutions for Multi-Family	74,760	$ 400	$ 3,930	$ 3,530	9.8	$ 0.0077
Energy Solutions for Manufactured Homes	74,732	$ 393	$ 3,364	$ 2,971	8.6	$ 0.0083
Residential Benchmarking Program	7,901	$ 324	$ 282	$ (42)	0.9	$ 0.0435
Residential Direct Load Control	2	$ 1,368	$ 4,324	$ 2,957	3.2	$ 835.9977
Energy Efficiency Arkansas	0	$ 198	$ -	$ (198)	0.0	n/a
Commercial Midstream	184,687	$ 2,401	$ 9,045	$ 6,644	3.8	$ 0.0201
C&I Solutions Program	1,351,232	$ 30,898	$ 54,386	$ 23,487	1.8	$ 0.0342
Small Business	338,417	$ 6,765	$ 13,010	$ 6,245	1.9	$ 0.0306
City Smart	278,562	$ 7,149	$ 10,992	$ 3,843	1.5	$ 0.0386
Agricultural Energy Solutions	76,872	$ 577	$ 2,551	$ 1,975	4.4	$ 0.0102
Agricultural Irrigation Load Control	0	$ 2,688	$ 3,853	$ 1,166	1.4	n/a
Bring Own T-stat Pilot	0	$ 69	$ -	$ (69)	0.0	n/a
Empty	0	$ -	$ -	$ -	n/a	n/a
Empty	0	$ -	$ -	$ -	n/a	n/a
Empty	0	$ -	$ -	$ -	n/a	n/a
Empty	0	$ -	$ -	$ -	n/a	n/a
Empty	0	$ -	$ -	$ -	n/a	n/a

Main Menu

Historical Data (Next Annual Report)

	Program Name	Target Sector	Annual Budget & Actual Cost 2016 Budget	2016 Actual	2017 Budget	2017 Actual	Annu 20 Plan
1.	Lighting & Appliances	Residential	$ 5,100,501	$ 4,723,152	$ 4,708,434	$ 4,521,562	31,321,000
2.	Home Energy Solutions	Residential	$ 15,097,877	$ 14,042,588	$ 11,798,620	$ 11,736,577	25,612,000
3.	Efficient Cooling Solutions	Residential	$ 2,620,953	$ 2,344,395	$ 2,608,580	$ 2,209,519	16,141,000
4.	Energy Solutions for Multi-Family	Residential	$ 701,785	$ 688,946	$ 1,087,309	$ 964,280	2,905,000
5.	Energy Solutions for Manufactured Homes	Residential	$ 634,547	$ 810,080	$ 1,066,973	$ 1,013,729	1,671,000
6.	Residential Benchmarking Program	Residential	$ 686,161	$ 598,198	$ 557,798	$ 468,626	6,328,000
7.	Residential Direct Load Control	Residential	$ 4,332,150	$ 4,052,965	$ 3,044,555	$ 2,064,063	0
8.	Energy Efficiency Arkansas	Residential	$ 326,589	$ 230,642	$ 198,507	$ 197,986	0
9.	Commercial Midstream	Commercial & Industrial	$ 1,153,018	$ 1,033,206	$ 1,228,253	$ 1,116,444	13,101,000
10.	C&I Solutions Program	Commercial & Industrial	$ 23,308,895	$ 19,748,340	$ 23,644,196	$ 21,195,549	110,073,000
11.	Small Business	Small Business	$ 3,247,526	$ 3,293,002	$ 4,184,886	$ 4,269,781	11,088,000
12.	City Smart	Commercial & Industrial	$ 4,265,759	$ 4,215,474	$ 3,664,805	$ 3,638,872	12,787,000
13.	Agricultural Energy Solutions	Agriculture	$ 965,016	$ 887,504	$ 1,018,569	$ 765,606	6,542,000
14.	Agricultural Irrigation Load Control	Agriculture	$ 3,522,940	$ 3,586,750	$ 3,092,606	$ 2,837,698	0
15.	Bring Own T-stat Pilot	Residential	$ -	$ -	$ 130,676	$ 68,912	0
16.	Empty		[redacted]	[redacted]	[redacted]	[redacted]	0
17.	Empty		[redacted]	[redacted]	[redacted]	[redacted]	0
18.	Empty		[redacted]	[redacted]	[redacted]	[redacted]	0
19.	Empty		[redacted]	[redacted]	[redacted]	[redacted]	0
20.	Empty		[redacted]	[redacted]	[redacted]	[redacted]	0
	Regulatory		$ -	$ 14,865	$ -	$ 72,440	
	Total Portfolio - Current Programs		**$ 65,963,717**	**$ 60,270,107**	**$ 62,034,767**	**$ 57,141,646**	**237,569,000**

Program Year	Company Statistics Revenue and Sales Revenue	Sales (kWh)	Expe Budget
2017	$ 1,739,545,000	20,888,455	##########
2016	$ 1,733,733,000	20,639,386	##########
2015	$ 1,820,805,000	21,160,228	##########
2014	$ 1,642,896,000	21,001,325	##########

[redacted]

ıal Net Energy Savings (kWh)			Annual Net Demand Savings (kW)			
16	2017		2016		2017	
Evaluated	Plan	Evaluated	Plan	Evaluated	Plan	Evaluated
53,871,110	29,927,961	50,040,143	3,600	8,160	6,533	9,908
24,842,378	22,638,739	25,757,464	9,000	8,535	10,440	10,122
10,724,845	17,446,000	9,548,026	8,600	3,348	10,228	2,908
2,794,597	3,011,306	6,111,955	700	865	1,716	2,526
1,620,786	1,996,069	4,690,095	600	192	393	1,083
8,142,462	9,118,435	7,901,231	4,500	5,863	6,718	5,351
52,172	0	1,734	27,300	28,099	35,000	37,612
0	0	0	0	0	0	0
10,411,844	11,466,158	12,312,436	2,500	1,886	1,654	3,452
91,431,787	109,920,001	98,073,142	15,100	11,123	17,364	12,174
17,197,779	13,247,024	23,005,941	1,700	2,024	2,841	2,817
25,040,969	12,806,791	19,940,702	2,100	4,410	2,598	3,203
7,159,184	6,551,697	7,609,051	900	965	937	1,040
0	0	0	14,900	17,027	31,000	12,216
0	0	0	0	0	580	0
[redacted]						
253,289,913	**238,130,182**	**264,991,920**	**91,500**	**92,496**	**128,003**	**104,412**

EE Portfolio		
nses	Savings (kWh)	
Actual	Budget	Actual
##########	238,130,182	264,991,920
##########	194,165	253,201
##########	186,555	229,268
##########	197,564	205,507

INTRODUCTION

Because of federal regulations, the NCWAP has a limited amount of funding it can use per house for health, safety and energy measures. If repair monies were not available from either federal or local sources, the home would be deferred. The Helping Home Fund filled this gap, allowing the NCWAP to serve customers who would have otherwise been deferred by service providers by providing the funding to make the needed repairs. Furthermore, North Carolina weatherization agencies' energy efficiency improvements waitlist had been experiencing lengthy delays, and customers were not getting work scheduled or completed. The funding provided additional services to customers and helped to leverage federal and state funds for maximum customer benefit and impact.

The Helping Home Fund focused on four main components:

01 Health and safety

02 Appliance replacement

03 Weatherization (in DEP territory only)

04 Heating/cooling system replacement and repair

In DEC territory, homes already had access to weatherization through the existing energy efficiency Weatherization Program.

LM Captures is Lockheed Martin's tracking and reporting system that service providers used to enter the individual home data for the program. The database required comprehensive data input for customer, home and project details to determine eligibility and track program expenditures and measure level detail by project type. All program activities, including QA/QC and reimbursement request/fulfillment, were also reported.

Funds for health and safety were originally capped at $800 per home, but due to customer needs learned throughout the program, the limit was later raised to $3,000. Health and safety measures included bath fans, vapor barriers, roof repairs, electrical/plumbing repairs, ingress/egress repairs, range repair and replacement, and water heater repair and replacement. Appliance replacement also started with an allotment of $800 per home, but this amount was increased to $2,000. This work included replacing inefficient appliances with ENERGY STAR® refrigerators, clothes washers, clothes dryers and room air conditioners.

Weatherization services were broken down into two tiers.

TIER 1

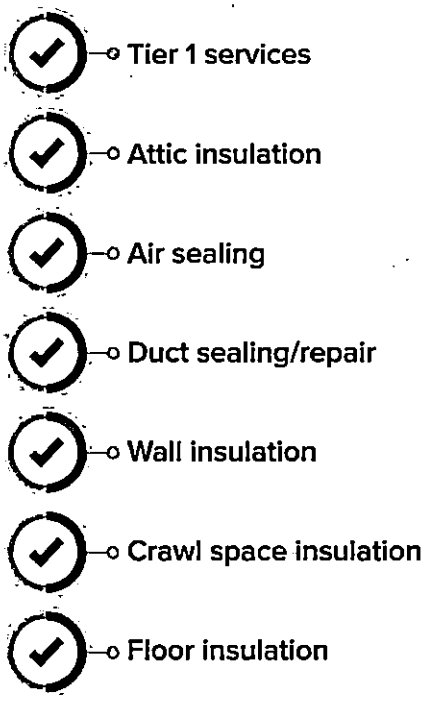
Tier 1 weatherization was for homes using < 7 kilowatt-hours (kWh) per square foot, < $0.23 per square foot oil/liquid propane (LP) gas heat, or < $0.38 per square foot oil/LP gas heat and water heating. Up to $600 was allotted for the following measures:

- ✓ Heating system tune-up and cleaning
- ✓ Heating system repair
- ✓ Water heater wrap and pipe wrap for electric water heaters
- ✓ Cleaning or replacement of electric dryer vents
- ✓ ENERGY STAR-certified compact fluorescent lamps (CFLs)
- ✓ Low-flow showerheads and aerators
- ✓ Weatherstripping doors and windows
- ✓ Energy education

INTRODUCTION

TIER 2

Tier 2 weatherization was provided to homes using ≥ 7 kWh per square foot, ≥ $0.23 per square foot oil/LP gas heat, or ≥ $0.38 per square foot oil/LP gas heat and water heating. Here, up to $4,000 was provided for the following:



Since heating/cooling systems account for the majority of an energy bill, 70 percent of the monies were allocated to improve customers' heating systems. The intent was to decrease customers' energy use, thereby providing them with more disposable income. Existing electric furnaces, electric baseboards, and oil or propane systems were replaced with high efficiency heat pumps (minimum 14 Seasonal Energy Efficiency Ratio [SEER] and 8.2 Heating Seasonal Performance Factor [HSPF]). In addition, many homes were found to have elderly residents with wood stoves, and new heating systems and ductwork were installed in these situations as well.

A maximum of $10,000 could be used for heating/cooling system replacement and repair ($6,000 max for heating/cooling and an additional $4,000 to upgrade electrical and/or install new ductwork). Consistent with Tier 2 weatherization, heating/cooling system replacement and repair required energy usage per year to meet the following requirements:

- **≥ 7 kWh per square foot,**
- **≥ $0.23 per square foot oil/LP gas heat, or**
- **≥ $0.38 per square foot oil/LP gas heat and water heating.**

High efficiency mini splits were allowed when a home did not have a centrally ducted system or the duct repairs exceeded an estimated threshold. Funds could also be used to upgrade the electrical system or repair/replace duct systems. All of the ductwork had to be insulated and sealed with mastic. Homes also had to have been weatherized as part of the installation of a new heating/cooling system, requiring proper sizing of the system.

STUDY DESCRIPTION AND METHOD

As the Helping Home Fund was nearing completion, Duke Energy had an interest in understanding the impacts of non-energy benefits among program participants and implementation service providers. Non-energy benefits can include a wide variety of improvements, such as those to economics, health, safety, quality of life and comfort. Studying and documenting these benefits helps determine the true cost-effectiveness of home energy programs and interventions.

In performing the analysis, the first step was to narrow down the array of potential non-energy benefits to specific ones to evaluate within the Helping Home Fund. The team selected health, safety, comfort, improved disposable income, and economic sustainability/community impact.

To measure these impacts, two surveys were developed (see Appendix I). One survey went to participating homeowners, and a second survey was administered to the service providers that implemented the program measures and coordinated the work. To supplement the survey results and further characterize the outcomes of the Helping Home Fund, the team conducted a literature review to monetize the non-energy benefits. The results of this component of the program can be found later in the report.

NON-ENERGY BENEFITS

HEALTH	Health included measures such as the number of doctor's visits, decreased asthma symptoms and other homeowner health effects.
SAFETY	Safety included homeowners' accessibility or ability to move about their homes, as well as electrical and durability issues.
COMFORT	Comfort addressed whether occupants felt that their homes were more comfortable.
DISPOSABLE INCOME	Disposable income looked at whether the Helping Home Fund provided homeowners with additional income to spend on other necessities.
ECONOMIC SUSTAINABILITY	Economic sustainability/community impact included effects on service provider employment and home deferrals, among others.

PROGRAM SUMMARY

The Helping Home Fund served 3,516 homes with an average of two projects each (e.g., appliance replacement, heating/cooling system replacement/ repair, health and safety measures). Homeowner incomes had to be below 200 percent of federal poverty guidelines to participate. The homes were assessed by local service providers serving low-income customers to determine what measures were most appropriate. The work was then completed by either service provider-based crews or subcontractors.

The homes were reported and tracked on a project level. Table 2 shows the average dollars spent per project category.

TABLE 2 • AVERAGE DOLLARS SPENT PER PROJECT

	APPLIANCES	HEALTH & SAFETY	HEATING/COOLING REPLACEMENT/ REPAIR	WEATHERIZATION TIER 1	WEATHERIZATION TIER 2	TOTAL
TOTAL SPENT	$1,570,742	$2,639,385	$12,784,018	$100,217	$1,018,932	$18,113,294
NUMBER OF PROJECTS	1,676	2,731	1,878	323	488	7,096
PROJECT TOTAL	$937	$966	$6,807	$310	$2,088	$2,553

Through the heating/cooling system replacements and repairs, more than 1,300 homes went from non-functioning to functioning heating systems (Table 3).

TABLE 3 • PRE-RETROFIT HEATING BREAKDOWN OF HOMES RECEIVING HEATING REPLACEMENT

EXISTING FUEL TYPE	NUMBER FUNCTIONING	NUMBER NON-FUNCTIONING	TOTAL
WOOD	7	26	33
ELECTRICITY	410	1,060	1,470
KEROSENE	9	9	18
NATURAL GAS	1	14	15
OIL/LP	107	222	329
NO HEAT	0	13	13
TOTAL	534	1,344	1,878

Note. All heating types converted to heat pumps with a SEER of 14 or greater.

The majority of homes (92 percent) were single-family detached and mobile homes. The remaining were multifamily units and townhomes or condominiums (Table 4).

TABLE 4 • BREAKDOWN OF HOMES SERVED BY THE HELPING HOME FUND

	SINGLE-FAMILY DETACHED	MOBILE HOME	MULTIFAMILY (5+ UNITS)	MULTIFAMILY (2-4 UNITS)	TOWNHOME/ CONDO	TOTAL
NUMBER OF HOMES	2,362	858	196	67	33	3,516

PROGRAM SUMMARY

The subset of customers that responded to the homeowner survey provided information regarding the number of children, elderly, and individuals with disabilities or respiratory illness (Table 5). With these varying degrees of vulnerability, it can be difficult for occupants to stay in their homes. The Helping Home Fund was able to provide services to populations that may not have otherwise been reached.

TABLE 5 • HELPING HOME FUND SURVEY RESPONSE

OCCUPANT CATEGORY	NUMBER OF OCCUPANTS
UNDER THE AGE OF 18	112
OVER THE AGE OF 60	275
IDENTIFY AS DISABLED	237
IDENTIFY AS HAVING A RESPIRATORY ILLNESS	171

Note. Included data from 317 survey respondents.

The Helping Home Fund spending on each participating home ranged from $114.32 to $19,825.31, with an average of $5,151. Additional funding sources were used on these homes as well, including the NCWAP, PNC Home Beautification and the NCHFA (Table 6). NCWAP funds were used for heating/cooling systems and weatherization, while PNC Home Beautification focused on exterior improvement, such as landscaping, painting and roofing. NCHFA funds were used for heating/cooling systems, weatherization and structural repairs. Therefore, although a house received an average of $5,151 through the Helping Home Fund, additional work may have been performed thanks to these other funding sources.

> **"We are no longer cold during the winter and hot in the summer."**

TABLE 6 • HELPING HOME FUND LEVERAGED FUNDS (2015-2017)

SOURCE	AMOUNT LEVERAGED
NCWAP (INCLUDES DOE WAP AND LIHEAP)	$17,321,491
PNC HOME BEAUTIFICATION	$250,000
NCHFA	$234,000

Note. Unable to obtain data for amount leveraged from other private funding.

To ensure that measures were installed correctly and funding was properly documented, randomly selected QC inspections were performed on completed jobs. At least 10 percent of homes with health and safety projects, appliance replacement or weatherization measures received QC, along with at least 25 percent of homes with heating/cooling system replacements and repairs.

QC inspectors conducted monitoring visits to evaluate effectiveness, safety, workmanship and compliance with program guidelines. They also addressed educational opportunities with local providers and customers during the on-site verification process. The process included a paper file review as well as an on-site visit with representation from a service provider. All measures installed with Duke Energy funds were verified to be present and compliant with work orders and materials invoiced. The quality of the workmanship was also evaluated, and QC inspection results were documented and discussed.

All QC documentation, on-site inspection details, reports and actions were uploaded into LM Captures. QC return visits were minimal, and all issues were addressed.

SURVEYS

The surveys sought to gauge the non-energy benefits and impacts of the Helping Home Fund. The full surveys, as well as responses from homeowners and service providers, can be found in Appendices I-III.

Homeowner Survey

The homeowner survey was designed to understand how the Helping Home Fund affected program occupants. Homeowners were randomly selected, and outbound calls were conducted by Duke Energy's call center for approximately one month. A total of 901 homeowners were contacted, with 317 completing the survey (a 35 percent completion rate).

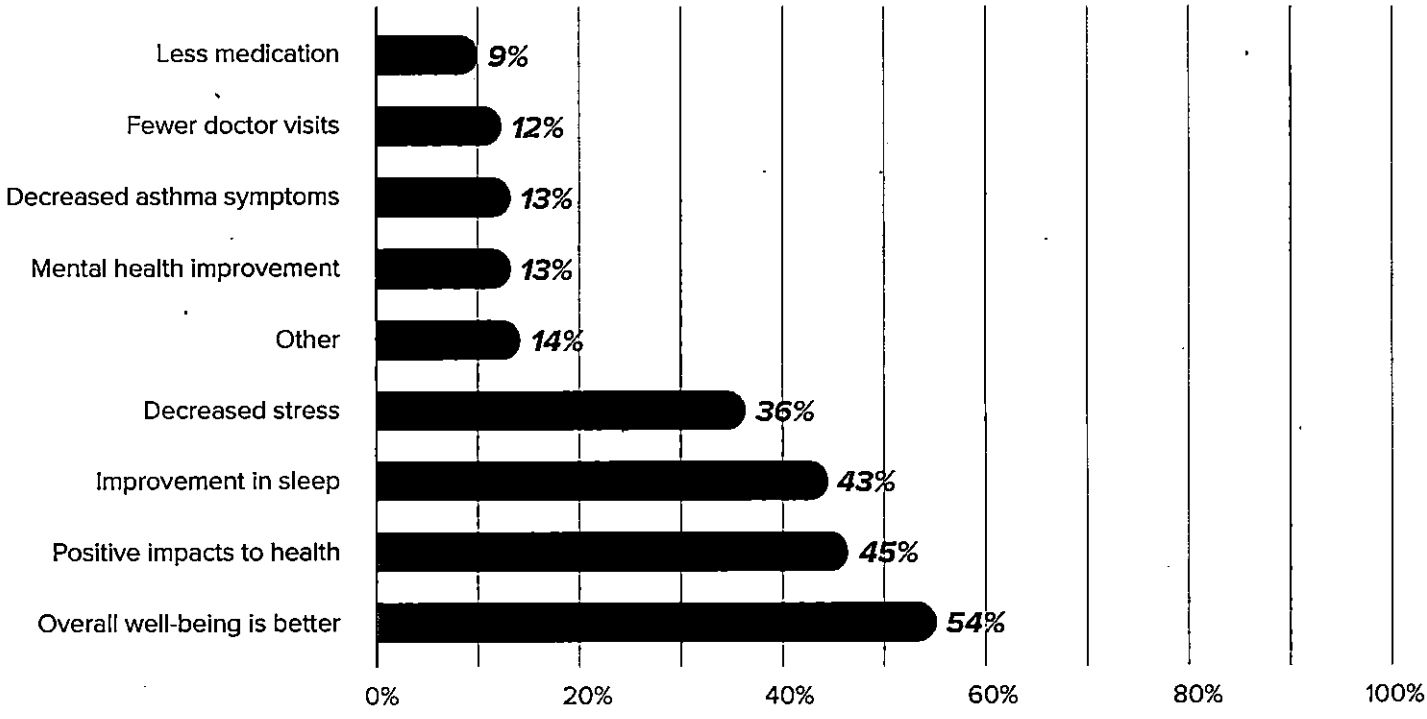
The homeowners overall had a highly positive view of the Helping Home fund. Ninety-two percent of respondents reported feeling safer in their homes, and 81 percent said they have better home accessibility (e.g., getting into and out of the home). Additionally, 91 percent said the improvements from the Helping Home Fund made it possible for them to stay in their current location, and 96 percent responded that their lives have been made easier in some form. "They did a good job and it really helped me a long way," said one homeowner. "They put windows in my home so it feels warmer and I truly appreciate everything that you all did."

> **"My light bill has been a lot lower, so that helps me have extra money. My water bill has been lower too. It has been a lot better than in years past."**

Forty-nine percent of respondents indicated that the Helping Home Fund upgrades definitely allowed them to have more money available to pay for other necessities, while an additional 29 percent said they somewhat did.

FIGURE 1 • HOMEOWNER SURVEY RESPONSES

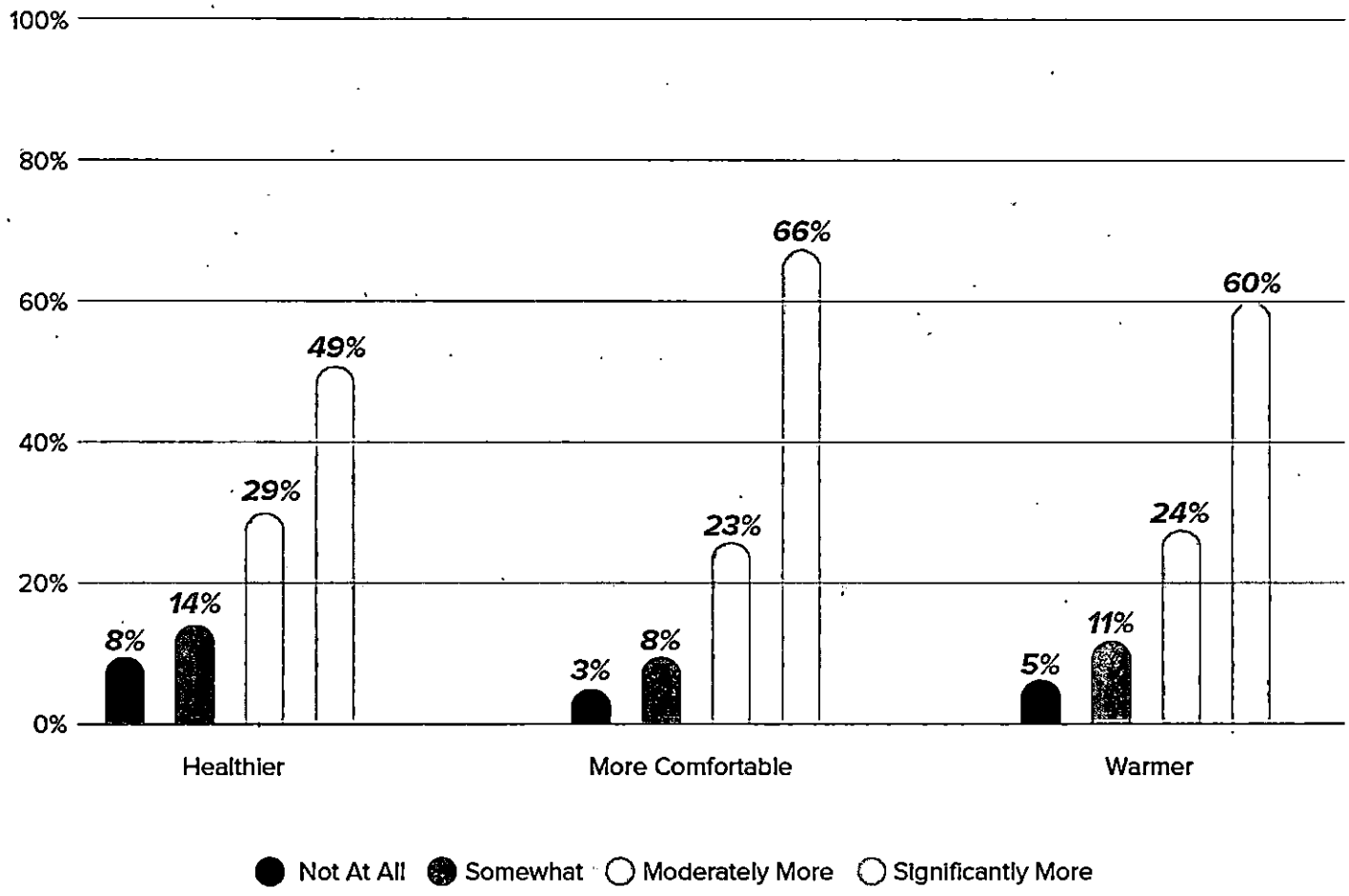
Survey question: Have you (or any family members) noticed any positive health impacts due to the upgrades to your home? Check all that apply.



Homeowners reported a number of positive health impacts for themselves and their families, including better overall well-being, sleep improvement and decreased stress (Figure 1). "If it wasn't for Duke I could still be in the hospital. Heat affects me very bad with my medical condition so to feel cooling has made a world of difference. I am now able to keep my body temperature down," reported one homeowner. Likewise, homeowners said they generally feel healthier, more comfortable and warmer as a result of

FIGURE 2 • HOMEOWNER SURVEY RESPONSES

Survey question: Are you healthier / more comfortable / warmer in your home because of the improvements made?



Service Provider Survey

The service provider survey was developed to assess the effects of the Helping Home Fund on participating service providers, their crews and subcontractors, and the homeowners they served. Twenty-four participating service providers were sent the survey via email, and all responded. The service providers had a very positive view of the Helping Home Fund. They applauded the staff, communication, benefits to homeowners, flexibility and reimbursement process. According to one service provider, "Overall, (the) Helping Home Fund has been both impactful for the community and rewarding for our agency to serve others in need. We would love to be considered for future opportunities."

In particular, service providers praised the Helping Home Fund for its effect on low-income homeowners: Every provider responded that the program had a positive influence. They reported that an average of 44 percent of the homes they worked on through the Helping Home Fund would have otherwise been deferred.

Fifty-four percent of respondents felt there was a strong positive influence of the Helping Home Fund on the local community. In terms of service provider hiring, 46 percent of service providers indicated that the program affected staff employment, 4 percent said it somewhat did, and 50 percent said it did not.

The most commonly completed measures by service provider-based (i.e., agency-based) crews included insulation and air sealing, duct sealing and structural repairs to roofs, stairs, railings and windows (Table 7). Subcontractors also performed substantial work. Service providers reported that during 2015 and 2016, subcontractors were hired to help complete over 90 percent of jobs, which included electrical work, heating/cooling system repair or replacement, and plumbing (Table 7). All service providers noted that the quality of the contractor crews was either good or excellent, and most (83 percent) did not have difficulty finding contractors to work on homes. When there was difficulty, it was typically regarding electrical contractors.

> **"It has allowed us to serve more people in our counties that would not have gotten any service this fiscal year."**

The service providers reported receiving funding from a variety of sources in addition to the Helping Home Fund. As noted earlier, more than $17 million was leveraged from the NCWAP, NCHFA and PNC Home Beautification, as well as other undisclosed funding sources. Service providers noted some variability and uncertainty in funding over the last five years. One

TABLE 7 • SERVICE PROVIDER SURVEY RESPONSES

Survey question: What measures did you install with an agency-based crew? What measures did you install using subcontractors? Check all that apply.

MEASURE	NUMBER OF SERVICE PROVIDERS USING AGENCY-BASED CREWS	NUMBER OF SERVICE PROVIDERS USING SUBCONTRACTORS
PLUMBING	2	19
ELECTRICAL	2	23
HEATING/COOLING REPAIR/REPLACEMENT	2	22
INSULATION/AIR SEALING	13	13
DUCT SEALING	13	11
STRUCTURAL REPAIRS	11	13

SURVEYS

service provider stated, "With the support of (the) Helping Home Fund, we were able to expand service delivery to Duke Energy Progress customers. Our agency's primary funding source was limited for FY 2017; therefore, Helping Home Funds were leveraged and resulted in more customers receiving home improvements to support energy use reduction and for some improved health conditions. In addition, the opportunity to complete appliance replacement might not have happened without Helping Home Funds."

MONETIZING NON-ENERGY IMPACTS

To get a better understanding of the monetization of non-energy impacts of the Helping Home Fund, we examined prior studies and program analyses. We relied heavily on a study conducted by Tonn, Rose, Hawkins, and Conlon (2014), which monetized non-energy benefits from the DOE WAP. This study was relevant for a number of reasons, including its focus on low-income housing and the overlap in non-energy measures being explored. It also used a robust sample size, attributing results to more than 80,000 homes.

Tonn et al. (2014) used a variety of approaches to monetize the non-energy impacts. The researchers evaluated pre- and post-weatherization survey data, relied on objective cost data from existing databases where available, and then performed monetization exercises to calculate the lifetime benefit over 10 years. The researchers categorized their results into three tiers based on the reliability of the outcomes. Tier 1 estimates were the most reliable, followed by Tiers 2 and 3. Tonn et al. also considered the value of lives saved in their analyses.

We also included data from a literature review from Schweitzer and Tonn (2003). The researchers reviewed approximately 25 articles; some were reports that presented primary research from previous weatherization programs, and others used a meta-analytic approach to examine multiple studies. This effort led to a large set of non-energy benefits, many of which were not addressed by Tonn et al. (2014). Using the available data from the prior literature, Schweitzer and Tonn selected a point estimate for individual non-energy benefits to represent an average value that could be applied to nationwide weatherization programs. In this case, monetized values were calculated using a lifetime benefit over 20 years.

Tables 8 through 12 contain the relevant non-energy benefit monetization estimates from Tonn et al. (2014) and Schweitzer and Tonn (2003). We took certain steps to err on the side of caution with the data to avoid overestimating the monetized values. For Tonn et al., we de-rated their Tier 2 estimates (by 50 percent) and Tier 3 estimates (by 75 percent). We also did not take into account the value of lives saved. For Schweitzer and Tonn, when calculating the monetized value of all non-energy impacts, we only took into account the environmental benefit associated with natural gas, the lower value, and not electricity. All estimates were converted to 2017 dollars using historical consumer price index data.

MONETIZING NON-ENERGY IMPACTS

TABLE 8 • MONETIZATION OF ECONOMIC AND SOCIAL BENEFITS

Tonn et al. (2014) and Schweitzer and Tonn (2003)

NON-ENERGY BENEFIT	MONETIZED VALUE FROM TONN ET AL. (2014) *VALUES BASED ON 10-YEAR LIFETIME BENEFIT*	MONETIZED VALUE FROM SCHWEITZER AND TONN (2003) *VALUES BASED ON 20-YEAR LIFETIME BENEIFT*
INCREASED PROPERTY VALUE		$244.80
DIRECT AND INDIRECT EMPLOYMENT		$1,089.36
AVOIDED UNEMPLOYMENT BENEFITS		$159.12
NATIONAL SECURITY		$436.56
REDUCED MOBILITY		$378.08
LOST RENTAL		$1.36
IMPROVED WORKPLACE PRODUCTIVITY (SLEEP)	$512.17	
IMPROVED HOUSEHOLD PRODUCTIVITY (SLEEP)	$375.44	
FEWER MISSED DAYS AT WORKS	$227.62	
WATER/SEWER SAVINGS		$368.56
REDUCED NEED FOR SHORT-TERM LOANS	$39.99	
REDUCES TRANSACTION COSTS		$50.32
TOTAL	$1,155.22	$2,728.16

TABLE 9 • MONETIZATION OF HEALTH AND SAFETY BENEFITS

Tonn et al. (2014) and Schweitzer and Tonn (2003)

NON-ENERGY BENEFIT	MONETIZED VALUE FROM TONN ET AL. (2014) *VALUES BASED ON 10-YEAR LIFETIME BENEFIT*	MONETIZED VALUE FROM SCHWEITZER AND TONN (2003) *VALUES BASED ON 20-YEAR LIFETIME BENEIFT*
CO POISONING*	$4.19	
FEWER FIRES	$50.04	$92.48
FEWER ILLNESSES		$74.80
THERMAL STRESS (COLD)	$194.28	
THERMAL STRESS (HEAT)	$95.79	
ASTHMA RELATED	$2,270.09	
REDUCED NEED FOR FOOD ASSISTANCE	$940.16	
INCREASED ABILITY TO AFFORD PRESCRIPTIONS	$1,090.01	
REDUCED LOW-BIRTH WEIGHT BABIES FROM HEAT-OR-EAT COMPROMISE	$55.96	
TOTAL	$4,700.52	$167.28

*Note. *CO poisoning used a 5-year lifetime benefit.*

MONETIZING NON-ENERGY IMPACTS

TABLE 10 • MONETIZATION OF UTILITY SERVICE BENEFITS

Tonn et al. (2014) and Schweitzer and Tonn (2003)

NON-ENERGY BENEFIT	MONETIZED VALUE FROM TONN ET AL. (2014) *VALUES BASED ON 10-YEAR LIFETIME BENEFIT*	MONETIZED VALUE FROM SCHWEITZER AND TONN (2003) *VALUES BASED ON 20-YEAR LIFETIME BENEIFT*
CARRYING COST OF ARREARAGES		$77.53
BAD DEBT WRITE-OFF		$121.04
FEWER SHUTOFFS AND RECONNECTIONS FOR DELINQUENCY		$10.88
AVOIDED RATE SUBSIDIES		$28.56
INSURANCE SAVINGS		$1.36
REDUCED GAS SERVICE EMERGENCY CALLS		$137.36
FEWER NOTICES AND CUSTOMER CALLS		$8.16
TRANSMISSION AND DISTRIBUTION LOSS REDUCTION		$65.28
AVOIDED SHUTOFFS AND RECONNECTIONS		$23.12
TOTAL	$0	$473.29

TABLE 11 • MONETIZATION OF ENVIRONMENTAL BENEFITS

Tonn et al. (2014) and Schweitzer and Tonn (2003)

NON-ENERGY BENEFIT	MONETIZED VALUE FROM TONN ET AL. (2014) *VALUES BASED ON 10-YEAR LIFETIME BENEFIT*	MONETIZED VALUE FROM SCHWEITZER AND TONN (2003) *VALUES BASED ON 20-YEAR LIFETIME BENEIFT*
AIR EMISSIONS - ELECTRICITY		$1,324.64
AIR EMISSIONS - NATURAL GAS		$435.20
OTHER BENEFITS		$745.64
TOTAL	$0	$2,505.48

TABLE 12 • MONETIZATION OF ALL NON-ENERGY BENEFITS

Tonn et al. (2014) and Schweitzer and Tonn (2003)

NON-ENERGY BENEFIT	MONETIZED VALUE FROM TONN ET AL. (2014) *VALUES BASED ON 10-YEAR LIFETIME BENEFIT*	MONETIZED VALUE FROM SCHWEITZER AND TONN (2003) *VALUES BASED ON 20-YEAR LIFETIME BENEIFT*
ALL	$5,856	$4,550

Note. The total monetized value from Schweitzer and Tonn (2003) excludes air emissions associated with electricity.

MONETIZING NON-ENERGY IMPACTS

The two studies reveal that weatherization and other energy efficiency upgrades can produce a wealth of non-energy benefits with values in the thousands of dollars. At the same time, it is worth noting the lack of overlap in the impacts that Tonn et al. (2014) and Schweitzer and Tonn (2003) examined. Therefore, the overall value of non-energy benefits may be even higher than those reported here.

Given the similarities in the housing stock, occupants and measures installed in the Tonn et al. (2014) and Schweitzer and Tonn (2003) studies when compared to the Helping Home Fund, it is possible to assume that participants in the Helping Home Fund received a similar level of non-energy benefits. Even with our conservative estimates, the non-energy benefits associated with the Helping Home Fund, then, could approach an average of $10,000 per home (the sum of the total non-energy benefits from the two studies). Indeed, the homeowner survey results confirm that those participating in the program did receive non-energy benefits, from health improvements to enhanced comfort and increased ability to stay in their homes. These benefits can be particularly important for occupants who are children, elderly, or have disabilities, respiratory illness or asthma.

The Helping Home Fund was not designed to reduce overall energy use but rather to provide other benefits to low-income customers, such as improved health, comfort and safety. For example, approximately 35 percent of the homes had non-functioning heating systems and the program was able to provide new systems to these customers. The program also provided new washers, dryers and room air conditioning units, since other programs typically did not address this. However, because the program highly leveraged the NCWAP, we can assume that these customers would also receive energy benefits. Based on the literature review, DOE WAP achieves average lifetime energy savings of $4,890 per home (Tonn, Carroll et al. 2014).

Table 13 summarizes the average costs and benefits for participating homes based on total invested funds and estimated benefits from the literature review.

TABLE 13 • SUMMARY OF COSTS AND BENEFITS FOR HELPING HOME FUND

	AVERAGE PRESENT VALUE PER HOME	PRESENT VALUE FOR TOTAL HOMES
ENERGY BENEFITS (COST SAVINGS)[1]	$5,115.33	$17,985,500
NON-ENERGY BENEFITS[2]	$10,312.83	$36,259,910
ECONOMIC AND SOCIAL	$3,883.38	$13,653,964
HEALTH AND SAFETY[3]	$4,775.32	$16,790,025
UTILITY SERVICE	$473.29	$1,664,088
ENVIRONMENTAL[4]	$1,180.84	$4,151,833
TOTAL BENEFITS	$15,428.16	$54,245,410
TOTAL COSTS	$10,124.37	$35,597,294
HELPING HOME FUNDS	$5,151.68	$18,113,294
LEVERAGED FUNDS	$4,972.69	$17,484,000

1. Value based on Tonn, Carroll et al. (2014)
2. Value (and subcategories below) based on summed benefits of Tonn et al. (2014) and Schweitzer and Tonn (2003)
3. Uses the lower monetized estimate of fewer fires, from Tonn et al. (2014)
4. Excludes air emissions associated with electricity from Schweitzer and Tonn (2003)

CHALLENGES AND LESSONS LEARNED

- The NCCAA was the appropriate choice for administering these funds, forming a valuable relationship with Duke Energy. The NCCAA provided access to a network of service providers who were already intricately involved in low-income communities across the state. These service providers were able to quickly access homeowners who met the requirements for participation in the Helping Home Fund. The NCCAA also saw value in being involved with individual agencies throughout the implementation of the program, getting to know their particular challenges and strengths. With this experience and data, the NCCAA is able to provide recommendations to the NCWAP to improve overall performance.
- The NCCAA collaborated with Lockheed Martin to assist with the administrative duties of the program. Lockheed Martin is a strong partner, providing invaluable recommendations for program implementation, QC and data documentation. In addition, Lockheed Martin oversaw key communication and training with service providers that kept the program running smoothly. The ability to adapt and be flexible with service providers, who had varying degrees of experience with implementing programs, was essential.
- Funding levels for individual measures (health and safety - $800 and appliances - $800) were initially too low, resulting in huge requests for exceptions. As a result of these requests, funding for health and safety was increased to $3,000 per home and appliances to $2,000 per home in 2016.
- Funding allocation for administrative costs (5 percent) was insufficient for some of the service providers; however, this could not be changed due to the regulatory filing.
- Delays in obtaining contracts and funding between the service providers and the NCWAP caused issues with completing projects in a timely manner.
- While the data collection process was thorough, some data was not collected during this initial spending cycle but was later learned through the customer surveys. In the future, the Helping Home Fund may consider including the following in data collection:
  - **Number of occupants by age group (to capture number of elderly/children)**
  - **Number of occupants with asthma or disabilities**
  - **Tracking of leveraged funds per home**
  - **Tracking of when measures are installed**
  - **Pre-retrofit survey of homeowners**
- Now that the service providers have been oriented and trained to the program, it should be less costly for them to support the program.
- Based on some of the homeowner surveys, it was determined that they did not realize Duke Energy had funded some of their repairs. While a brochure was developed and available for the agencies to provide homeowners, its use may have dwindled over time. There is an opportunity for better marketing of the program to both homeowners and local communities.
- There were mixed reviews of LM Captures, which is understandable when working with a network of providers with varying degrees of experience with technology and availability of local resources. Role-based dashboard reports provided updates for status and planning. The NCCAA and Lockheed Martin worked closely with service providers to provide one-on-one customer service and support during program launch

CHALLENGES AND LESSONS LEARNED

and throughout the program. Feedback from service providers has resulted in ongoing updates to LM Captures, including easily identified required fields, less data entry on the home page, additional options in drop-down selections and revisions to heating/cooling data entry fields.

- Programs such as the Helping Home Fund are not designed to pass energy efficiency tests. Therefore, the utility only receives funds in special cases, such as during rate cases or mergers. However, evaluating non-energy benefits in addition to traditional energy benefits can help determine the true cost-effectiveness of these programs, and allow the utility to capture the benefits such a program can offer.

- Weatherization service providers are limited in the funds they can spend on health and safety measures, causing many homes to be deferred each year. Working closely with service providers ensured that they used the Helping Home Fund monies in the anticipated manner. This funding source, along with others such as the NCHFA's Single Family Rehab program, works well with WAP so that homes can be retrofit, and homeowners benefit from access to multiple programs that can address different needs. As one example, the Macon County Housing Department "was able to use the monies from the Helping Home Fund in conjunction with other programs such as the Urgent Repair Program, LIHEAP Heating and Air Repair and Replacement Program (HARRP), Single Family Rehab Program and the Weatherization Program."

- Leveraging other programs, while a benefit, was also a challenge for some service providers. It took time for providers to learn how to effectively use different funding sources on the same homes. To help them get up to speed, the Helping Home Fund used multiple methods to train service providers, including webinars, on-site training and ongoing mentoring. Overall, they found that one-on-one training was more effective than group training. The QC field visits were an additional training opportunity for service providers.

NEXT STEPS

The Helping Home Fund recently received an additional $2.5 million when Duke Energy merged with Piedmont Natural Gas. This money will go toward a similar program and will be used in the following ways: $800 for heating/cooling repair and/or maintenance, $3,000 for health and safety, and $2,000 for appliance replacement (refrigerators, washers, dryers, room air conditioners and dehumidifiers). Duke Energy decided to reduce the allocation toward heating/cooling systems due to the limited funding, and to allow the funds to be available over a 12-18 month period.

With the success of the Helping Home Fund, the team is sharing its experience with stakeholders around the country so that others may learn from it and build upon it.

REFERENCES

- LM Captures database, developed and maintained by Lockheed Martin.
- Schweitzer, M., & Tonn, B. (2003). Non-energy benefits of the US Weatherization Assistance Program: A summary of their scope and magnitude. Applied Energy, 76, 321-335.
- Tonn, B., Carroll, D., Pigg, S., Blasnik, M., Dalhoff, G., Berger, J., Rose, E., Hawkins, B., Eisenberg, J., Ucar, F., Bensch, I., & Cowan, C. (2014). Weatherization Works - Summary of Findings from the Retrospective Evaluation of the U.S. Department of Energy's Weatherization Assistance Program. Retrieved from http://weatherization.ornl.gov/Retrospectivepdfs/ORNL_TM-2014_338.pdf
- Tonn, B., Rose, E., Hawkins, B., & Conlon, B. (2014). Health and household-related benefits attributable to the Weatherization Assistance Program. Retrieved from http://weatherization.ornl.gov/Retrospectivepdfs/ORNL_TM-2014_345.pdf

ABBREVIATIONS AND ACRONYMS

DEC	Duke Energy Carolinas
DEP	Duke Energy Progress
DOE	Department of Energy
HHF	Helping Home Fund
HSPF	Heating Seasonal Performance Factor
LIHEAP	Low Income Home Energy Assistance Program
LM Captures	Database developed and maintained by Lockheed Martin
kWh	Kilowatt-hours
LP	Liquid Propane
NCCAA	North Carolina Community Action Association
NCHFA	North Carolina Housing Finance Agency
NCWAP	North Carolina (State) Weatherization Assistance Program
PNC Home Beautification	Fund offered by PNC bank
QA	Quality Assurance
QC	Quality Control
SEER	Seasonal Energy Efficiency Ratio
WAP	Weatherization Assistance Program

HOMEOWNER SURVEY

Intro Section: (Provide context and explain the value of participating in the survey)

Hello, my name is _____ and I am calling on behalf Duke Energy. I'm calling today because your household participated in a program to receive free home improvements through the XXX Weatherization Agency. As part of this program, a contractor would have come into your home and installed free energy saving products and made home improvements. We would like to take just a few minutes to ask you a few questions.

Are you the person in your household who is most familiar with the improvements that were made to your home?

- ▫ Yes
- ▫ No
- ▫ Don't know
- ▫ Refused

We're speaking with customers who have participated in the program to complete a short survey to learn about their experience and satisfaction with the program. This is not a sales call, and all of your responses will be kept confidential.

Homeowner questions

1. How many children under the age of 18 currently live in the home?
2. How many people over the age of 60 currently live in the home?
3. How many residents in your household identify as disabled?
4. How many residents in your household identify as having a respiratory illness (e.g., asthma)?
5. Can you recall any of the weatherization improvements that were specifically made to your home?
6. Are you aware that the Duke Energy Helping Home Funds were used in your home?
7. If yes, do you know which improvements were paid for by HHF?

8-10. Are you healthier / more comfortable / warmer in your home because of the improvements made?

- ▫ Not at all
- ▫ Somewhat
- ▫ Moderately more
- ▫ Significantly more

11. Have the upgrades to your home allowed you to have more money available to pay for other necessities?

- ▫ Definitely
- ▫ Somewhat
- ▫ No

12. Have you (or any family members) noticed any positive health impacts due to the upgrades to your home? Check all that apply.

▫ Positive impacts to health, Less doc visits, overall well-being is better, mental health improvement, improvement in sleep, decreased stress, less medication, decreased asthma symptoms, Other (fill in the blank)

13. Have the improvements made on your house made it possible for you to remain at home (as opposed to needing to move to another location)?

- ▫ Yes
- ▫ No

14. Has your life been made easier through these upgrades?

- ▫ Yes
- ▫ No

15. Do you have better accessibility or access to your home because of these upgrades (e.g., ability to get in and out of your home)?

- ▫ Yes
- ▫ No

16. Do you feel safer in your home (e.g., from injury due to durability issues)?

- ▫ Yes
- ▫ No
- ▫ Somewhat

(If yes or somewhat, please describe)

17. Any other comments regarding Duke Energy's Helping Home Fund you would like to share?

That is all the questions I have today. Thank you so much for your time and have a great day.

Service Provider Survey

Duke Energy launched the Helping Home Fund in North Carolina in January 2015. This fund was designed to assist low-income customers with managing their energy costs while also addressing health and safety. As the first round of funding comes to a close, we are reaching out to participating Weatherization Agencies to hear your feedback. We want to learn about your experience with the program, as well as gather data on how the program impacted local communities. We sincerely appreciate you taking the time to provide responses to the following questions.

Service provider questions

1. Contact Info:
   - ▫ Name
   - ▫ Agency
2. Has the Helping Home Fund had a positive impact on the low-income homeowners that you serve?
   - ▫ Yes, Somewhat, No
3. Have you noticed any positive effects on the local community (beyond the occupants of the homes) from your participation in the Helping Home Program?
   - ▫ Yes, Somewhat, No
4. What % of homes were you able to work on that would have been deferred because of the Helping Home Fund?
5. Did the Helping Home Program have an impact on how many staff your agency employed during the program years?
   - ▫ Yes, Somewhat, No
6. What types of funding does your agency receive on an annual basis? Check all that apply.
   - ▫ LIHEAP
   - ▫ NCHFA
   - ▫ DOE Weatherization
   - ▫ Utility Funds
   - ▫ PNC Beautification Funding
   - ▫ Private Funds
   - ▫ Other (_____)
7. Has that funding varied over the last five years? If yes, please explain to what degree it has varied.
8. What measures did you install with an agency-based crew?
   - ▫ Plumbing
   - ▫ Electrical
   - ▫ HVAC Repair or Replacement
   - ▫ Insulation/Air Sealing
   - ▫ Duct Sealing
   - ▫ Structural Repairs (Roof, Stairs, Railing, Windows)
9. Did the Helping Home Fund impact your ability to retain an agency-based work crew?
   - ▫ Yes, Somewhat, No
10. What measures did you install using subcontractors?
    - ▫ Plumbing
    - ▫ Electrical
    - ▫ HVAC Repair or Replacement
    - ▫ Insulation/Air Sealing
    - ▫ Duct Sealing
    - ▫ Structural Repairs (Roof, Stairs, Railing, Windows)
11. How was the overall quality of contractor crews?
    - ▫ Excellent / Good / Fair / Poor (If fair or poor, please explain what was lacking)
12. Did your agency have difficulty finding local contractors to work on homes?
    - ▫ Yes, Somewhat, No
13. If yes, any suggestions of what could help remedy this situation?
14. If yes, how did this affect what work was completed?

APPENDIX I • SURVEYS

15. If yes, what type of contractors did you having trouble finding?
    - ▫ Plumbing
    - ▫ Electrical
    - ▫ HVAC Repair or Replacement
    - ▫ Insulation/Air Sealing
    - ▫ Duct Sealing
    - ▫ Structural Repairs (Roof, Stairs, Railing, Windows)
16. What percentage of jobs did you hire subcontractors to help you complete the work in 2015 and 2016?
17. If the Helping Home Fund was to be continued as a program, what improvements / changes would you suggest?
18. What worked well about the program?
19. Were there any houses or families that stood out with regard to the impact you observed from participation in the program?
20. Is there anything you want to tell us about your experience with this program?
21. Can we contact you with additional questions? If yes, Name, email address, phone number.

APPENDIX II • HOMEOWNER RESPONSES

I really like the program. Years before I didn't know about different things to make my home efficient. I have told people about it too. I feel like Duke Energy really tried to help people. Thank you so much.

. . . . . .

I am so amazed by all Blue Ridge took care of for me with my new ac, the insulation, the moisture barrier the sensor for carbon monoxide and the replacing of my duct work. I am also happy to learn that Duke Energy had a hand in this too. Kudos to Duke Energy. Keep doing what you all doing. I have a testimony about everything that was done for me. I am so grateful. Mr. Dale and his crew were amazing. They did an outstanding job. They gave me a sense of everything going to be alright. The inspector was also great and offered his number to if anything should go wrong with my unit to call him. They did everything they said and much much more. This program is great for older disabled people like me. Anytime you need live customer data or feedback, please call me because I have nothing but good things to say about Blue Ridge and Duke Energy.

. . . . . .

I just want to say everybody was nice and good to me. I thank you all. I love my new ac unit. I didn't know Duke Energy was responsible for doing that. I don't have to worry about that being done anymore. This is a good thing to have and I am thankful.

. . . . . .

It was very helpful and nice to know assistance is out there for people who may be in a struggle. This is wonderful program also for older customers or those with health issues. I was more concerned with the efficiency of my home and the insulation has been great since added. I'm not worried about how often my units cycles on and off.

. . . . . .

Everybody was so kind that came out. Very polite and were courteous to take off their shoes and not track dirt into the home. They also cleaned up after themselves. Very thoughtful. I am thankful for the good Lord to make something like this available to me. The agency also helped replace the faucets and I got light bulbs. I am very thankful for this program. I'm not sure if anything can be done or if someone can direct me, but I am in need of windows. The windows I have now are terrible. I'm using duct tape and plastic to close them shut. I would just love if someone could help guide me to a agency or a program that can help me with my windows.

. . . . . .

I thank God for the program. Really overwhelmed with joy and happiness that there was such a program available to help me.

. . . . . .

Appreciate this program so much. Helped me because I would have had to find another job to have to done some of the things that were done, especially the new heat pump that was installed. I was blessed with this program and to be able to qualify. I am thankful. It didn't push me into anymore debt and although I am on a fixed income at 73 yrs. old I can still pay my bills and not scraping to make ends meet.

. . . . . .

It's the best thing that happened to me, I couldn't afford to have these structure repairs done.... wonderful thing to happen to me it's highly blessing that fell on me!!! the best thing that could have happened for me! So grateful and thankful

. . . . . .

All of them were very nice people. I am definitely appreciative of having an electrical heating system in my house. I feel safer now since I don't have to mess with the kerosene heating and worrying about it tipping over or not changing the filter or the possibility o hit burning down more house.

Where the back porch was they built steps with a handrail... I was very appreciative, I needed the work done and had no idea how I was going to do it, I was so happy to qualify for the program.... it was a blessing.... I said my prayers and this happened... I really appreciate it....

. . . . . .

I am so grateful.....when the contractors came out to my house - I cried.... I was so thankful..... I just want to thank everyone at duke energy from the bottom of my heart!! I don't have to worry about spinning my air unit by hand....it would freeze up and we would have to cut it off by the breakers.... old a/c unit finally stopped running... I had everyone in my family send a letter to the agency thanking them for everything....I send them Christmas cards, send them thank you notes.....

. . . . . .

I thought my light bill would come down....but it hasn't.... put insulation in the roof, I appreciate all of the improvements that were done..... thankful for the help.... did a lot of work....

. . . . . .

I appreciate the program and I would recommend it to anyone. You guys did such a wonderful job, from the bottom of my heart.

. . . . . .

I'm so grateful...I. would like to say thank you from the bottom of my heart... it was getting to the crisis mode where I thought I would have to move..

. . . . . .

They put insulation in attic, fixed heat ducts so heat would go down... it's a good thing to help people, it's a good fund if people don't have the income to put stuff in...it's good.

The contractors that were used were excellent, the approach, communication, they were a great group.

. . . . . .

I would like to say thank you for the program, its been a life saver...

. . . . . .

I think this is a great program. It helped me and my family. I hope more funding becomes available to help other families.

. . . . . .

I must say that everyone who came out I was well pleased with. They were all kind mannered and promised to be here and was here at the time given. I am very happy with all things done and happy for my new ac unit. The guy who installed my new system explained everything to me very well.

. . . . . .

The crew was great. I hope Duke will be about to continue this service. It has a lot of benefits to the community and I appreciate being able to have had the opportunity. I was out of work during the time my new system was installed so I am thankful. This program is one of the Best programs Duke offers and is an excellent service.

. . . . . .

I am surprised that they were able to install my new heat and cool unit in my home because I have an old mill house so I am very grateful that they managed to install it. They did a great job. Everyone was nice and cleaned up after themselves. The inspectors were nice too. I wish I had money to contribute to this fund to help others in need because it is hard when you need improvements and don't have the money or means to pay for it. I am thankful Duke has a program like this and the weatherization agencies.

APPENDIX II • HOMEOWNER RESPONSES

I just think is Godsend. It is such a wonderful program for senior citizens, someone who is disabled that cannot afford to help themselves.

. . . . . .

I'm on equalized payment and my bill went from 193 to 120 dollars per month... that extra savings can pay for another bill... I was flabbergasted when I qualified for the program, my heat pump was replaced, washing machine is great, (this machine wrings out clothes so less drying) replaced every light bulb... they were fabulous, couldn't believe it... I work at a non-profit organization, it was unreal, it I hadn't been worked there i wouldn't have known about the program.

. . . . . .

Power bill has gone from 500 to 200 dollars per month. We were using space heaters to heat the home & a window unit to cool the home. I'm 100% satisfied that they helped me as much as they did!

. . . . . .

My mother doesn't have to worry about buying oil this winter or using a space heater, which is dangerous. Many people do not know about this program and its because of the line of work I am in to why I found out. This has been a life saver. I do not live with my mother but my brother and I were there when everything was being done and I don't know what we would have done without this program because financially we don't have the money to have made these sort of upgrades. My mother is elderly and it gives her now a sense of being safer, warmer and saving money. She can also stay in her own home and not in a living facility. This program saved our lives and we thank you so much.

. . . . . .

Having the new windows make me feel safer. Overall I feel better and I am grateful and thank you all.

It was just wonderful and I thank and appreciate it. It's fantastic that Duke can set aside funds to help people like myself that is on a fixed income and elderly. I am a widower and I can't thank you all enough for my new air conditioning system. I am very appreciative of everything and Duke.

. . . . . .

The program has done a lot for a lot of people in the neighborhood. I hope that the program continues and help others. My light bill is very very good. I really enjoy the way it is. I hope they decide to do more of this program, especially for senior people who can't afford it. It really came in handy.

. . . . . .

It's a great program to help people. I always worked and made it on my own and I have been very independent and then had a lot of medical issues. I have been in a pretty bad shape, and my stuff went out, so I was glad for that program.

. . . . . .

I think is a great program for people who really need it. Sometimes is hard to make meets end, so anything that you can do to lower the electric bill, so I think you should do more of these programs.

. . . . . .

I really want to thank you for having the program. It helped very much. I am in a lot of medications, so this helped me a lot. I have told people that Duke Energy helped me a lot and that's why I feel better. My bill also decreased and is very nice now.

. . . . . .

The whole process was painless. I couldn't have asked for a better set of people. Mark and David were exception. They were great. Neat and courteous. I was so appreciative I cooked them a little something to say thanks.

I never knew that Duke Energy was involved. The people that worked on the house they were some of the best people ever. The people that were hired were great people.

. . . . . .

I think the program is amazing, for citizens who pay taxes like myself. These improvements allow me to tell others about this program. It's great. I am truly blessed.

. . . . . .

They did so much!!! I think it's a real good program who need assistance.. when winter comes I'll really get the benefits.... appreciate the program, a really good program.... the people who administrated the program did a great job! They let me know all of the information.

. . . . . .

I just think the program is wonderful. They did so much for us. Me and my sister live here and we are getting out there in age, fixed income, and we couldn't have done any of this without you guys. We don't have to worry about things breaking down. We know that we will be able to stay here for a long time. It is just wonderful!

. . . . . .

They all did a fantastic job with the upgrades. After they finished my evaluation my refrigerator went out 4 days later, and it wasn't included.... thank the lord for that program and I was eligible for it. it's a great thing you do for people who can't afford those things, i don't know what i would have done... all the guys were very nice and friendly and everything I'm glad to be a duke energy customer.

. . . . . .

Thanks a lot, if it weren't for the upgrades I don't know what me and my mom would do, keep the program going... most definitely... if you can help anybody else like you've helped us, please continue. It was amazing for us!! It was an amazing experience.. the people that did the work were very considerate of me and my home...

. . . . . .

I think Duke Energy is good, everything is great, all the upgrades, I couldn't ask for anything any better thanks to duke power, what would we do without them.

. . . . . .

Door is a lot more secure, windows are more secure.... previously on windy days you could actually hear the wind blowing inside, it was so bad the wind would move the blinks... there was a lack of sealing previously... I'm glad to know Duke Energy was behind a lot of it.... this place really needed it (public housing).

. . . . . .

I think it is a good program for people that are on social security and can't afford big bills. Everyone who came out was really nice and I thank Duke Energy for helping me.

. . . . . .

The little boys that the installed the equipment were really nice, they did a good job.. Ms. Cannon wanted to make sure everyone got involved with the installation got an A+ After my a/c was installed I told my girls "I believe I've went to heaven when I woke up."

. . . . . .

It has made a world of difference... wasn't aware Duke Energy HHF was involved.. couldn't believe I was eligible for all this equipment... I want to thank Duke Energy for being a company that has helped a consumer, feels very very good!! Absolutely remarkable...

APPENDIX II • HOMEOWNER RESPONSES

Don't have to use plug in heat, feel safer now.... not worried about fires as much, fire/gas alerts system make customer feel safer... Duke Energy has done a wonderful job to help the seniors, a lot of customers can't afford a heating/cooling system, we didn't have the money to put in heating/cooling system. The people who installed the system did a good job, cleaned up before they left.... appreciate washer/dryer, appreciate that..... customer really appreciates everything to the highest..... they removed a lot of stuff from the bottom of the house and they had it all removed... can't complain about any of the services.

. . . . . .

Feel safer in home because old heaters were bought from Walmart and they weren't as safe. The HHF has been a blessing, it has made our lives so much easier... Hopefully others can benefit from this program... our electric bills have been cut in 1/2...

. . . . . .

I appreciate everything that was done. I appreciate it so much that I wrote thank you letters to everyone with Community Action Opportunities. I am very thankful. I used to burn oil and I didn't have to spend the money this year. They also upgraded my wiring to get the new heat pump in. They took good care in what they did and with me.

. . . . . .

I am glad that Duke Energy had the funds to help and assist the disabled. It helped me tremendously. It has helped my bill a lot. It has decreased my bill for about $100 or so.

. . . . . .

I am just glad that it was available and we qualified for it, for our HVAC. It was really expensive for us because of kerosene.

I am so thankful for everything that was done for me. Everyone who came out from each of the companies were very professional. Even the Inspectors were nice and not snobs. They assured me that all the electrical work was done correctly. They even installed a smoke and gas detector alarm.

. . . . . .

I appreciate the new appliances, because they are more energy efficient. I know down the line they will help me with the electric bill. I greatly appreciate it.

. . . . . .

Customer says he and his mother are on disability and it was blessing, and they really appreciated what Duke has done for them.

. . . . . .

My personal opinion, I think this program is a blessing. I think that DE is one of the most wonderful companies to help people who are disabled. My husband passed away last year from cancer and this program helped me so much. I am so thankful.

. . . . . .

I am greatly thankful for Duke Energy and this type of program. I was in shocked that I could apply and actually got accepted. They replaced my washer and dryer and my ac unit. They also gave me a refrigerator. My house was hot and moldy previous to the improvements and had deteriorated and had critters. I feel healthier overall. If it wasn't for Duke I could still be in the hospital. Heat affects me very bad with my medical condition so to feel cooling has made a world of difference. I am now able to keep my body temperature down. This is a mobile home so it isn't very efficient to begin with. Thank Duke and the weatherization Action Pathways for everything.

. . . . . .

Everyone that was sent out was professional from start to finish. From the first inspector to the final inspection inspector. This was very convenient and mindful and everyone was friendly. Definitely keep

this type of system around. I hope it can extend across the nation to others in need. I recommend it. Sad to hear that our fearless leader is trying to take programs away like this but I am grateful that it is available. Thank you so much for taking the time out to call to ask about my experience.

. . . . . .

I would tell anyone that has the opportunity to do this to please do it immediately. Be careful who you said yes to, but if you know if it is a program that Duke Energy is responsible for, then they will take care of you.

. . . . . .

I can breathe a lot better. You all did such a good job. Thank you all for doing this. I am so pleased. Everyone was so nice and the entire thing was enjoyable.

. . . . . .

Keep program up. Elderly people need it. After you work all your life then to end up on a fixed income it's hard when things need to be fixed. Sometimes you have to choose to do without meds or maybe food depending on how bad it gets. I thank you all for doing this and keep it up.

. . . . . .

Thankful for heat pump and thankful overall for everything that was done and is coming out to her home. During the winter customer feels a lot warmer and during the summer hot months she is a lot cooler. She has noticed breathing better although she doesn't have an issue breather. The quality of the air is better. In the past she has used fans but now feels better overall during the hot days.

If it wasn't for Duke Energy I don't know where I would have been this winter. With previously having to use a wood burner for heat which caused my sons breathing issues I am thank you to Duke for installing a new heat and cool system. I am tickled to death and so pleased of all the work that was done. I am so happy that Duke cares about people who need help and from the bottom of my heart I am thankful.

. . . . . .

I was not aware Duke Energy money was used towards the improvements in my home so knowing this is great and I appreciate you all so much. I also like the tips you send out on think that can be done in the home to save money like hanging the clothes to dry instead of using the dryer.

. . . . . .

I sure appreciate the things that were done because it helped to better the household. To have a better heating and cooling unit helped a greater deal. They also did the cracks and the bathrooms which was good too.

. . . . . .

I have nothing negative to say about my experience. The air conditioning company (Mr. Richard) was awesome. Make note that Mr. Richard explained that this was one of the biggest jobs they have done. It was starting from scratch. No insulation in the attic, no central heat or cool. They also added vent in bathroom and a main breaker. I am so very grateful and thankful and happy to recommend this is anyone I know. I had to wait 2-3 years for this and I am thankful my home had all these improvements made. Tell the program manager that this was exceptional for Duke and the other workers to do.

. . . . . .

They did a good job and it really helped me a long way. They put windows in my home so it feels warmer and I truly appreciate everything that you all did. One person in here asthma is as bad and overall we feel good and is comfortable. Thank you so much.

APPENDIX III • SERVICE PROVIDER RESPONSES

WARM was able to assist so many families with these funds. We are so grateful, and wish there were more funds to continue to help so many more families that are in need.

We worked very hard within a short time frame to spend the original allocation, plus the additional funds we requested and received. In about a two year period, we installed over 175 heating systems, a great many appliances, and health & safety and weatherization measures. In spite of all that was accomplished, the need exists for that much more to be done.

It has been an great program for all our eligible clients.

We look forward to continuing to work with Duke, it has been an outstanding opportunity for our agency as well as the customers that have been touched by this program. It has given us the opportunity to bundle services with other agencies to serve customers and provide additional measures in the home.

This was a great program, but the need is still great (10x).

The program support team was very helpful in assisting us from the start to finish and we were able to leverage the funding to provide needed services to the low-income folks CADA serves.

This was one of the best programs we have administered to assist homeowners with appliances. (2x).

The staff at NCCAA and the Martin group were very helpful and easy to work with. The requests for exceptions were processed quickly as were agency reimbursements. This program was a win-win for all involved.

Overall, HHF has been both impactful for the community and rewarding for our agency to serve others in need. We would love to be considered for future opportunities.

Joel Groce with NCCAA did an outstanding job administering the dollars.

This has been a great program. The Duke HHF staff were great and very knowledgeable. Payments were also processed timely.

The HHF program has helped offset many program expenses and has allowed us to continue working longer through the year until the new contract is completed and/or funding is released.

CONTRIBUTORS

Advanced Energy

Kelsy Green

Maria Mauceri

Matt Murray

Jonathan Susser

Duke Energy

Casey Fields

Lorrie Maggio

Lockheed Martin

Deborah Hill

North Carolina Community Action Association

Joel Groce

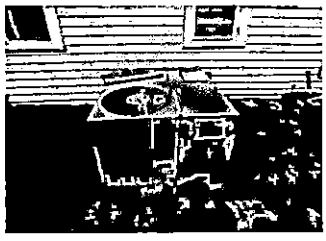
Sharon Goodson

advanced energy

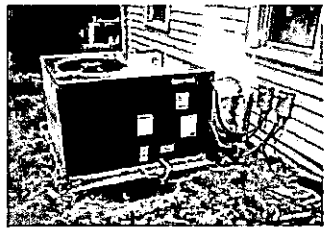
www.advancedenergy.org
909 Capability Drive, Suite 2100 | Raleigh, NC 27606 | 919-857-9000

Testimonials

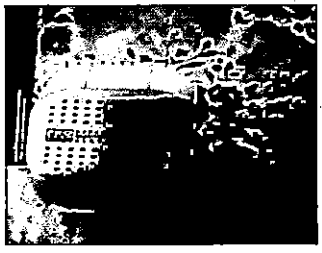
[redacted] is a Columbus County resident that applied for weatherization due to the high cost of heating and cooling her home. [redacted] qualified for the HVAC replacement program through Duke and was able to get an energy efficient heat pump installed. [redacted] stated, "I don't have to seek assistance anymore with filling my tank to heat my home. I am very pleased with all of my services."



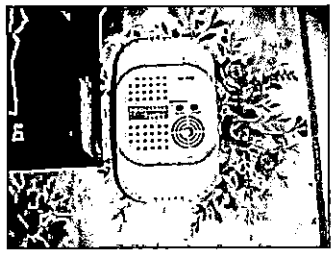
Old Unit



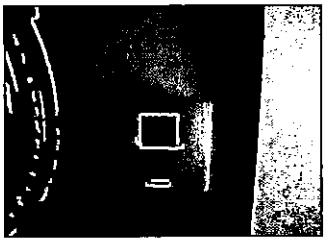
New Energy Efficient Unit



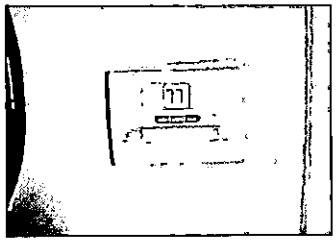
Non-Functioning CO Detector



New CO Detector



Old Thermostat



New Energy Efficient Thermostat

Helping Homes Fund gives Hickory woman her first heating and AC system …

By KJ HIRAMOTO khiramoto@hickoryrecord.com
Sep 9, 2016

Janet Lutz of Brookford adjusts her thermostat to her new heating and cooling system from Duke Energy's Helping Home Fund.

Janet Lutz of Brookford has already started covering her new refrigerator from Duke Energy's Heling Home Fund with photos of her grandchildren.

HICKORY – The thermostat at Janet Lutz's house in Hickory has remained at exactly 72 degrees Fahrenheit throughout the summer. While Lutz insisted she is comfortable with the temperature setting in spite of some of the hottest and most humid days during previous summer, it was also due in part to her being overwhelmed by the technology.

"I'm scared to touch the buttons," Lutz said jokingly. "But it feels great around the house. ... My sister also told me to keep the fans in the living room going to keep the air flowing."

Before having the thermostat installed in her house, Lutz had never owned a heating and air conditioning system.

"I've always had my wood stove for over 40 years," Lutz said. "I made my boys go out buy a loaf of wood, stack a pile outside, bring some inside the kitchen and we'd heat it with a stove."

Thanks to the collaborative efforts between Duke Energy and Blue Ridge Community Action (BRCA), Lutz's days of making her grandsons gather wood to generate heat around the house is over.

Lutz was among the families selected by BRCA as one of the recipients of Duke Energy's Helping Home Fund.

Helping Home Fund is a program that offers free assistance for income-qualified Duke Energy customers with up to $10,000 in energy efficiency upgrades. After receiving a complete home energy assessment, they also receive assistance and counseling to help the families save on their future energy bills.

BRCA's role is to administer the home improvements for the chosen Duke Energy customers as soon as the non-profit organization receives the allocations from Helping Home Funds. They identify the clients who apply for the program, send out contracted auditors to test the home then the auditors send the reports back to BRCA, which then follows up with a select group of clients based on their eligibility scores.

BRCA Energy Director Shawna Hanes said the program operates in a team effort with all the contracted partners and Duke Energy all playing their own roles.

"We have qualified contractual partners that we had carefully selected which we are glad to have with us," Hanes said. "And we would not have been able to install the system (in Lutz's home) if it weren't for the funding received by Duke Energy."

In addition to assessment and counseling, chosen families like Lutz's receive services from the program such as health and safety repairs and installation of home ventilation systems.

And for Lutz's case, she received repairs on her home windows and a refrigerator as additional services provided by the program.

Lutz said ever since the installations for the series of home improvements were completed several months ago, she had been pleasantly surprised to see her house is a lot more energy efficient, evident by the noticeable difference in her monthly Duke Energy bills.

"When we used the wood around the house, it went around $200 a month," Lutz said. "Now it's between $120 to $140. ... Now I can spend the extra money on the boys' school supplies and (school) uniforms."

Lutz said the new heating system in the house has enabled her to give her two grandsons -- Daniel, 15, and Nick, 11 -- extra time in the evenings by not having to make them go out to gather wood for the stove. But as a result, she did add more chores around the house for the boys.

"They're not going to sit around," Lutz said jokingly. "Daniel likes to cook so I have his prepare the main dishes, and Nick likes to bake pastries and I get him to organize the Bible shelves."

All jokes aside, Lutz said the series of home improvements and installations have helped the family immensely, especially for her two grandsons. They've struggled with asthma when their house was in its previous conditions.

"They're nowhere near as affected by it now," Lutz said. "I couldn't be more thankful for Helping Home Fund."

Hanes said seeing the families experience improvements to not only their home utility systems, but also to the quality of their lives makes her job that much more fulfilling.

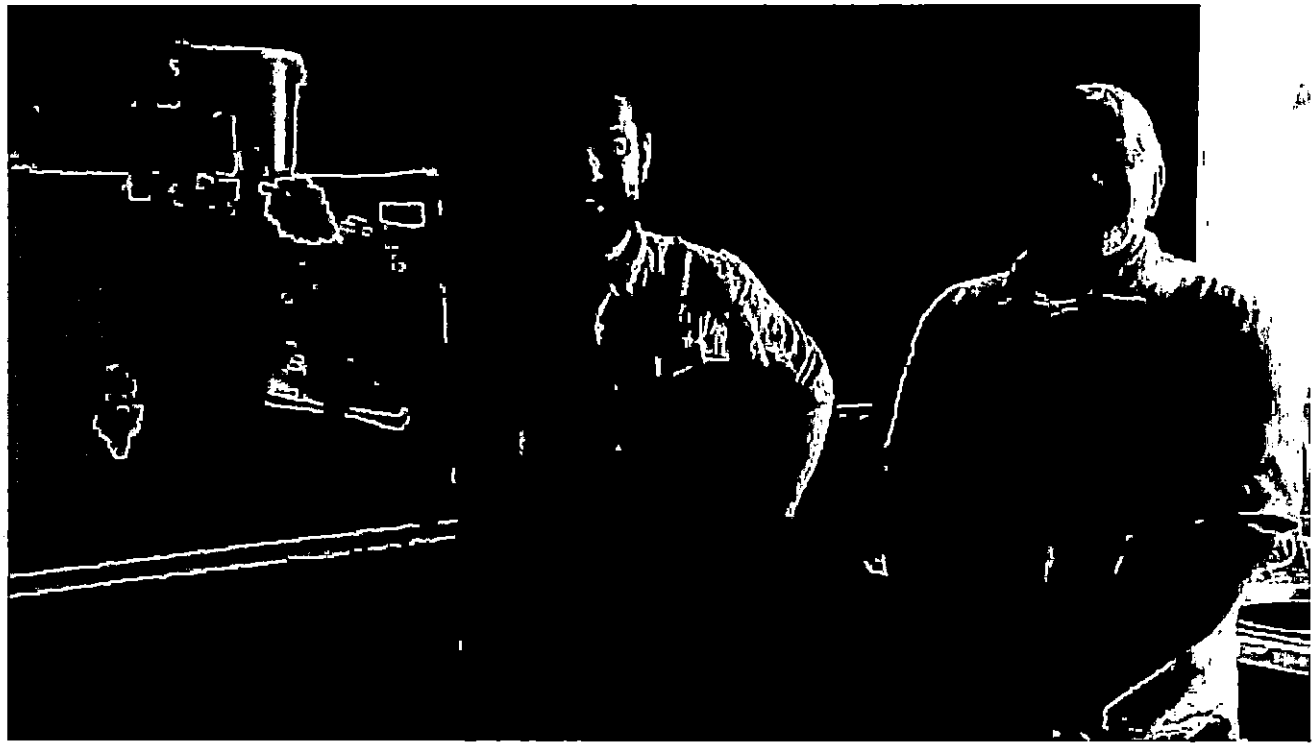
"It's always exciting to see all the work get done," Hanes said. "It keeps our staff motivated when they get a chance to see these families smile in-person."

Application Process

Although BRCA is nearing the end of its Duke Energy HHF allocation period, Hanes said she encourage clients to apply for services since they will continue to provide weatherization services to low-income families. Hanes said if a client is unable to come to the BRCA office locations, our organization's service workers could make a home visit when possible.

For more information on the weatherization services, visit their website at http://www.brcainc.org/weatherization. The Weatherization Services page provides more information about how weatherization helps low income families save energy and money and also informs clients on how to qualify for weatherization. Applicants must qualify for weatherization in order to qualify for the Duke funds.

Duke Energy's Helping Home Fund aides Lincolnton woman



MATT CHAPMAN
Staff Writer

Duke Energy launched its Helping Home Fund in January of last year and has since provided more than 2,000 families in North Carolina with up to $10,000 of energy efficiency upgrades at no cost to the customer.

The Helping Home Fund is a $20 million program funded by Duke Energy shareholders that was authorized through an agreement with the N.C. Public Staff and approved by the N.C. Utilities Commission in 2013. It serves families at or below 200 percent of federal poverty guidelines and helps income-qualified customers with upgrades that include the replacement of outdated washers and dryers, HVAC replacements, insulation and other weatherization benefits.

Duke Energy contracted the N.C. Community Action Association to administer the $20 million of funding through 28 agencies across the state. In Lincoln County, more than $58,000 from the Helping Home Fund has been administered through I Care Inc., a private non-profit that works to expand economic security for vulnerable families.

Patrenia Fair is one of the Lincoln County residents who has been helped by this collaboration between Duke Energy and I Care. She spent years living through sweltering summers and harsh winters in a home without a properly functioning heating and cooling system. Fair lacked the

disposable income to make the required fixes and the problems snowballed as the use of space heaters and window air conditioning units drove her energy costs through the roof.

"I thank God for these people who have helped me," Fair said while fighting back tears. "I'm glad that they came by to see about me and cared enough to come check on me."

Fair applied for the program through I Care and as a Duke Energy customer was eligible for assistance through the Helping Home Fund. Work began on her home in April as I Care replaced her electric baseboard heating and installed a brand new heat pump. In addition to the new heating system, Fair's home also received weatherization upgrades and the fund provided her with a new, energy efficient refrigerator to help save additional money each month.

"I've been in this job for almost seven years and I'll never forget the first home I went into," Rick Stotts of I Care said. "It was a mobile home and it was in the winter time and it was freezing cold in there. I saw this young girl laying on the sofa with a bunch of blankets over her and I didn't realize it right away, but she had a little baby under there trying to keep it warm. I have a real soft spot for older folks and kids. They're so appreciative for what you do for them and you can see the difference it makes in their lives."

The Helping Home Fund is a one-time program, meaning that once the $20 million has been spent the program is over. However, Duke Energy representatives are working on putting a similar initiative together sometime in the near future

"We are a very large company, but we want to try to reach out to everybody and have a conversation," Duke Energy program manager Casey Fields said. "If it means that we can make a big enough change in someone's life that you get emotional or you feel good about it, it makes my job much, much better at the end of the day. This is a phenomenal program and this is the right thing that we're doing and it's what we should be doing."

Image courtesy of Matt Chapman

The customer was in need of energy saving measures for his mobile home. He is disabled and has limited income, which made it difficult to get much needed measures done to his home. [redacted] was grateful for all the assistance that Action Pathways along with Duke Energy's Helping Homes Funding provided to his home. [redacted] was very pleased with all the services he received by from weatherization program and has already seen a change in the way his home feels.

[redacted]'s Home

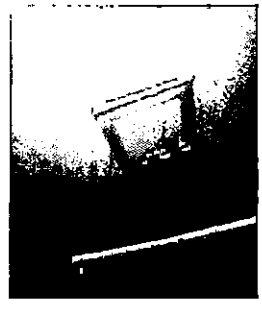
Old System

New Energy Efficient System

No Vapor Barrier

Vapor Barrier

Old Bath Fan



New Bath Fan

Since the start of the Duke Helping Homes program we have helped over 125 families in Macon County addressing health and safety issues and installing energy efficient appliances and heating systems to reduce their energy usage and monthly bills.

The health and safety part of the program enabled us to install handicap ramps, grab bars and do much needed porch repairs so that our clients could stay in their homes. Also we were able to install new heating and air conditioning systems where they were non-existent or beyond repair. This was so very important to our clients on oxygen and with health issues.

[redacted] is one of our clients with health issues and cannot endure extreme cold or heat. She is very comfortable in her home now with her new heating and air system and does not have to go stay with relatives as she did in the past.

[redacted] is a client who is on oxygen and installing a new heating and air system to his home eliminated the wood burning stove. He could no longer lift the logs and a dangerous situation was eliminated.

[redacted] was in a nursing home and could not return home until a handicap ramp was installed. She is now able to be in her own home.

[redacted] was in desperate need of a handicap ramp and since his wife is on oxygen, we were able to replace the propane system with a heat pump and install the handicap ramp.

[redacted] was in need of porch repairs and a handicap ramp. He is now able to enter and exit his home safely and can stay there for many more years.

[redacted] **and his wife** are both disabled and have a young child. They are truly grateful for the handicap ramp and heating and air system.

[redacted] lives alone in a very rural area and was in need of a handicap ramp. She was in a nursing home and couldn't return home. We were able to install the needed ramp and also install a mini split heating system for her. She is now able to be at home.

So many of our clients have commented about how their lives have been changed for the good and how happy they are to see the reduction in their energy bills due to the appliance replacement program and HVAC replacement program.

Macon County Housing Department was able to use the monies from the Helping Home Fund in conjunction with other programs such as the Urgent Repair Program, HARRP, Single Family Rehab Program and the Weatherization Program.

We wish the program would be continued as there are many elderly, disabled and single parent families here who would benefit from being able to switch from wood burning stoves and the expensive propane heating to the energy efficient heat pumps.

Various Success Stories from Duke Energy's Helping Home Fund

[redacted]
Wilmington, NC

To Duke Energy Helping Home Fund:

How will I ever be able to thank you for kindness & generosity in helping us to get a new HVAC system put in. After living over a decade without heat and air, it had pretty much become a way of life for us to live in one room during cold and hot days. Using an electric heater to stay warm was neither safe or efficient. As students (trying to improve our lives) we would sit and do homework with hat, coat, & gloves on. For us, it was a normal way of life for many years. However, thanks to your Home fund and giving back to the community, Wilmington Area Rebuilding Ministry, Inc. was able to see to it that we were matched with you to be a recipient of your gift. It has changed our life overnight to have this new system in place. Thank you again and WARM for your kindness & especially for the volunteers at WARM for treating us with dignity & respect.

[redacted]
Durham, NC

[Received Air Sealing and Mechanical Ventilation]

This letter is to thank you for the amazing and wonderful maintenance work that was done to bring my home up to standard. I would never have been able to pay or save for the service that Your Company did for me. The company is a God Sent for Seniors.

I would like to thank the people (men) who performed the service, they were [redacted], the Auditor, [redacted], and the other two men from Charlotte, NC who did the electric work. They were very polite, friendly and respectable to me and my home. After the work was completed they checked to see if everything was working or performing correctly.

Again, Thank all of You.

[redacted] [HVAC Replacement]

To whom it may concern. We just wanted to thank you for all you did for us. We could not have afforded this ourselves. It's good to know that in this messed up world we live in today, there is still people with goodness in them. I believe God will bless and prosper your company for what you do. We appreciated all your crews that came out. God bless you and good luck in the future.

[redacted]
Willow Spring, NC
[HVAC Replacement – Mechanical Ventilation]

Thank you for the weatherization of our home. The things did have definitely made a difference in our electric bill. We are so appreciative for the services that you provided because they were needed so badly and we could not afford to have any of the work done.

The gentlemen from your organization and the service providers from Therma Direct, Carolina Weatherization, and Lowe's were so respectful and extremely courteous.

[redacted]
[Plumbing repairs & HVAC Repairs]

Wanted to say thank you so very much for help in facilitating all the repairs on my home. Already seeing a difference in energy bills. I have nothing but good things to say about your agency. Hope you all keep up the great work.

[redacted]
Zebulon, NC
[HVAC Replacement]

My deepest appreciation to all administrators of Wake County Weatherization and Duke Energy Progress Heat/AC Assistance Programs. Because of your programs, I was blessed to get my Heat and AC needs met for only 25% of the total cost which was paid by my landlady.

[redacted]
Henderson, NC

I would like to express my appreciation for this program. It has really helped me a lot. I would not have been able to have this work done without your help. My house has never been better.

The works were very professional and kept me informed on what was going on. They had to rework the duct work, install insulation, replaced attic steps, replaced roofing (ceiling tiles) and installation of the unit. There "wore" the best. Without this program, a lot of families would be without heat or air and a comfortable place to live.

[redacted]

Just wanted to thank you and let you know how much I appreciate all that you all have done for me. The heating and cooling unit works great, and the washer and dryer are great, makes doing laundry a pleasure. All who came to my house to install everything, were so very very nice. I have never had that many new things that I didn't have to make monthly payments on. What a blessing.

Homeowner serviced by Coastal Community Action in New Port, NC

[redacted] [Executive Director of Coastal Community Action] called this morning after receiving a call from a lady who had been helped through the Helping Home Fund. This lady was a retired teacher who because of sickness was no longer able to work. She had replaced the roof on her home before her funds ran out. She has been without heat for a very long time. The actual work will not be completed until tomorrow, but the lady was so overwhelmed with the kindness shown to her that she called [redacted] and talked for over an hour. She said that she had never been treated as kind and was so appreciative of the professional staff at Coastal.

[redacted]
Mount Airy, NC

Dear [redacted]/Weatherization and Duke Power,

Just a note to say THANK YOU, so much, All of you, for my new A/C unit and the free installation of same. I've worked hard all my life and it is so much appreciated. To find people willing to help me so much in my older, non-working time and age. And what a year to get such a blessing – So hot!

[redacted]
Fuquay Varina, NC

I just had to thank you and your company for caring about our community and seniors. I have been so afraid of falling "again" in the winter with 2 inches of ice on my stairs, not even able to get out of my home. Through the money you gave to Senior Weatherization I am now much safer going in and out of my home. I am more than grateful for your helping me! I will be praying for God's blessings to overtake you and your company and your family.

You truly have been used by God to answer my prayers to keep me safe Thank you one million times

[redacted]
Charlotte, NC

I wanted to take this time to thank you for your service in making sure I have received my new GE Appliances, what a difference it has made in my home. Having appliances that are not only brand new, but are updated and just simply beautiful.

Thank you for your Help and the Change it has made in my life.

[redacted]
Raleigh/Durham

Season Greetings,

I did not want another day to go pass without me giving you all this big appreciative love email!! I am speechless and so grateful for all the work that was done to my home! I came to you will lots of concerns and not to mention a $1200.00 light bills for two months. My family barely made it through the year because there was only money for the basics but God!!! There was no way I could have ever afford to do any of the work you all did! I am less stressed because my power bill has been cut down tremendously, we all sleep safe at night because you have installed smoke detectors and carbon monoxide detectors, I won't have animals crawling in the crawl space and it was fully insulated as well, and although it's not the last thing you all did but you all got rid of my 1980s refrigerator and blessed us with a new one. I am emotional right now just writing this email! If I ever was wavering in my faith, I am reminded every time I opened the front door and step inside my warm and cozy home 2 things-God has angels on earth and He is still performing miracles.

[redacted]
Boonville, NC

From the agency that served [redacted]

I had a delightful telephone call from [redacted] and wat to shar it. [redacted] is an elderly lady. She's an expressive person and has a jolly attitude and outlook about most things.

She called me to let me know Lowe's delivered her new refrigerator at 8:08am Tuesday morning. She said she "had no idea it would be so big and so pretty and so nice! That's a rich lady's refrigerator! I have never had a refrigerator I didn't have to buy on credit, make payments on, and do without, in order to get it. I'll be 83 next Wednesday and I think this is my birthday present from heaven! I don't know if other people call you to thank you for their refrigerators and let you know how nice they are, but I had to. I want to thank each one of you that had anything to do with helping me get my new refrigerator and heat pump. My house is nice and warm now!"

Success Story from Charlotte Area Fund

Good Afternoon [redacted],

I really did not know what I was going to do! For almost 5 years, my washing machine had been leaking, it took more than 2 hours for 1 load of clothes to dry, my refrigerator made a "humming" noise, and my oven door was broken.... the whole house was falling apart and honestly so was I!

I was barely making enough money to survive and just the thought of trying to replace worn out broken appliances was almost too much to bare. And then.... I read the article in the *Charlotte Area Fund Spring 2016 Newsletter* about the Charlotte Area Fund and Duke Energy Replacement Appliance Assistance Program and like an **angel** you helped a struggling resident obtain new appliances!

[redacted], you made the process so easy, you completed the paperwork quickly, and you were very professional. The contractor and the delivery personnel you sent to my home were extremely professional, courteous and completed the job in a timely manner. I thank the Good Lord for this program. I can now cook in a new modern oven, wash my clothes in an energy efficient washer and it only takes about ***15 minutes for a load to dry!!***!
I am so overjoyed at receiving these appliances words can hardly express my joy and gratitude!!

Thank you so much [redacted], the Charlotte Area Fund, and Duke Energy for this awesome program.

God Bless you once again.

POSTED ON SEPTEMBER 7, 2016 BY STOKES NEWS

Couple benefit from Duke Energy's Helping Home Fund

By Amanda Dodson - adodson@civitasmedia.com

Anthony and Lydia Prysock, a retired couple living in the Walnut Tree community, were the recipients of home upgrades through Duke Energy's Helping Home Fund.

Anthony and Lydia Prysock, a retired couple living in the Walnut Tree community, were the recipients of a new high efficiency heating and cooling heat pump, a washer and dryer, and safety measure upgrades to their home through the Helping Home Fund. The two-year initiative, launched in January of 2015 by Duke Energy, reduces the burden of energy costs and electricity for families in North Carolina. The $20 million community investment pays up to $10,000 per household for repairs, new appliances, retrofitting for efficiency, and other electricity costs based on household income.

Last winter, the Prysock's were paying nearly $400 a month using baseboard heating, a grueling amount for the couple who are on a fixed income. While they've slowly completed home renovations over the years, there was a mounting list of more to do.

"I noticed one of my neighbors down the street was having a heat pump put in and I asked the contractor to write up an estimate of how much it would cost at our house," Prysock said. "But as I was talking to the young lady, she told me about this program and I gave them a call."

After doing some research, Prysock realized he and his wife were eligible for Duke Energy's Helping Home Fund, and the program would easily cut his power bill in half.

"We applied and went through the process. I'm really thankful for this and for Duke Energy giving to our area. This is how you rebuild communities. What little money we did have we redid the cabinets and put on a new roof. It would have been a long time before we could have done anything like this."

The Helping Home Fund has invested over $175,000 in Stokes County and helped 55 families receive energy-saving upgrades at no charge to income-qualified customers.

"The Prysock's are one of more than 2,000 families we've helped all over North Carolina. We've spent almost $10 million dollars and we still have about another $10 million," explained Lisa Parrish, Duke Energy's Government and Community Relations Manager. "We have great organizations we work with like YVEDDI that just know how to get it done."

Tommy Eads, the weatherization director from YVEDDI, said the program has been flooded with applicants and said when considering homes, they look at household size, yearly kilowatts usage, and income.

"We've done several houses on this street and some others close by. There's 334 projects that we have either started or completed in homes from Stokes, Surry, Yadkin and Davie. We service all four counties with the state and the Duke Energy program," Eads said. "It's great to be able to help the community. I feel like we get to be a part of making a difference one homeowner at a time."

Amanda Dodson can be reached at 336-813-2426 or on Twitter at AmandaTDodson.

June 12, 2015

Governor Pat McCrory
Office of the Governor
20301 Mail Service Center
Raleigh, NC 27699-0301

Dear Governor McCrory,

My heating and air conditioner quit working in January. I purchased some little heaters that kept me warm. I was employed for many years and was a single parent of two children. Unfortunately, I had to retire sooner than expected and being independent made that a hard transition. I called several companies for estimates and realized faith was my only solution. My daughter contacted an agency by the name of Coastal Community Action Inc, specifically its Weatherization Assistance Program and the Heating and Air Repair and Replacement Program. It was an answer to prayer! I called and spoke with [redacted] *at Coastal Community, and she had me send in the necessary paper work to see if I qualified. She was very kind and helpful. My daughter had originally spoke with her boss,* [redacted] *and he talked with me and was very helpful, explaining the process that would take place. Next* [redacted]*, the auditor, came to my house to inspect my whole house to see what could be done to weatherize my home. He was very precise checking throughout my home, and he explained how different things would be beneficial. I called and talked with* [redacted] *who is in charge of the whole program. She told me something that really stuck in my heart. She had presented a three hour presentation to get the funds and grants to help people. I had much gratitude that she had accomplished receiving the grants that would be a gift to so many people. I have never received such help so I am very appreciative. Then they sent the crew out to weatherize my home and to put in an exhaust fan, to wrap my hot water heater, to put a new shower head on, and carbon monoxide detection. They also put insulation around the duct work. These guys were very mannered and it was obvious there was great team work. These guys were* [redacted]*, came to inspect their final job. These guys were awesome!*

Coastal Community Action Inc. used an electrician, [redacted]*, with For A Electric and he was a super gentleman. They selected McLeans Heating and A/C, owner* [redacted]*, whose workers were* [redacted] *and* [redacted]*. They installed a new unit and duct work. I was very pleased with their work and kindness.*

I wanted to express my gratitude and share the great blessing I received and felt you should be aware of this wonderful organization and the gracious grants offered by Coastal Community Action! I would be so happy if you could acknowledge my appreciation to each one that has made my life more comfortable and efficient. I want to thank Duke Energy for their assistance and the other donors at Coastal Community Action who made the grants possible.

Sincerely,

[redacted]

.cc Coastal Community Action, CEO Lynn Good (Duke Energy)

April 28, 2016

Blue Ridge Community Action Inc.
601 East Fifth Street Ste. 255
Charlotte NC 28202

To Whom It May Concern,

My name is [redacted]. I have been a life long resident of the Stanly County area. During this time I made choices in my life that did not reflected a thoughtful planned out success for my future. So I struggled financially. Unfortunately, I never qualified to receive any of the grant money that was allotted to Stanly County to help those who were in need of assistance.

During my life in Stanly County I was blessed to have a son with disabilities which required total care. This job was the love and joy of my life for twenty years. Within that time I was attending school to get a degree which would increase pay, so I can better provide for my children. I had to drop out of school and had to let go many jobs because of my responsibility at home. He passed in 2009, and life itself was a struggle. At one point of my I had no hope nor did it even matter whether I got it together or not. One day, God, just gave me a want- to- live spirit again. So I found jobs that lasted short term and applied for assistance many times. This was very embarrassing and degrading because the people made you feel you just wanted a hand-out. The workers made you feel like scum. After being rejected many times, you have a fear of even seeking help. When it was cold I would put cover up to block off rooms so we would stay in one area of the house, using a space heater. When it was too hot, we would visit someone or mess around in stores until it cool off to go home. I heard about you through a friend at the Community Action in Albemarle. At my wits end I fearfully applied at the Blue Ridge Community Action.

My vocabulary does not even extend far enough to express what my heart truly feels for the blessing you gave my daughter and I. For two years we have been without heat and air. As a single parent making minimum wage and not forty hours a week, I had to prioritize which bills got paid and I just couldn't seem to fit this in my budget during that time. Through Gods power we survived.

I truly thank God for this program, and especially to one of your workers [redacted]. The compassionate spirit and concern was of one I have never experienced. Never once did I feel as though I was being seconded guessed about any information, nor made me feel inferior concerning my needs. Out of all the rejections and mistreatments were worth the reward of compassion we received.

Our hats off to you guys and our hands up to God for his mighty acts he showed through you as workers. Continue to show his love and he will continue to bless this business and each one individually for what you do for others.

Thanks,

[redacted]

Team effort helps keep man in home

Tim Reaves
reporter@thefranklinpress.com

Kenneth Cruse stood proud on his porch on West Old Murphy Road on Thursday.

"You don't know how much I appreciate it, folks," he said to a group of people from the county who helped him stay in his home.

Cruse, 64, is the beneficiary of a number of emergency repairs, weatherization and energy efficiency upgrades to his 86-year-old home. Over the last two years, he's seen his house repainted, his roof replaced, electrical service upgraded and the installation of an HVAC system, water heater, oven and insulation.

Cruse said the equipment upgrades and weatherization improvements have cut his power bill in half.

"It's quieter, it's warmer, I enjoy it now," he said. "I don't have to sit around in a sweat suit."

Duke Energy contributed about $10,000 from its $20 million statewide Helping Home Fund fund for a new stove, the rails on the porch and various weatherization upgrades, said Lisa Parrish, government and community relations manager for the company. Other funding came from the North Carolina Housing Finance Agency. World Changers did much of the housework on Cruse's home, including the new porch.

"This is probably one of the best examples of a public-private partnership," said John Fay, housing director for Macon County Housing Department (MCHD). "It's really a melding of funds and effort by many different organizations. ... It was really great, because we got to do so much here."

Cruse is the third generation of his family to own the house, and he's lived there for 32 years. But propane expenses and electrical inefficiencies were pushing him to the breaking point.

"The way the house was set up before the intervention, there was no way," he said. "It's the only way I could've stayed in it."

Cruse, who lives on Social Security Disability and Supplemental Security Income, said he had no insulation in his home and an old gas furnace that seemed ready to catch on fire.

"Over the years, things happened, things just deteriorated," he said.

He said a friend of his let him know about MCHD, so he filled out an application to see if he qualified for any of the funding. It's typical of most MCHD clients, Fay said. They usually hear about the agency and its programs from friends and family members or local medical or senior services. Then they come to the MCHD office on Old Murphy Road and fill out an application. Staff members look at a number of factors, including income level and problem severity to prioritize the work. MCHD has 250 homes that need some kind of repairs or weatherization upgrades.

"We make that determination, and match the work with the capabilities," Fay said. "And sometimes we don't have those. Sometimes we end up having to use, for instance, Habitat for Humanity, Macon Baptist Association, various people in the community that are volunteers."

The work on Cruse's home represents a broader philosophy that places value on letting seniors age in place, Fay said.

Press photo/Tim Reaves

Kenneth Cruse pulls a pan out of an oven, which he received as part of Duke Energy's Helping Home Fund.

"It's important for people to be able to be around the things that they have comfort with and to be able to feel at home and not have to worry about it falling in on them," he said.

MCHD is located at 1419 Old Murphy Road, Franklin. Housing help is available for those who qualify. For more information, call 828-369-2605.

Norlina, NC - Warren County

To whom this may concern,

I wanted to send this letter of appreciation to Franklin Vance Warren and all of the companies that contributed to helping us make our home energy efficient, as well as, safe and livable. For the 2 years that we have had our home, it did not have a heating source. We used kerosene to stay warm in the winter and it was awful. My four children and myself developed asthma and breathing issues that we never had prior to using kerosene. The smell of the kerosene was so strong sometimes that it made our eyes water. We couldn't afford to do anything else besides the kerosene at that time. We finally invested in propane as our heating source, but it didn't heat up the whole house, so we used electric heaters as well. I am so thankful and grateful for the FVW programs because with their help, we were able to qualify for a program that installed central heating and air in our home and a gas pump that has now been such a blessing. With all of the work that the electricians and heating and cooling guys did, we would've never been able to afford such quality work and installation of this system. Not only did they help us in regards to our new heating source, but they also installed more insulation, installed a carbon monoxide detector, installed new shower heads, fixed holes in our walls, sheet rocked around our windows all in effort to help save us from wasting money by making our home energy efficient. They did so much and worked hard to make sure it was done correctly and with love. I can't imagine how my children and I, health would be today,if FVW hadn't been there for us. The most frustrating thing as a parent, is to watch your kids get sick while trying to protect them from freezing to death. It was like torture, to know that you had to do what you had to do to keep us all warm, while sacrificing our extended health in the process. I had to give my children breathing treatments daily, they suffered from headaches, nausea, and low energy and I believe it was from that kerosene. But now, they don't complain about headaches, they haven't had any breathing treatments since, and they are full of healthy energy. We are all happier and warm throughout the entire house. I now have peace of mind and deep gratitude in my heart for the program that I believe saved my families life. Thank you again for all of your help and investments into making our living situation better. Miracles&Blessings.

With Love,

[redacted]

I/A

D. Williamson Exhibit No. 1
E-7, Sub 1192

Duke Energy Carolinas, LLC
Comparison of "As-Filed" Cost-Effectiveness Scores to Previous DSM/EE Riders
Docket Number E-7, Sub 1192

	2017 - filing year vintage 2018 Evans Exhibit 7 in Sub 1130				2018 - filing year vintage 2019 Evans Exhibit 7 in Sub 1164				2019 - filing year vintage 2020 Evans Exhibit 7 in Sub 1192				TRC % Change
	UCT	TRC	RIM	PCT	UCT	TRC	RIM	PCT	UCT	TRC	RIM	PCT	
Residential Programs:													
Appliance Recycling Program	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy Efficiency Education	1.72	2.32	0.90	-	1.22	1.69	0.53	-	1.32	1.32	0.54	7.68	-22%
Energy Efficient Appliances & Devices	3.19	3.43	0.91	4.36	2.4	2.17	0.42	6.11	3.27	3.54	0.70	7.50	63%
Residential Smart $aver EE (formerly, HVAC EE)	1.60	0.99	0.83	1.39	0.94	0.59	0.45	1.52	1.31	0.95	0.60	1.84	61%
Income-Qualified Energy Efficiency and Weatherization Assistance	0.49	4.51	0.38	-	0.19	0.83	0.16	-	0.21	0.35	0.17	2.80	-58%
Multi-Family Energy Efficiency	4.00	6.09	1.06	-	2.82	4.71	0.59	-	2.97	2.97	0.61	22.81	-37%
My Home Energy Report	1.98	1.98	0.86	-	1.56	1.56	0.57	-	1.89	1.89	0.61	-	21%
Power Manager	5.18	10.33	5.18	-	4.33	8.86	4.33	-	4.22	8.72	4.22	-	-2%
Residential Energy Assessments	2.65	3.05	1.06	-	1.41	1.56	0.54	-	1.36	1.34	0.49	30.23	-14%
Residential Total	2.91	3.65	1.20	6.03	2.22	2.60	0.70	7.69	2.5	3.02	1.04	6.61	16%
Non-Residential Programs:													
Business Energy Report	1.39	1.39	0.71	-	-	-	-	-	-	-	-	-	-
Non Residential Smart Saver Custom Energy Assessments	5.87	1.64	1.56	1.36	2.17	0.89	0.68	1.78	3.07	1.08	0.84	1.99	21%
Non Residential Smart Saver Custom	4.88	1.96	1.43	1.87	2.38	1.07	0.67	2.18	3.42	1.79	0.84	3.38	68%
EnergyWise For Business	1.44	2.70	0.94	-	0.83	1.21	0.68	-	0.72	1.25	0.61		3%
Non Residential Smart Saver Energy Efficient Food Service Products	4.44	2.74	1.21	2.65	2.68	1.95	0.61	3.18	1.40	0.81	0.51	2.02	-58%
Non Residential Smart Saver Energy Efficient HVAC Products	3.41	2.11	1.53	1.29	2.04	1.63	0.88	1.82	1.57	1.24	0.70	2.06	-24%
Non Residential Smart Saver Energy Efficient Lighting Products	4.12	1.96	1.16	1.61	3.48	1.44	0.74	2.17	4.29	2.00	0.80	3.75	39%
Non Residential Smart Saver Energy Efficient Pumps and Drives Products	3.71	3.51	0.85	3.35	2.54	2.45	0.54	3.56	3.68	2.63	0.86	5.38	7%
Non Residential Smart Saver Energy Efficient IT Products	4.14	2.34	0.89	3.16	2.36	1.77	0.59	3.79	0.60	0.46	0.31	2.55	-74%
Non Residential Smart Saver Energy Efficient Process Equipment Products	2.39	2.42	0.85	2.67	2.13	2.23	0.47	4.21	2.14	1.85	0.70	3.86	-17%
Non Residential Smart Saver Performance Incentive	3.53	1.14	1.29	1.08	2.7	0.81	0.69	1.50	3.29	1.06	0.83	1.79	30%
Small Business Energy Saver	3.91	2.50	1.46	2.38	2.59	1.61	0.77	3.00	2.70	1.67	0.80	2.93	4%
Smart Energy in Offices	3.75	5.84	1.69	-	-	-	-	-	-	-	-	-	-
PowerShare Call Option	-	-	-	-	-	-	-	-	-	-	-	-	-
PowerShare	3.24	60.80	2.05	-	2.9	41.14	2.90	-	3.35	112.28	3.35	-	173%
Non-Residential Total	3.94	2.50	1.41	2.04	2.69	1.67	0.85	2.41	3.28	2.13	0.94	3.34	27%
Overall Portfolio total:	3.44	2.88	1.31	2.78	2.46	1.98	0.78	3.48	2.90	2.43	0.98	4.00	23%