BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1174

In the Matter of Application of Duke Energy Progress, LLC,) for Approval of Demand-Side Management) and Energy Efficiency Cost Recovery Rider) Pursuant to N.C. Gen. Stat. § 62-133.9 and) Commission Rule R8-69)	TESTIMONY OF DAVID M. WILLIAMSON Public Staff – North Carolina Utilities Commission

September 4, 2018

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND PRESENT POSITION.

A. My name is David M. Williamson. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am a Utilities Engineer with the Electric Division of the Public Staff, North Carolina Utilities Commission.

Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.

A. My qualifications and duties are included in Appendix A.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to present the Public Staff's analysis and recommendations with respect to the following aspects of the June 20, 2018, application of Duke Energy Progress, LLC (DEP), for approval of its demand-side management (DSM) and energy efficiency (EE) cost recovery rider for 2019 (2019 Rider Rates): (1) the portfolio of DSM and EE programs included in the proposed 2019 Rider Rates; (2) the ongoing cost-effectiveness of each DSM and EE program; and (3) the evaluation, measurement, and verification (EM&V) studies filed as Exhibits A through K to the testimony of Company witness Robert P. Evans.

Q. WHAT DOCUMENTS HAVE YOU REVIEWED IN YOUR INVESTIGATION OF DEP'S PROPOSED 2019 RIDER RATES?

A. I reviewed the application and supporting testimony and exhibits, as well as DEP's responses to Public Staff data requests. In addition, I reviewed previous Commission orders related to DEP's DSM and EE programs and cost recovery rider proceedings, including the Commission's *Order Approving DSM/EE Rider, Revising DSM/EE Mechanism, and Requiring Filing of Proposed Customer Notice* issued November 27, 2017, in Docket No. E-2, Sub 1145 (Sub 1145 Order), that approved revisions to the Mechanism approved in Docket No. E-2, Sub 931 (Revised Mechanism).

Q. DO YOU HAVE ANY EXHIBITS?

A. Yes. I have three exhibits to my testimony. Williamson Exhibit No. 1 provides a historical look at the cost-effectiveness of the Company's Residential Smart $aver EE Program (formerly known as the Home Energy Improvement Program, or HEIP). Williamson Exhibit No. 2 shows the changes in the cost-effectiveness of the Company's programs as calculated by the Company in its 2016, 2017, and current DSM/EE rider proceedings. Williamson Exhibit No. 3 shows the difference between the cost-effectiveness calculations of each program using the Company's methodology of determining avoided capacity benefits and the methodology that the Public Staff believes is required by the Revised Mechanism.

DSM and EE Programs in DEP's 2019 Rider Rates

Q. PLEASE IDENTIFY THE DSM AND EE PROGRAMS FOR WHICH DEP IS SEEKING COST RECOVERY THROUGH THE DSM/EE RIDER IN THIS PROCEEDING.

A. In its proposed 2019 Rider Rates, DEP included the costs and incentives associated with the following programs:

- Residential
  - Appliance Recycling Program (Sub 970)
  - EE Education Program (Sub 1060)
  - Multi-Family EE Program (Sub 1059)
  - My Home Energy Report (MyHER) Program (formerly the EE Benchmarking Program) (Sub 989)
  - Neighborhood Energy Saver (Low Income) Program (Sub 952)
  - Residential Smart $aver EE Program (formerly HEIP) (Sub 936)
  - New Construction Program (Sub 1021)
  - Load Control Program (EnergyWise Home) (Sub 927)
  - Save Energy and Water Kit Program (Sub 1085)
  - Energy Assessment Program (Sub 1094)

- Non-Residential
  - Non-Residential Smart $aver Energy Efficient Products and Assessment Program (formerly Energy Efficiency for Business Program) (Sub 938)[1]
  - Non-Residential Smart $aver Performance Incentive Program (Sub 1126)[2]
  - Small Business Energy Saver Program (Sub 1022)
  - CIG Demand Response Automation (CIG DRA) Program (Sub 953)
  - EnergyWise for Business (Sub 1086)
- Combined Residential and Non-Residential
  - Energy Efficient Lighting Program (EE Lighting) (Sub 970)
  - Distribution System Demand Response (DSDR) Program (Sub 926)

Each of these programs has previously received Commission approval as a new DSM or EE program and is eligible for cost recovery under N.C. Gen. Stat. § 62-133.9, subject to certain program-specific conditions imposed by the Commission regarding

[1] The Non-Residential Smart $aver EE Products and Assessment program encompasses its own sub-portfolio of programs, which include the Smart $aver Performance (Custom) and Smart $aver Performance (Prescriptive) programs. These programs are listed under the same tariff in Docket No. E-2, Sub 936, but are reflected separately in Evans Exhibit 7 because of the unique nature of each program.

[2] Approved December 20, 2016.

the recovery of net lost revenues (NLR) and portfolio performance incentives (PPI).

Program Performance

Q. PLEASE DISCUSS THE PERFORMANCE OF THE PORTFOLIO.

A. While the testimony and exhibits of DEP witness Evans provides information regarding the performance of each program in DEP's portfolio, I want to bring certain information to the Commission's attention regarding the performance of particular programs, as well as the performance of DEP's overall portfolio. While the portfolio of programs seems generally to be performing satisfactorily, the level of savings obtained from non-specialty light-emitting diode (LED) lighting-related measures and the MyHER program merit further discussion. I also discuss the performance of the Residential Smart $aver EE Program, and its struggles to remain cost-effective.

Q. PLEASE DISCUSS YOUR OBSERVATIONS CONCERNING LIGHTING-RELATED MEASURES.

A. As seen in Evans Exhibit 1 in this rider and past riders, savings from lighting-related measures continue to provide a significant portion of the savings in the portfolio. The two lighting profiles, residential and non-residential, are comprised of both specialty and non-specialty bulbs. I have serious concerns about the future of the non-specialty bulbs incorporated in the Company's portfolio, which I discuss below.

In various recent dockets[3] over the past two years, including the Sub 1145 proceeding, the Public Staff has highlighted trends that we are seeing in North Carolina regarding the adoption of EE lighting measures. The EE lighting market in North Carolina appears to be transforming at a faster rate than the rest of the country, and non-specialty LED lighting will likely become the baseline standard for general service bulb technologies[4] by January 2020 as phase 2 of the federal government's Energy Independence and Security Act (EISA) goes into effect. This will result in decreased savings from EE lighting programs. Furthermore, I am not aware of any new information that would suggest that federal proposals to revise lighting standards[5] are being delayed or modified. Accordingly, the new EE Lighting EM&V (Evans Exhibit H) states that "under this new phase of EISA, energy-efficient lighting programs, such as the DEP EEL [EE Lighting] program, will no longer be cost-effective or needed."[6]

Evans Exhibit H provides strong evidence that lighting-related programs have assisted in transforming the lighting market in DEP's

[3] DSM/EE Rider proceedings and within the discussion of EE Credits as part of the North Carolina Renewable Energy Portfolio Standard (REPS) Compliance reports and plans.

[4] General service bulbs refer to the general use bulb technologies found in residential lamp shade fixtures.

[5] https://www.federalregister.gov/documents/2017/01/19/2016-32012/energy-conservation-program-energy-conservation-standards-for-general-service-lamps

[6] p. 11.

service territory such that consumers have begun adopting EE on their own without the need for incentives. Market transformation is difficult to determine because the associated metrics are subjective. However, one of the purposes of utility EE programs, including the EE Lighting Program, is market transformation. As technologies become more energy efficient, costs decrease, and consumer acceptance increases, adoption of EE measures should become more the norm.

The Net-to-Gross Ratio (NTGR) for a program can show the degree of consumer acceptance. The NTGR of the EE Lighting Program, as shown in Evans Exhibit H, uses a triangulation approach that takes into account sales data, retailer interviews, and manufacturer interviews. The report concluded that the NTGR for DEP's lighting program is 0.40, which is applicable to all bulb types.[7] However, when looking specifically at the sales data[8] for DEP's LED bulbs, the weighted average of all types of LED bulbs has a NTGR of 0.10, which means that 90% of the LED bulbs in the market during the time-frame of January 1, 2016, through March 12, 2017, would have been purchased even if the program did not exist.

[7] All Bulb types for purposes of this report refers to CFL and LED bulbs.

[8] Sales Data represents the customers who are actually buying the bulb in the stores and not manufacturer/retailer sale records to the stores.

Regardless of the new standard and barring any new technology for lighting, it appears that the lighting market in North Carolina has been transformed, and that further incentives for certain EE lighting measures for certain customers may not be necessary after January 1, 2020.[9] In DEP's 2019 rider proceeding, the Company will file for rider rates that will be effective for the 2020 rate period. I recommend that the Company include in its 2019 DSM/EE rider filing its plans for general service lighting measures in all of its EE programs that include lighting measures.

Q. PLEASE DISCUSS YOUR OBSERVATIONS CONCERNING THE MYHER PROGRAM.

A. The MyHER program provides periodic reports to customers that compare their household energy consumption patterns to those of other similarly situated, nearby households. The reports provide a summary of energy use compared to the customer's neighbors, and also provide energy savings tips to encourage customers to reduce energy consumption. As illustrated on page 5 of Evans Exhibit 1, for Vintage Year 2017, approximately one-half of the energy savings and one-quarter of the peak demand savings of the residential portfolio were derived from the MyHER program.

[9] http://www.nmrgroupinc.com/wp-content/uploads/2017/09/Davids-poster-description.pdf

As indicated in its recent general rate case (Docket No. E-2, Sub 1142), the Company is modernizing its electric grid, in part by updating its metering technology and billing software to allow its customers to access their energy consumption data in a more manageable and timely format. The Company is currently replacing its existing billing meters with Advanced Metering Infrastructure (AMI) meters, as well as replacing and updating its customer information and billing systems.

DEP's AMI deployment and its new customer billing/information software should both be fully implemented by the end of 2021. While both the AMI meters and billing/information software are being deployed in stages over the next three years, customers should begin to experience the benefits of these newer technologies prior to their final completion dates.

To the extent that there is any redundancy in the information (primarily energy saving recommendations and shifting energy use from on- to off-peak periods) available through these new systems and the information provided through the MyHER program, the EM&V for the MyHER program will need to clearly isolate any savings associated with enhanced access to customer data provided through AMI and customer information systems from the impacts

solely attributable to the customized energy-saving suggestions provided by the MyHER program.

The current MyHER EM&V report, filed in this proceeding as Evans Exhibit I, contains a list of key findings,[10] two of which I note: (1) 87% of respondents recalled receiving at least one MyHER, with 98% of those that recalled receiving a MyHER indicating that they "always" or "sometimes" read the reports; (2) respondents reported that the most useful feature of the reports was the graphs illustrating the home's energy usage over time, and the least useful feature was the customized suggestions for the home. Thus, while respondents appear to generally read their MyHER, much of the energy usage information that they find most useful will be, or at least should be, available through AMI and new billing functionalities.

The Public Staff will continue to work with DEP to evaluate the MyHER program to ensure that it produces verifiable and cost effective energy savings as the Company develops its technology base and provides customers with new functionalities.

Q. PLEASE DISCUSS YOUR OBSERVATIONS CONCERNING THE RESIDENTIAL SMART $AVER EE PROGRAM.

[10] Section 4.3 of the report, page 59 of 123.

A. The Residential Smart $aver EE program has struggled to achieve cost-effectiveness for several years because of: 1) higher efficiency standards mandated by the federal government that have increased baselines against which savings impacts have been measured, and 2) the need for large participant incentives to overcome the upfront out-of-pocket costs to participants. Williamson Exhibit No. 1 provides the history of TRC test performance for this program, consisting of Company-filed TRC scores for rider filings, modification filings, and actual year-ending TRC scores. This exhibit shows that the actual TRC test results for this program have not been positive since Vintage Year 2013. Additionally, as illustrated by Evans Exhibit 7, the program is not expected to be cost effective, as measured by the TRC test for Vintage Year 2019.

DEP has consistently advocated the need to offer a residential HVAC (heating, ventilation, and air conditioning) replacement program. Because HVAC is one of the largest energy-consuming users in homes, I agree that a well-designed, cost effective program that encourages adoption of higher efficiency HVAC equipment is fundamental for any utility EE portfolio. DEP has also indicated the importance of maintaining its trade ally network. While it is desirable to maintain a good vendor network that provides customers with accurate, reliable information on HVAC energy consumption and other assistance, ratepayers should not be required to pay for a

program year after year where the costs of the program outweigh the benefits ratepayers receive from the program.

Further, the cost-effectiveness projections continue on a downward trend, forcing ratepayers to shoulder more of the costs but receiving less benefit. While the Company asserts that this program is a necessary and fundamental EE program for an electric utility to offer its customers, the Public Staff continues to believe that N.C. Gen. Stat. § 62-133.9, and the Commission rules implementing this statute, require DEP to offer EE programs that are cost effective. Ratepayers should not be forced to pay for an EE program that has demonstrated over multiple years that it cannot attain and maintain cost effectiveness.

Q. PLEASE PROVIDE YOUR RECOMMENDATION FOR THE RESIDENTIAL SMART $AVER EE PROGRAM.

A. In the Sub 1145 proceeding, the Commission's Order stated that "if the [upcoming] modifications do not maintain or improve the program's cost-effectiveness by the next DSM/EE rider proceeding, the program should be terminated at the end of 2018." The Residential Smart $aver EE Program's performance has not improved.

Therefore, based on the continuing performance of the program, the Sub 1145 Order requiring termination at the end of 2018 if

performance is not improved, and to protect ratepayers from continuing to pay for a program that is not cost-effective, I recommend that the program be closed at the end of 2018.

Q. WHAT ARE THE IMPACTS TO THE REVENUE REQUIREMENT BY CLOSING THE RESIDENTIAL SMART $AVER EE PROGRAM?

A. The impact to the North Carolina revenue requirement is a savings to customers of approximately $424,000 for Vintage Year 2019.

Cost Effectiveness

Q. HOW IS THE COST EFFECTIVENESS OF DEP'S DSM AND EE PROGRAMS EVALUATED?

A. The Public Staff reviews the cost-effectiveness of the individual DSM/EE programs to determine if their benefits outweigh the costs when they are proposed for approval, and on an ongoing basis in the annual DSM/EE rider proceedings. Pursuant to the Revised Mechanism, cost-effectiveness is evaluated at both the program and portfolio levels. The Public Staff reviews cost-effectiveness using the Utility Cost (UC), TRC, Participant, and Ratepayer Impact Measure (RIM) tests. Under each of these four tests, a result above 1.0 for any one test indicates that a program is cost-effective from the perspective of that particular test.

The TRC test represents the overall net system and participant benefits that will result from implementation of the program; a result greater than 1.0 indicates that these overall benefits outweigh the costs of a program to both the utility and the program's participants. A UC test result greater than 1.0 means that the program is cost beneficial[11] to the utility system (the overall system benefits are greater than the utility's costs, including incentives paid to participants). The Participant test is used to understand how ratepayers who do participate in a program will be impacted by the program, and conversely, the RIM test is used to understand how ratepayers who do not participate in a program will be impacted by the program.

Q. HOW IS COST-EFFECTIVENESS EVALUATED IN DSM/EE RIDER PROCEEDINGS?

A. In each DSM/EE rider proceeding, DEP files the projected cost-effectiveness of each program and the portfolio as a whole for the upcoming rate period (Evans Exhibit 7). New DSM/EE programs are approved under Commission Rule R8-68, which evaluates cost-effectiveness over a three- to five-year period using estimates of participation and measure attributes that can be reasonably

[11] "Cost beneficial" in this sense represents the net benefit achieved by avoiding the need to construct additional generation, transmission, and distribution facilities related to providing electric utility service, and/or avoiding energy generation from existing or new facilities or purchased power.

expected over that period. The evaluations in DSM/EE rider proceedings look more specifically at the expected performance of a typical measure in the next year. Each year's rider filing is updated with the most current EM&V data and other program performance data.

Q. HOW DOES THE PUBLIC STAFF ASSESS COST-EFFECTIVENESS IN EACH RIDER?

A. The Public Staff compares the cost-effectiveness test results in previous DSM/EE proceedings to the current filing, and develops a trend of cost-effectiveness that serves as the basis for the Public Staff's recommendation on whether a program should (1) continue as it is currently implemented, (2) be placed under watch for signs of decreasing cost-effectiveness and be modified to sustain cost-effectiveness, or (3) be terminated.

Q. HOW DO THE COST-EFFECTIVENESS TEST SCORES FILED IN THIS RIDER COMPARE TO SCORES IN PREVIOUS RIDERS?

A. While many programs continue to be cost effective, the TRC scores as filed by the Company for the majority of the programs have decreased since the 2017 DSM/EE rider proceeding, mainly due to the change in avoided cost rate determinations, but also due to updated EM&V and program participation. These changes are shown in Williamson Exhibit No. 2.

Q. UNDER DEP'S CALCULATION OF COST-EFFECTIVENESS, ARE THERE ANY PROGRAMS THAT ARE NOT PROJECTED TO BE COST-EFFECTIVE FOR VINTAGE 2019?

A. Yes. Evans Exhibit 7 indicates that the following programs are not cost-effective under either the TRC or UC test, or both:

Program	TRC	UC
Residential Smart $aver EE Program	0.57	0.91
Neighborhood Energy Saver program (low-income)	1.55	0.46
My Home Energy Report program	0.96	0.96
Non-Residential Smart $aver Performance Incentive	0.92	3.75
EnergyWise for Business program	1.07	0.72

Revisions to the Mechanism Approved in Sub 1145

Q. PLEASE DISCUSS THE REVISIONS TO THE SUB 931 MECHANISM THAT WERE APPROVED IN THE SUB 1145 ORDER.

A. As proposed by DEP and the Public Staff, and approved by the Commission in Sub 1145, revisions to the DEP DSM/EE Mechanism were made to better align the avoided cost rates used for DSM/EE PPI calculations, PPI true-up, and program cost-effectiveness evaluations with the current avoided cost rates being implemented

by the Company.[12] These changes are discussed in more detail in the testimonies of Public Staff witnesses Hinton and Maness.

Impact on Portfolio Cost-Effectiveness from the Mechanism Revisions

Q. PLEASE DISCUSS THE IMPACTS TO THE PORTFOLIO AS A RESULT OF THE REVISIONS TO THE MECHANISM APPROVED IN THE SUB 1145 ORDER.

A. In the last rider proceeding, the underlying avoided costs utilized for calculation of avoided energy and avoided capacity values were derived from the 2015 IRP[13] and the 2014 Avoided Cost proceeding,[14] respectively. Under the Revised Mechanism, the underlying avoided costs utilized for the calculation of avoided energy and capacity values in this proceeding are derived from the Avoided Cost Proceeding approved as of December 31, 2017, in Docket No. E-100, Sub 148 (Sub 148).

While the changes in program cost effectiveness from last year's to the current year's rider filing are not solely attributable to the changes in avoided cost rates, the impact of the changes is significant. As

[12] Similar changes were made to the evaluation process for new programs in the Revised Mechanism, but are not an issue in this proceeding. However, the Commission's decision in this proceeding should apply to the evaluation of avoided capacity values for new programs.

[13] Docket No. E-100, Sub 137

[14] Docket No. E-100, Sub 136

calculated by the Company, these changes decreased the dollar impacts on a net present value basis by approximately 35% for avoided energy rates and approximately 15% for avoided capacity rates.[15] Williamson Exhibit No. 2 shows the aggregate impact on program cost-effectiveness, which includes updates to avoided cost rates, EM&V, and program participation.

Q. DOES THE PUBLIC STAFF AGREE WITH DEP'S CALCULATION OF COST-EFFECTIVENESS FILED IN THIS PROCEEDING?

A. No. Based on the information provided in response to the Public Staff's data requests and in conversations with the Company representatives who perform the DSMore modeling,[16] the Public Staff believes that the Company's calculations of cost-effectiveness were not appropriately based on the avoided capacity rates approved by the Sub 148 Avoided Cost Order. The Public Staff believes the Revised Mechanism requires the Company to use avoided capacity rates consistent with Sub 148 Avoided Cost Order and should reflect zero avoided capacity value in years prior to the

[15] The calculations of the decreases in avoided cost were provided to the Public Staff in the Sub 1145 proceeding. These percentages were Company projections of avoided energy and avoided capacity values that could result from the Sub 148 avoided cost proceeding, since an Order by the Commission had not been issued at the time of that rider proceeding.

[16] DSMore is a modeling tool that simulates the impacts (in terms of both energy and demand savings, and avoided cost benefits) that an EE or DSM measure could contribute to a program over a period of time. Usually the model provides projections for the upcoming year. This model takes into account the market potential, current participation, costs, and benefits, along with other economic factors.

identified need for new capacity in the underlying IRP (which in this case is the 2016 IRP) that serves as the basis for the avoided capacity rate calculations.

Q. WHY DO THE PUBLIC STAFF AND THE COMPANY HAVE DIFFERING OPINIONS ON THE USE OF ZEROS IN THE AVOIDED CAPACITY PAYMENTS?

A. From conversations with the Company and responses to Public Staff data requests, the Company believes that there are fundamental differences between a Qualified Facility (QF) and a DSM/EE measure and that the avoided benefits were not intended to be the same for these two sources of non-traditional capacity.

Q. DOES THE PUBLIC STAFF CONTEND THAT THE AVOIDED COST METHODOLOGY USED FOR CAPACITY PAYMENTS TO QFS AND FOR MEASURING COST EFFECTIVENESS OF DSM/EE MEASURES SHOULD BE IDENTICAL?

A. Yes. The basis behind the methodology for calculating these measures should be the same. Through the plain language of the Revised Mechanism, the calculations for both capacity payments and measurements of cost effectiveness should utilize the same methodology and approach as approved by the Commission in its last avoided cost proceeding.

The avoided cost proceeding establishes the avoided cost capacity and energy rates that are applicable to the rates used for payments made to QFs, and the valuation of kWh and kW savings for DSM and EE program. These are separate purposes and one does not have influence on the other. However, both use the same methodology that is the basis of the avoided cost proceeding. DSM/EE impacts do not influence the payments to QFs, and vice versa. The language of the Revised Mechanism that was agreed to by DEP and the Public Staff acknowledges this application of the avoided cost methodology derived from the avoided cost proceeding.

Q. IS THE APPLICATION OF ZEROS IN DETERMINING AVOIDED CAPACITY COSTS, AS DEFINED BY THE SUB 148 ORDER, AN INAPPROPRIATE METHOD FOR ASSESSING THE PERFORMANCE OF DSM/EE PROGRAMS NOW AND GOING FORWARD?

A. No. The Public Staff believes that the Sub 148 Order establishes the methodology by which all other proceedings that incorporate the findings and conclusions represented in the Sub 148 Order should be applied. This includes DEP's DSM/EE portfolio as provided in the Revised Mechanism.

Q. WHEN DID THE PUBLIC STAFF FIRST LEARN THAT THE COMPANY'S CALCULATIONS FOR COST-EFFECTIVENESS

MAY NOT INCLUDE THE USE OF ZEROS FOR CAPACITY IN YEARS WHERE THE IRP DID NOT REFLECT A NEED FOR CAPACITY?

A. In February of this year, while reviewing the results of the cost effectiveness tests for the Prepaid Advantage Energy Efficiency Pilot proposed by Duke Energy Carolinas, LLC, (DEC) the Public Staff realized that the calculations provided by DEC included payments for capacity in years when its 2016 IRP did not reflect a need for capacity. As noted in our comments filed in E-7, Sub 1167, the Public Staff and DEC did not agree on how to calculate the avoided capacity cost rates used in the cost effectiveness tests. Considering the language in DEC and DEP mechanisms for DSM/EE cost recovery regarding the calculation of cost effectiveness is the same, the Public Staff realized that the calculation would likely be an issue in both the DEC and DEP DSM/EE rider proceedings.

Impacts of the Public Staff's Position

Q. WHAT ARE THE IMPACTS ON PORTFOLIO COST-EFFECTIVENESS OF APPLYING ZERO CAPACITY VALUES FOR YEARS PRIOR TO 2022?

A. Williamson Exhibit 3 shows the change in cost-effectiveness scores for each program when no capacity value is given for years that DEP's 2016 IRP does not show a capacity need. I note that programs with measures having lives extending to 2022 and beyond

do include a capacity payment for those periods when the IRP shows a capacity need.

Q. UNDER THE PUBLIC STAFF'S CALCULATION OF COST-EFFECTIVENESS, ARE THERE ANY ADDITIONAL PROGRAMS THAT ARE NOT COST-EFFECTIVE FOR VINTAGE 2019?

A. Yes. In addition to the programs that I listed earlier that had a TRC score of less than 1.0, the TRC test scores for the Residential New Construction, EE for Business, and the EnergyWise for Business programs drop below 1.0 after incorporating zeros for the value for capacity in the appropriate years when in calculating cost-effectiveness. Williamson Exhibit No. 3 highlights the programs that had a TRC score of less than 1.0 as filed by DEP, as well as the additional programs that have a TRC score of less than 1.0 under the Public Staff's position.

Q. WHAT ACTIONS DO YOU RECOMMEND THAT THE COMMISSION TAKE REGARDING PROGRAMS THAT ARE NOT COST EFFECTIVE PURSUANT TO THE REVISED MECHANISM?

A. As part of the Revised Mechanism, the Company and the Public Staff agreed on a procedure for programs that are not cost effective. Under Paragraph 22 and Paragraphs 22A-D of the Revised Mechanism, for any program that initially demonstrates a TRC score less than 1.00, the Company will include in its annual DSM/EE rider

filing a discussion of the actions being taken to maintain or improve cost-effectiveness, or alternatively, its plans to terminate the program. If a program demonstrates a prospective TRC score of less than 1.00 in a second DSM/EE rider proceeding, the Company will include a discussion of what actions it has taken to improve cost-effectiveness. If a program demonstrates a prospective TRC score of less than 1.00 in a third DSM/EE rider proceeding, the Company will terminate the program at the end of the year following the DSM/EE rider order, unless otherwise ordered by the Commission. This approach provides ample time for program modifications to improve cost-effectiveness. I discuss below my recommendations regarding the programs in this rider proceeding that have a projected ongoing TRC score of less than 1.0:

1. The Residential Smart $aver EE program. My recommendation, as stated earlier in this testimony, should be to close the program at the end of 2018, pursuant to the Commission's order in the Sub 1145 proceeding.
2. The MyHER, Residential New Construction, EE for Business, and Non-Residential Smart $aver Performance Incentive programs fall under Paragraph 22B of the Mechanism,[17]

[17] This is the second year the Non-Residential Smart $Aver Performance Incentive Program has not been cost-effective. The program was launched in January 2017. The Public Staff prefers to give new programs a year to get established before directing the Company to take action to improve cost effectiveness.

which requires that the Company provide a discussion in the next proceeding on the actions being taken to maintain or improve cost-effectiveness, or alternatively, its plans to terminate these programs.

3. The EnergyWise for Business program is a demand-side management program that draws the majority of its avoided benefits from capacity and (T&D) cost reductions. Using the Company's application of avoided capacity costs, this program is cost effective under the TRC test; however, when using the Public Staff's methodology, this program is no longer cost effective, as illustrated in Williamson Exhibit No. 3. Pursuant to Paragraph 23B, the Company should provide a discussion of the actions being taken to maintain or improve cost-effectiveness, or alternatively, its plans to terminate the program. Pursuant to Paragraph 23C of the Revised Mechanism, if this program shows a prospective TRC of less than 1.0 in next year's DSM/EE rider proceeding, the Company should include a discussion of what actions it has taken to improve cost-effectiveness.

EM&V

Q. HAVE YOU REVIEWED THE EM&V REPORTS FILED BY DEP?

A. The Public Staff contracted the services of GDS Associates, Inc., to assist it with review of EM&V. With GDS's assistance, I have

reviewed the EM&V reports filed in this proceeding as Evans Exhibits A through K.

I also reviewed previous Commission orders to determine if DEP complied with provisions regarding EM&V contained in those orders. In the Sub 1145 proceeding, the Commission approved my recommendations that:

1. Future evaluations of the Residential Multi-Family Energy Efficiency program should include a billing analysis and more specific data on bulbs being replaced.
2. Future evaluations of the Small Business Energy Saver program should (a) incorporate HVAC interactive effects and update the coincidence factors for lighting measures, and (b) begin tracking the heating and cooling types of participants to improve estimates of the HVAC interaction factors.
3. Future evaluations of the Neighborhood Energy Saver program, and similar programs, should consider utilizing state-level specific data in its evaluations when providing estimates in the program's EM&V review, unless cost-prohibitive.
4. Future DEP evaluation reports should include a discussion of key methodological differences between past and present evaluations, including differences in methodologies across multiple programs that offer similar or identical measures.

Q. DID DEP ADOPT THE PUBLIC STAFF'S RECOMMENDATIONS IN ITS EM&V REPORTS?

A. Yes. To the extent these recommendations are applicable to the EM&V reports filed in this proceeding, the reports incorporated my recommendations. I understand that the Company's EM&V evaluator intends to incorporate these recommendations in future EM&V reports as well.

Q. DO YOU HAVE ANY RECOMMENDATIONS CONCERNING THE EM&V REPORTS YOU REVIEWED?

A. Yes. I have reviewed the testimony and exhibits of DEP witness Evans concerning the EM&V of DEP's DSM and EE programs. Based upon my review, I have three recommendations that will impact any future analysis of the EE Lighting program (Exhibit H) and one recommendation for the MyHER program (Exhibit I) that will impact current and future analyses.

Q. PLEASE EXPLAIN YOUR EM&V-RELATED RECOMMENDATION REGARDING THE EE LIGHTING PROGRAM.

A. Unless DEP or the program evaluator can demonstrated the following recommendations are cost-prohibitive, in future evaluations of the EE Lighting program, I recommend:

1. The program evaluator should include the basis for the selected weighting methodology (weightings based on bulb

sales, measure savings, or other metric) when assessing program savings. The program evaluator should also indicate what other weighting methodologies were considered and why they were rejected, and why the selected methodology is preferable;

2. The program evaluator should provide further clarity into the sales of incentivized bulbs at dollar/discount stores to determine the income levels of customers purchasing these bulbs. This information would be useful in determining the appropriate NTGR applicable to this category of sales. The program evaluation in Evans Exhibit H asserts a NTGR of 1.00 for these sales, assuming that many of the sales are made by low income customers, who typically would not participate in the program without the incentive. Higher income customers who also shop at dollar/discount stores usually show NTGRs of less than 1.00. The volume of sales from the dollar/discount stores and the potential impacts that result justify my recommendation for further study; and,

3. The program evaluator should update its study on the percentage of bulb sales to residential and non-residential customers.

Q. PLEASE EXPLAIN YOUR EM&V-RELATED RECOMMENDATION REGARDING THE MYHER PROGRAM.

A. The savings and impacts of the MyHER program were evaluated by Nexant, (Evans Exhibit I) for the period of program participation spanning calendar year 2016. Nexant relied upon a randomized control trial (RCT) to determine the savings of program participants. An RCT compares observed differences in energy consumption between the treatment group (program participants) and a control group (non-participants). A benefit of the use of an RCT is that it can isolate the observed differences between the treatment and control group to those which must be attributable to the program. In other words, the only difference in the change in consumption patterns between the treatment and control groups over time is that one group is exposed to the home energy reports and the other is not. The Public Staff recognizes this approach to be a standard and best practice for the evaluation of residential behavioral programs that are similar or identical in nature to the MyHER program.

Nexant evaluated the program savings based on the timing of participation of different groups of customers called "cohorts." As the report describes, a cohort is a group of accounts that are added to the program at a given time. For this evaluation, there were five cohorts: the first included customers who began participating in 2014, the second included those who began participating in 2015, the third included those who began participating in June 2016, the fourth, or Cohort R, included those who began participating in

October of 2015, and the fifth, or Cohort X, included those who began participating in June of 2015.

The annual kWh savings were found to vary by cohort as follows:

Cohort 1 (2014)	-123.8 kWh
Cohort 2 (2015)	-0.4 kWh
Cohort 3 (June 2016)	-2 kWh
Cohort R (October 2015)	-7.7 kWh
Cohort X (June 2015)	-15.5 kWh

Source: Table 3-10 of Evans Exhibit I shows point estimates for each cohort for the 2016 calendar year.

While the Public Staff has confidence in the methodology applied to complete this evaluation and believes that the overall savings appear to be reasonable and in line with the findings of other similar evaluations of residential behavioral savings in the United States, the Public Staff is unable to conclude its review of the overall findings and savings estimates put forth in the evaluation report. The Public Staff will continue to evaluate Evans Exhibit I and will coordinate with DEP to conduct additional review of the data used in the evaluation. As a result, the Public Staff is not able to make a definitive recommendation on Evans Exhibit I in this proceeding and bring its review to a conclusion. Therefore, it is my recommendation is to postpone acceptance of the results of the MyHER program evaluation for the purposes of this EE Rider proceeding. However, the Public Staff will continue to review this report and offer further recommendations in the next DSM/EE rider proceeding.

Q. SHOULD THE EM&V REPORTS FILED IN THIS PROCEEDING BE ACCEPTED AS COMPLETE?

A. With the exception of Evans Exhibit I as discussed above, the program vintages for which the remaining EM&V reports were filed in this proceeding should be considered complete and do not require any adjustment to the impacts at this time. With respect to Evans Exhibit I, I believe it is appropriate to postpone accepting Evans Exhibit I until the Public Staff can conclude its review, which would be addressed in DEP's 2019 DSM/EE rider proceeding.

Q. WERE THERE ANY EM&V REPORTS THAT WERE CARRIED OVER FROM LAST YEAR'S RIDER PROCEEDING AND LEFT OPEN FOR REVISION?

A. Yes. In the Sub 1145 proceeding, I recommended that the EM&V reports for the Small Business Energy Saver and the Multi-Family EE programs (Evans Exhibits D and E, respectively, filed in the Sub 1145 proceeding) be revised before accepting them as complete. These reports have been revised and submitted as Evans Exhibits J and E, respectively, in this proceeding. The Public Staff's review indicates that the Company appropriately incorporated the Public Staff's previous recommendations into these EM&V reports. Therefore, I recommend that Evans Exhibits J and E be considered complete for purposes of calculating program impacts in this proceeding.

Q. HAVE YOU CONFIRMED THAT THE COMPANY'S CALCULATIONS INCORPORATE THE VERIFIED SAVINGS OF THE VARIOUS EM&V REPORTS?

A. Yes. As in previous cost recovery proceedings, I was able, through sampling, to verify that the changes to program impacts and participation were appropriately incorporated into the rider calculations for each DSM and EE program, as well as the actual participation and impacts calculated with EM&V data. I reviewed: (1) workpapers provided in response to data requests; (2) a sampling of the EE programs; and (3) Evans Exhibit 1, which incorporates data from various EM&V studies. I also met with DEP personnel to review the calculations, EM&V, DSMore runs, and other data related to the program/measure participation and impacts. Based on my ongoing review of this data, I believe DEP has appropriately incorporated the findings from EM&V studies and annual participation into its rider calculations consistent with Commission orders and the Mechanism. I will continue to review this information and, if necessary, file further information with the Commission should my review reveal any relevant issues that would cause me to alter my recommendations or conclusions.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

APPENDIX A

DAVID M. WILLIAMSON

I am a 2014 graduate of North Carolina State University with a Bachelor of Science Degree in Electrical Engineering. I began my employment with the Public Staff's Electric Division in March of 2015. My current responsibilities within the Electric Division include reviewing applications and making recommendations for certificates of public convenience and necessity of small power producers, master meters, and resale of electric service; reviewing applications and making recommendations on transmission proposals for certificates of environmental compatibility and public convenience and necessity; and also interpreting and applying utility service rules and regulations.

My primary responsibility within the Public Staff is reviewing and making recommendations on DSM/EE filings for initial program approval, program modifications, EM&V evaluations, and on-going program performance of DEC, DEP, and DENC's portfolio of programs. I filed an affidavit in DEP's 2016 DSM/EE rider proceeding in Docket No. E-2, Sub 1108. I have filed testimony in DEP's 2017 DSM/EE rider proceeding in Docket No. E-2, Sub 1145 and also in DEC's 2018 DSM/EE rider proceeding in Docket No. E-7, Sub 1164.

Public Staff
Williamson Exhibit #1

Duke Energy Progress, LLC
Timeline of Cost-Effectiveness for the Residential Smart $aver EE Program (formerly known as HEIP)
Docket Number E-2, Sub 1174

Filing Year	2012	2013	2014	2015	2016	2017	2018
Vintage Year	V2013	V2014	V2015	V2016	V2017	V2018	V2019
Rider filing projections for the Vintage year (projection)	-	1.20	0.90	0.80	0.49	0.67	0.57
Modification TRC values (projection)	-	-	-	0.91	-	1.23	-
Actual performance for the Vintage year	0.90	0.80	0.89	0.64	0.48	-	-

Public Staff
Williamson Exhibit #2

Duke Energy Progress, LLC
Comparison of "As-Filed" Cost-Effectiveness Scores to Previous DSM/EE Riders
Docket Number E-2, Sub 1174

	Evans Exhibit 7 in Sub 1108				Evans Exhibit 7 in Sub 1145				Evans Exhibit 7 in Sub 1174				Changes from Sub 1145 to Sub 1174
Program	UCT	TRC	RIM	PCT	UCT	TRC	RIM	PCT	UCT	TRC	RIM	PCT	TRC % Change
Residential Programs													
Appliance Recycling Program	1.15	1.67	0.39	-	1.07	1.43	0.50	-	-	-	-	-	-
Energy Education Program for Schools	0.97	1.33	0.53	-	1.15	1.62	0.54	-	1.62	2.24	0.76	-	38.4%
Energy Efficient Lighting	2.63	3.54	0.50	8.08	2.36	4.09	0.74	8.77	1.79	2.58	0.57	6.36	-36.8%
Home Energy Improvement	0.83	0.49	0.51	0.86	0.91	0.67	0.57	1.30	0.91	0.57	0.48	1.36	-14.7%
Multi-Family	2.15	3.08	0.66	-	3.39	6.19	0.81	-	3.00	5.58	0.64	-	-9.7%
Neighborhood Energy Saver	0.50	1.87	0.35	-	0.57	1.60	0.37	-	0.46	1.55	0.31	-	-2.8%
Residential Energy Assessments	1.80	2.03	0.75	-	2.23	2.53	0.77	-	1.54	1.71	0.60	-	-32.7%
Residential New Construction	1.11	1.20	0.71	1.95	2.27	1.26	0.97	1.88	1.96	1.03	0.86	1.85	-17.8%
Save Energy and Water Kit	6.76	13.11	0.71	6.76	7.77	19.61	0.84	-	12.43	27.29	0.95	-	39.2%
Residential Home Advantage	-	-	-	-	-	-	-	-	-	-	-	-	-
My Home Energy Report	1.08	1.08	0.57	6.76	1.42	1.42	0.08	-	0.96	0.96	0.48	-	-32.7%
EnergyWise Home	10.10	55.80	10.10	6.76	10.06	94.65	10.06	-	9.28	58.30	9.28	-	-38.4%
Residential Total	**2.28**	**2.73**	**0.83**	**5.53**	**3.07**	**3.16**	**0.66**	**10.66**	**2.79**	**2.70**	**1.03**	**5.28**	-14.5%
Non-Residential Programs													
Business Energy Reports	1.03	1.03	0.64		-	-	-	-	-	-	-	-	-
Smart$aver EE Products and Assessment (formally EE for Business)	3.15	1.57	1.22	1.72	-	-	-	-	-	-	-	-	-
Energy Efficient Lighting	19.03	5.85	0.94	8.38	6.13	10.61	1.92	8.77	4.63	7.98	1.21	12.09	-24.8%
Smart $aver Performance (Custom)[1]	-	-	-	-	3.94	0.98	1.22	1.33	2.45	1.07	0.77	1.99	8.8%
Smart $aver Performance (Prescriptive)[1]	-	-	-	-	2.64	1.19	1.02	1.79					-10.2%
Smart $aver Performance Incentive	-	-	-	-	0.54	0.40	0.42	1.58	3.75	0.92	0.95	1.64	126.7%
Small Business Energy Saver	2.36	5.45	1.06	9.01	3.13	2.00	1.13	2.83	2.57	1.60	0.87	2.87	-19.9%
EnergyWise ® for Business	1.29	1.82	1.00	1.72	1.80	2.32	1.25	-	0.72	1.07	0.62		-53.8%
Commercial Industrial Governmental Demand Response	2.62	42.22	2.62	2.81	2.67	4.33	2.67	-	2.06	33.28	2.06		668.7%
Non-Residential Total	**2.86**	**3.10**	**1.35**	**3.20**	**2.87**	**1.77**	**1.25**	**2.36**	**2.41**	**1.56**	**1.01**	**2.37**	-12.0%
Overall Portfolio total	**2.50**	**2.88**	**1.00**	**4.42**	**2.99**	**2.45**	**0.79**	**5.94**	**2.63**	**2.12**	**1.03**	**3.67**	-13.5%

[1] Similar to what DEC has done, DEP is combining the Performance Custom and Performance Prescriptive programs due to their similarities in participants and renaming them Non-Residential Smart Saver (formerly known as EE for Business)

Public Staff
Williamson Exhibit #3

Duke Energy Progress, LLC
Comparison of Program/Portfolio Cost Effectiveness - Program Year 2019
Docket Number E-2, Sub 1174

	Original - As Filed				Public Staff position on applying zeros to avoided capacity			
	Evans Exhibit 7				Evans Exhibit 7			
Program	UCT	TRC	RIM	PCT	UCT	TRC	RIM	PCT
Residential Programs								
· Appliance Recycling Program								
· Energy Education Program for Schools	1.62	2.24	0.76		1.31	1.77	0.63	
· EnergyWise Home	9.28	58.30	9.28		8.93	56.11	8.93	
· Home Energy Improvement	0.91	0.57	0.48	1.36	0.81	0.52	0.44	1.36
· Neighborhood Energy Saver	0.46	1.55	0.31		0.41	1.21	0.28	
· Multi-Family Energy Efficiency Program	3.00	5.58	0.64		2.69	4.79	0.60	
· My Home Energy Report	0.96	0.96	0.48		0.75	0.75	0.39	
· Residential Energy Assessments	1.54	1.71	0.60		1.39	1.53	0.56	
· Residential New Construction	1.96	1.03	0.86	1.85	1.75	0.95	0.80	1.85
· Energy Efficient Lighting	1.79	2.58	0.57	6.36	1.63	2.29	0.54	6.36
· Save Energy and Water Kit	12.43	27.29	0.95		10.71	22.05	0.86	
Residential Total	**2.79**	**2.70**	**1.03**	**5.28**	**2.50**	**2.42**	**0.96**	**5.28**
Non-Residential Programs								
· Energy Efficiency for Business	2.45	1.07	0.94	1.51	2.18	0.99	0.87	1.51
· Performance Incentive	3.75	0.92	0.95	1.64	3.37	0.86	0.90	1.64
· CIG DRA	2.06	33.28	2.06		1.84	29.83	1.84	
· EnergyWise for Business	0.72	1.07	0.62		0.42	0.61	0.37	
· Energy Efficient Lighting	4.63	7.98	1.21	12.09	4.16	6.89	1.13	12.09
· Small Business Energy Saver	2.57	1.60	0.87	2.87	2.24	1.43	0.79	2.87
Non-Residential Total	**2.41**	**1.56**	**1.01**	**2.37**	**2.12**	**1.40**	**0.92**	**2.37**
Overall Portfolio Total	**2.63**	**2.12**	**1.03**	**3.67**	**2.34**	**1.91**	**0.94**	**3.67**