Summary of the Testimony of Brian S. Pratt

My testimony includes the following findings and recommendations:

1. Staff has concerns related to the program participation and cost-effectiveness of the proposed Bring Your Own Smart Thermostat Program. Consequently, Staff does not recommend approval of this program. Should the Company desire to pursue this program, it may be more appropriately implemented as a modification to the Company’s current Peak Reduction Program, a similarly designed program currently approved by the Commission and recovered in frozen base rates.

2. After several corrections to the Company’s cost/benefit test calculations, the proposed Appliance Recycling Program no longer passes two of the four cost/benefit tests. This program also reflects high free-ridership and participation estimates that appear to be unsupported based on the empirical evaluation, measurement and verification ("EM&M") results of the program to date. Consequently, Staff does not recommend approval of this program.

3. The Company did not appear to account for a federal change in lighting efficiency standards that will take place in 2020. This change affects the projected savings of many of the LED lighting measures within the proposed Multi-Family Direct Install ("MFDI") Program, Efficient Products ("EP") Program, and eScore Program. As a result, the proposed MFDI Program no longer passes three of the four cost/benefit tests and Staff does not support its approval.

4. Secondly, as a result of the federal change in lighting efficiency standards stated above, the proposed EP Program no longer passes two of the four cost/benefit tests. Additionally, some incremental cost assumptions are too low, which over-inflates the results of several of the cost/benefit tests for the program. Consequently, Staff does not recommend approval of this program.

5. The cost effectiveness of the proposed eScore Program is dependent on the assumptions related to the rebate component of the program, which appear unsupported based on EM&M reports from jurisdictions where American Electric Power Company subsidiaries have similar programs, including APCo's Virginia service territory. As such, Staff is unable to support approval of the program.

6. Residential customers billed for 1,000 kilowatt-hours of monthly usage will see a $0.20, or approximately 0.17%, increase in their monthly bills. APCo customers in other non-exempt rate classes will see a similar percentage increase in their monthly bills.

7. The Company's proposed EE-RAC charges are based on the same methodology that was approved by the Commission in the most recent EE-RAC proceeding in Case No. PUE-2016-00089. Should the Commission approve a revenue requirement that differs from the Company's proposed revenue requirement of approximately $6.9 million in this case, Staff recommends that the EE-RAC surcharges be adjusted proportionately.
Q1. PLEASE STATE YOUR NAME AND POSITION WITH THE STATE CORPORATION COMMISSION ("COMMISSION").

A1. My name is Brian S. Pratt. I am a Senior Utilities Analyst in the Commission's Division of Public Utility Regulation.

Q2. WHAT ARE YOUR PRESENT RESPONSIBILITIES?

A2. My primary functions are to analyze demand-side management ("DSM") plans proposed by public utilities regulated by the Commission and to analyze public utility certificate and rate case applications with regard to cost of service, tariff revisions, and rate design. I am also responsible for presenting testimony as a witness and making alternative proposals to the Commission when appropriate.

Q3. PLEASE BRIEFLY SUMMARIZE THE PETITION FILED IN THIS PROCEEDING.

A3. On September 29, 2017, Appalachian Power Company ("APCo" or "Company") filed with the State Corporation Commission ("Commission") a petition ("Petition") for approval to implement six new DSM programs and to extend two existing DSM programs (collectively, the "Proposed EE/DR Portfolio"). Specifically, the Company
requests approval to implement the following newly proposed DSM programs for a three-year period starting January 1, 2019:

- Residential eScore ("eScore") Program;
- Residential Multi-Family Direct Install ("MFDI") Program;
- Residential Bring-Your-Own Smart Thermostat ("BYOT") Program;
- Commercial and Industrial Lighting ("C&I Lighting") Program;
- Commercial and Industrial Standard ("C&I Standard") Program; and
- Small Business Direct Install ("SBDI") Program.1

The Company also requests approval to extend the following two previously approved DSM programs2 for an additional three-year period starting January 1, 2019:

- Residential Efficient Products ("EP") Program;
- Residential Appliance Recycling ("AR") Program.3

The Company estimates that it will spend approximately $27.3 million on the Proposed EE/DR Portfolio over the three-year period starting in January 2019 and is requesting recovery of the costs of the Proposed EE/DR Portfolio, including a margin on the program expenses, through the existing rate adjustment clause designated "EE-RAC."4 Specifically, the Company requests approval to continue the EE-RAC for the July 1, 2018 through June 30, 2019 rate year ("2018 Rate Year") for recovery of: (i) 2018 Rate Year costs associated with the Company's current and proposed EE/DR

1 Petition at 2-4; Pre-filed Direct Testimony of Zachary L. Bacon ("Bacon Direct") at 7.
3 Petition at 1; Bacon Direct at 7.
4 Bacon Direct at 10.
programs ("Projected Factor"); and (ii) any (over)/under recovery of costs associated with the EE/DR Portfolio as of June 30, 2018 ("True-Up Factor"). The Company’s proposed EE-RAC revenue requirement for the 2018 Rate Year is $6,921,333 which consists of a Projected Factor of $7,547,888 and a True-Up Factor credit of ($626,555).

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A4. My testimony:

(i) describes the Proposed EE/DR Portfolio and each respective program;

(ii) analyzes the program designs and assumptions of the Proposed EE/DR Portfolio and each respective program;

(iii) analyzes the cost/benefit test results of the Proposed EE/DR Portfolio and each respective program;

(iv) examines the proposed jurisdictional and class revenue apportionment; and

(v) examines the proposed rate design for the EE-RAC.

THE PROPOSED EE/DR PORTFOLIO

Q5. PLEASE BRIEFLY SUMMARIZE APCO’S SIX NEW PROPOSED DSM PROGRAMS.

A5. APCo has proposed three new residential programs and three new commercial programs. A detailed description of these programs may be found in Schedule 2 of the direct testimony of Zachary L. Bacon and Schedule 1 of the direct testimony of Fred D. Nichols II.
Proposed New Residential Programs:

Residential eScore Program

The eScore program will offer online assessments, in-home assessments, a variety of direct install measures and incentives for other major measures to promote energy efficient homes. According to the Company, the in-home assessments as well as the direct install measures will be offered to customers at no charge. These eligible direct install measures include energy efficient lighting, water savings devices, water heater temperature setback, water heater pipe insulation and tank wrap, and smart thermostats. Incentives are also offered for other major measures, including heat pumps, high efficiency fan motors, air sealing, attic insulation, duct sealing, and smart thermostats.

Residential Multi-Family Direct Install Program

The MFDI program will target multifamily residential properties with four or more units per building. The program will involve the direct installation of energy-saving measures and materials in individual units of multi-family buildings, as well as identifying and assisting in the completion of additional, targeted energy savings opportunities. According to the Company, walk-through assessments with direct install measures will be provided at no charge to qualifying customers. Opportunities for deeper savings and common area measures will also be identified and presented to building managers and/or owners.
Bring-Your-Own Smart Thermostat Program

The BYOT Program provides residential customers the opportunity to enroll a qualifying Wi-Fi enabled thermostat in a demand response program. Under the Program, the customer purchases and installs the smart thermostat. Customers with existing smart thermostats and customers who purchase new smart thermostats will be eligible. During a load management event, the Company will either cycle the customer’s HVAC unit or raise the set point of the thermostat. Load management events will be at the discretion of the Company with up to 25 events per calendar year, with 10 events being reserved for system emergency conditions.

Proosed New Commercial Programs:

Commercial and Industrial Lighting Program

The C&I Lighting Program generates energy efficiency through the promotion of high efficiency lighting upgrades. Under the program, commercial and industrial customers will be eligible for rebates to cover a portion of the cost of energy efficient lighting technology. The program will utilize local contractors and installers for the lighting equipment installations and customers are also permitted to self-install. The program will provide cash-back mail-in incentives for the installation of qualifying energy efficient lighting equipment and will focus exclusively on T5 and light-emitting diode ("LED") lights.
Commercial and Industrial Standard Program

The C&I Standard Program generates energy efficiency through the promotion of high efficiency non-lighting measures. Under the program, commercial and industrial customers will be eligible for cash-back mail-in rebates for the installation of qualifying energy efficient non-lighting equipment. The Program will utilize local contractors and installers for the non-lighting equipment installations. Customers are also permitted to self-install. Eligible measures will include variable frequency pumps and fans, packaged terminal heat pumps, room occupancy sensors for HVAC, commercial refrigerators and freezers, heater controls for refrigeration, auto closers for walk-in coolers, ENERGY STAR® refrigeration doors, cooler and freezer ECM’s, low-flow pre-rinse sprayers, variable frequency drive air compressors, condensate drains for air conditioners, air nozzles for air compressors, and vending machine controls.

Small Business Direct Install Program

The SBDI Program offers on-site energy assessments, direct installation of certain energy efficient measures, and financial incentives for other measures to capture deeper energy savings. The program targets small business customers with a peak demand of 200 kilowatts ("kW") or less. The energy assessments and measure installation will be performed by trade allies participating in the program or the program implementation contractor. Direct install measures will be provided at no charge and a customized Energy Report will be provided to each participant to identify additional energy efficiency improvements. The direct install measures include LED screw in bulbs, low-flow faucet aerators and showerheads, and low-flow pre-rinse sprays. Additional rebate
measures include LED bulbs and fixtures, T5 lamps, high performance T8 lamps, refrigerated case lighting, auto closers for walk-in freezers, strip curtains, LED exit signs, and occupancy sensors.

Q6. PLEASE BRIEFLY DESCRIBE THE TWO PREVIOUSLY APPROVED DSM PROGRAMS THE COMPANY IS REQUESTING TO EXTEND.

A6. The Company is proposing to extend two existing residential programs. A detailed description of these two programs may be found in Schedule 2 of the direct testimony of Zachary L. Bacon.

Residential Efficient Products Program

The EP Program promotes the purchase and installation of high-efficiency ENERGY STAR electric lighting and appliances. The electric lighting measures focus on the purchase of LEDs. The high efficiency appliances are refrigerators, room air purifiers, clothes washers, dehumidifiers, freezers, and heat pump water heaters. The lighting component of the program offers instant rebates at the point of purchase, whereas rebates associated with the appliance component of the program are administered through online or mail-in rebates.

Residential Appliance Recycling Program

The AR Program permanently removes operable second refrigerators and freezers from the power grid and recycles them in an environmentally friendly manner. APCo offers a $50 incentive to each customer who turns in a secondary refrigerator or freezer to be recycled.
Q7. **HOW DID STAFF EVALUATE THE COST-EFFECTIVENESS OF THE PROPOSED PROGRAMS?**

A7. Staff evaluated the proposed programs according to the definition of "in the public interest" as set forth in § 56-576 of the Code of Virginia ("Code"), which states:

"In the public interest," for purposes of assessing energy efficiency programs, describes an energy efficiency program if, among other factors, the net present value of the benefits exceeds the net present value of the costs as determined by the Commission upon consideration of the following four tests: (i) the Total Resource Cost Test; (ii) the Utility Cost Test (also referred to as the Program Administrator Test); (iii) the Participant Test; and (iv) the Ratepayer Impact Measure Test. Such determination shall include an analysis of all four tests, and a program or portfolio of programs shall not be rejected based solely on the results of a single test. In addition, an energy efficiency program may be deemed to be "in the public interest" if the program provides measurable and verifiable energy savings to low-income customers or elderly customers.

A brief description and the associated formula of each cost/benefit test can be found in Attachment No. BSP-1.

Q8. **HOW MAY THE COST/BENEFIT TEST RESULTS BE EXPRESSED?**

A8. The cost/benefit test results may be expressed directly in terms of net present values ("NPV") or as ratios. If a test result is to be expressed as a ratio, the total NPV benefits are divided by the total NPV costs. If a test ratio is greater than one, that indicates that the NPV benefits exceed the NPV costs. While test ratios are a convenient means to summarize the cost/benefit test results, reliance on the cost/benefit ratios alone may be misleading. The NPVs are more useful for summarizing and comparing programs.5

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5 California Standard Practice Manual, July 2002, at 3-5. These pages are attached to this testimony as Attachment No. BSP-2.
Q9. **DID THE COMPANY PRESENT THE COST/BENEFIT TEST RESULTS FOR THE PROPOSED DSM PROGRAMS IN ITS PETITION?**

A9. Yes. The Company's cost/benefit test ratios and NPVs for the proposed DSM Programs are in Schedule 4 of Company witness Bacon's direct testimony. Additionally, the Company's total benefits, total costs, NPVs, and test ratios for each program, as well as the overall portfolio, can be viewed in the table presented on page 1 of Attachment No. BSP-3 for convenience.

Q10. **DID STAFF EVALUATE THE COMPANY'S COST/BENEFIT ANALYSIS USED TO SUPPORT THE TEST RESULTS PRESENTED IN ITS APPLICATION?**

A10. Yes. In addition to examining the Company's cost/benefit test results, Staff also evaluated the Company's analysis used to produce the cost/benefit test results shown in Schedule 4 of Company witness Bacon's direct testimony.

Q11. **HOW DID STAFF EVALUATE THE COMPANY'S COST/BENEFIT ANALYSIS?**

A11. Staff evaluated the Company's cost/benefit analysis by examining and evaluating data supporting the Company's results ("Cost/Benefit Model").

6 The spreadsheet was provided in APCo's response to Staff Interrogatory No. 2-15.

Staff evaluated the model structure, calculations, and the general and program-specific assumptions contained in the Company's Cost/Benefit Model. Where appropriate, Staff also examined the EM&V results of similar programs implemented by APCo in its West Virginia service territory or by American Electric Power Company ("AEP") in AEP's respective service territory.
territories. Staff additionally examined the Virginia EM&V results of currently or previously approved programs.

Q12. DOES STAFF HAVE ANY PRELIMINARY COMMENTS REGARDING THE COMPANY’S COST-BENEFIT RESULTS?

A12. Yes. During Staff’s assessment of the Company’s Cost/Benefit Model, Staff discovered several errors with respect to assumptions and/or calculations used to compute the Company’s cost/benefit results. Staff adjusted these accordingly, utilizing the Company’s Cost/Benefit Model, prior to interpreting and assessing the results. Specifically, Staff adjusted: (i) the Company’s Ratepayer Impact Measure ("RIM") cost calculation,7 (ii) the Company’s weighted average cost of capital ("WCC") assumption,8 and (iii) the Company’s Total Resource Cost ("TRC") calculation.9 The updated cost/benefit results are shown in Attachment No. BSP-3, page 2, and summarized in Table 1 below for convenience.

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7 The Company’s RIM cost calculation did not include its margin allowed on operating expenses pursuant to § 56-585.1 A 5 of the Code. Staff adjusted the calculation to include this margin.
8 The Company’s Cost/Benefit Model contained a WCC assumption of 6.876% which reflects the Company’s WCC established in its biennial review in Case No. PUE-2014-00026. Staff adjusted this input to reflect the Company’s most recently-updated WCC, established in Case No. PUE-2016-00090. This WCC is 7.017%.
9 The Company applied its net-to-gross ratio ("NTGR") to the non-incentive costs in the TRC cost calculation. These costs are direct program costs that will be incurred by the Company and recovered by ratepayers regardless of program participation. As such, they should not be adjusted to reflect the impact of free-riders. Furthermore, the NTGR was not applied to non-incentive costs in the Company’s prior EE-RAC proceeding, Case No. PUE-2014-00039. Thus, Staff’s adjustment is consistent with the Company’s prior methodology.
## Table 1
### APCo’s Cost/Benefit Results – Staff Corrected

<table>
<thead>
<tr>
<th>Program</th>
<th>Net Benefits NPV</th>
<th>Benefit/Cost Ratio</th>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential eScore Program</strong></td>
<td>$7,307,856</td>
<td>4.02</td>
<td>$1,718,206</td>
<td>($6,120,500)</td>
<td>0.46</td>
<td>1.20</td>
</tr>
<tr>
<td><strong>Residential Efficient Products Program</strong></td>
<td>$28,641,718</td>
<td>7.94</td>
<td>$11,733,980</td>
<td>($12,833,328)</td>
<td>0.54</td>
<td>2.96</td>
</tr>
<tr>
<td><strong>Residential Appliance Recycling Program</strong></td>
<td>$4,359,764</td>
<td>5.50</td>
<td>$218,956</td>
<td>($2,386,106)</td>
<td>0.41</td>
<td>0.96</td>
</tr>
<tr>
<td><strong>Residential Multi-Family Direct Install Program</strong></td>
<td>$5,930,216</td>
<td>5.68</td>
<td>$778,826</td>
<td>($5,244,039)</td>
<td>0.40</td>
<td>1.18</td>
</tr>
<tr>
<td><strong>Bring-Your-Own Thermostat Program</strong></td>
<td>$4,571,231</td>
<td>4.52</td>
<td>$4,457,569</td>
<td>$4,034,778</td>
<td>2.36</td>
<td>2.15</td>
</tr>
<tr>
<td><strong>Commercial &amp; Industrial Lighting Program</strong></td>
<td>$33,810,670</td>
<td>3.92</td>
<td>$15,695,110</td>
<td>($17,467,950)</td>
<td>0.53</td>
<td>1.82</td>
</tr>
<tr>
<td><strong>Commercial &amp; Industrial Standard Program</strong></td>
<td>$23,135,446</td>
<td>4.17</td>
<td>$9,256,346</td>
<td>($13,601,517)</td>
<td>0.49</td>
<td>1.64</td>
</tr>
<tr>
<td><strong>Small Business Direct Install Program</strong></td>
<td>$9,736,534</td>
<td>8.98</td>
<td>$2,277,983</td>
<td>($5,917,815)</td>
<td>0.43</td>
<td>1.78</td>
</tr>
<tr>
<td><strong>PORTFOLIO</strong></td>
<td>$117,758,330</td>
<td>4.92</td>
<td>$46,136,976</td>
<td>($59,271,583)</td>
<td>0.54</td>
<td>1.80</td>
</tr>
</tbody>
</table>
Please summarize the results of APCO's cost/benefit analysis as adjusted by staff in Table 1.

A13. A review of the results in Table 1 shows that the proposed AR Program fails two of the four requisite cost/benefit tests. Specifically, the proposed AR Program reflects a net TRC cost of $73,842, rather than a benefit, and a net RIM cost of $2,386,106. This implies that the program would produce a net cost as a total resource option and a net cost to non-participating ratepayers.

The proposed eScore Program, MFDI Program, and SBDI Program all show a relatively large divergence between the net RIM costs and the net TRC benefits. Such a divergence indicates that the net benefits from a total resource perspective come at a relatively high cost to non-participating ratepayers.

The proposed EP Program, C&I Lighting Program, and C&I Standard Program do not reflect as large of a divergence between the net RIM costs and the net TRC benefits. However, both the net RIM costs and the net Participant Test ("PCT") benefits are significantly higher than the other programs. This indicates that these programs would be highly beneficial to program participants, but would also carry a high cost to non-participating ratepayers in return. In effect, these programs represent a large economic transfer of benefits from non-participants to participants.

Q14. Did staff perform its own sensitivity analysis with respect to the requisite cost/benefit tests?

A14. Yes. In addition to the updates and comments discussed in my testimony above, Staff also performed a sensitivity analysis related to the avoided energy cost projections in the Company's Cost/Benefit Model ("Avoided Energy Sensitivity").
Q15. WHY DID STAFF PERFORM ITS AVOIDED ENERGY SENSITIVITY?

A15. The Company’s projected avoided energy costs are based on the Company’s energy price forecasts used in APCo’s 2017 IRP. Staff expressed concern regarding the accuracy of those forecasts in that proceeding. Furthermore, in Case No. PUR-2017-00031, an independent consultant retained by Staff posed an alternative energy price forecast ("Alternative Energy Forecast"). This Alternative Energy Forecast was used by Staff to assess the Company’s proposal in that proceeding. This consultant was not utilized in the instant case and Staff is not addressing the merits of one forecast over the other in this proceeding per se, given that Case No. PUR-2017-00031 is currently pending before the Commission. However, due to Staff’s prior concerns and the availability of the Alternative Energy Forecast, Staff developed an Avoided Energy Sensitivity using the Alternative Energy Forecast in lieu of the Company’s energy price forecast. This sensitivity is intended to provide the Commission with an opportunity to compare the difference in the cost/benefit results due to the differing energy price forecasting techniques.

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10 See the Company’s response to Staff Interrogatory No. 7-30(c) included in Staff Attachment No. BSP-4.
11 In the 2017 IRP, Staff witness Eichenlaub stated on page 17 of his pre-filed direct testimony that “Staff lacks confidence in the commodity pricing assumptions and data used in this IRP and the results of the modeled scenarios.”
12 See Pre-filed Testimony of Bernadette Johnson, Petition of Appalachian Power Company, For a rate adjustment clause pursuant to § 56-585.1 A 6 of the Code of Virginia, Case No. PUR-2017-00031. This case is currently pending before the Commission.
13 See Pre-filed Testimony of Gregory L. Abbott, Petition of Appalachian Power Company, For a rate adjustment clause pursuant to § 56-585.1 A 6 of the Code of Virginia, Case No. PUR-2017-00031. This case is currently pending before the Commission.
Q16. WHAT WERE THE RESULTS OF STAFF'S AVOIDED ENERGY SENSITIVITY?

A16. Staff’s Avoided Energy Sensitivity is presented in Attachment No. BSP-3, page 3. The results indicate lower TRC, RIM, and Utility Cost Test ("UCT") scores for each of the eight proposed programs. This is the result of a reduction in avoided cost benefits due to the lower energy prices in Staff’s Alternative Energy Forecast. The PCT results are unaffected by the sensitivity test. The results associated with the proposed BYOT program change only slightly as the primary avoided cost benefit in this program stems from avoided capacity rather than energy. The remaining seven proposed programs experience a much more significant reduction in avoided costs.

Three of the proposed programs would fail three of the four requisite cost/benefit tests if Staff’s alternative energy price forecast is used. These programs are the proposed eScore Program, AR Program, and MFDI Program. Specifically, the proposed eScore Program reflects a net TRC cost of $1,177,409, a net RIM cost of $8,181,639, and a net UCT cost of $342,932 if Staff’s alternative energy price forecast is used. Additionally, the proposed AR Program reflects a net TRC cost of $666,641, a net RIM cost of $2,978,905, and net UCT cost of $373,842. Finally, the proposed MFDI Program reflects a net TRC cost of $855,292, a net RIM cost of $6,638,778, and net UCT cost of $615,913. This implies that these proposed programs would produce a net cost as a total resource option, a net cost to non-participating ratepayers and would

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14 The participant benefits are customer bill reductions and incentive payments received from APCo. Thus, avoided energy cost benefits are not reflected in the PCT and any changes in avoided energy cost benefits due to Staff’s Avoided Energy Sensitivity would not affect the outcome of the PCT.
also not be cost-beneficial to APCo, if Staff's alternative energy price forecast proves to be accurate.

Q17. DOES STAFF HAVE ANY COMMENTS SPECIFIC TO THE PROPOSED PROGRAMS FOLLOWING ITS EXAMINATION OF THEIR ASSUMPTIONS AND PROGRAM DESIGNS?

A17. Yes. In addition to the comments and recommendations discussed in my testimony above, Staff has several comments and recommendations specific to the respective proposed programs within the proposed EE/DR Portfolio. Staff will present these comments successively by program.

Q18. DOES STAFF HAVE ANY COMMENTS RELATED TO THE PROPOSED BYOT PROGRAM?

A18. Yes. Staff has concerns related to participation in the proposed BYOT Program. Additionally, Staff believes its observations related to the Company's projected capacity benefits may influence the viability of the BYOT Program. Staff's concerns and observations are discussed in my testimony below.
Q19. HOW DID THE COMPANY DETERMINE ITS FORECASTED PARTICIPATION IN THE PROPOSED BYOT PROGRAM OVER THE THREE-YEAR IMPLEMENTATION PERIOD?

A19. According to the Company, the annual participation rates were developed by the Company's implementation contractor.\textsuperscript{15} The Company projects 3,000 new participants annually, totaling 9,000 total participants over the three-year implementation period.\textsuperscript{16}

Q20. WHAT ARE STAFF'S CONCERNS RELATED TO PARTICIPATION IN THE PROPOSED BYOT PROGRAM?

A20. Staff believes that the Company's participation expectations are unrealistic. According to APCo's response to Staff Interrogatory No. 6-028, the Company estimates that only 9,900 of its customers currently have Wi-Fi thermostats installed.\textsuperscript{17} This means that for APCo to meet the Company's expectation of participation, 91 percent of estimated customers with Wi-Fi thermostats installed will have to participate in the proposed BYOT Program.

While it is possible that the number of residential customers with Wi-Fi thermostats will increase due to participation in the Company's proposed EP and eScore Programs\textsuperscript{18} (should they be approved by the Commission), APCo provided no evidence to support such an increase.\textsuperscript{19} Moreover, this would still imply a participation rate of 80 percent for customers with Wi-Fi thermostats based on APCo’s projections. Thus, the

\textsuperscript{15} See the Company's response to Staff Interrogatory No. 6-027 included in Attachment No. BSP-4.
\textsuperscript{16} See Direct Testimony of Fred D. Nichols II, Schedule 1, page 1. Additionally, the estimated program participation was provided in the Company’s Cost/Benefit Model.
\textsuperscript{17} The Company’s response to Staff Interrogatory No. 2-028 is included in Attachment No. BSP-4.
\textsuperscript{18} APCo estimates an additional 1,350 residential customers will purchase smart thermostats through the eScore or EP Programs during the three-year implementation period.
\textsuperscript{19} See the Company’s response to Staff Interrogatory No. 6-027 included in Attachment No. BSP-4.
Company’s projected participation in the proposed BYOT Program appears to be overstated.

Q21. DOES STAFF HAVE ADDITIONAL CONCERNS REGARDING PARTICIPATION IN THE PROPOSED BYOT PROGRAM?

A21. Yes. In addition to the concerns related to the Company’s participation forecast, Staff has concerns regarding potential interaction between participation in the proposed BYOT Program and participation in the currently approved Peak Reduction Program.

Q22. PLEASE BRIEFLY DESCRIBE THE CURRENTLY APPROVED PEAK REDUCTION PROGRAM.

A22. The Peak Reduction Program provides customers with the opportunity to participate in a residential demand response program and, in turn, receive financial incentives for allowing the Company to cycle the central A/C or heat pump system during periods of peak load, high market pricing and/or emergency conditions. The Peak Reduction Program was originally approved in Case No. PUE-2014-00026 and the Company is currently seeking a three-year extension of this program in a separate case proceeding. The costs of the Peak Reduction Program are currently being recovered through frozen base rates.

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Q23. WHAT INTERACTION EXISTS BETWEEN PARTICIPATION IN THE PROPOSED BYOT PROGRAM AND THE CURRENT PEAK REDUCTION PROGRAM?

A23. Both the Peak Reduction Program and the proposed BYOT Program are residential demand response programs open to customers with Wi-Fi thermostats. According to the Company, customers cannot participate in both programs simultaneously. A prospective customer would have to choose between one of the two programs. This circumstance suggests that one or both programs will likely detract from participation in the other, which could further undermine the ability of one or both of the programs to achieve its expected participation (further, Staff expressed concern regarding the going-forward participation forecast for the Peak Reduction Program in Case No. PUR-2017-00094). It is certainly possible that customers could shift from the Peak Reduction Program, under frozen base rates, to the proposed BYOT Program (if approved by the Commission), where costs will be recovered in APCo's proposed EE-RAC.

Q24. TURNING NOW TO STAFF'S OBSERVATIONS RELATED TO CAPACITY, HOW MAY DSM PROGRAMS RESULT IN AVOIDED CAPACITY BENEFITS IN A GENERAL SENSE?

A24. Generally, reduced load attributed to DSM programs, especially peak load reductions, may reduce or delay a utility's need to acquire additional capacity due to reduced capacity demand. This can result in avoided costs (avoided capacity benefits) that

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21 See the Company's response to Staff Interrogatory No. 9-050 included in Attachment No. BSP-4.
22 In Case No. PUR-2017-00094, Staff witness Pratt stated on page 17-18 of his pre-filed direct testimony that "[s]uch a forecasted increase appears to reflect an optimism that is not justified based on customer participation in the program over the 2015 to 2017 period."
would be reflected as an economic benefit in three of the four cost/benefit tests (the
UCT, RIM, and TRC tests).

Q25. WHAT ARE STAFF’S OBSERVATIONS REGARDING THE COMPANY’S
PROJECTED AVOIDED CAPACITY BENEFITS IN THIS CASE?

A25. In the instant case, APCo projects avoided capacity benefits attributed to the proposed
EE/DR Portfolio from 2019 through 2045. However, in its 2017 IRP, the Company
stated that APCo has capacity resources to meet its forecasted internal demand until
2026 when its Clinch River Units 1 and 2 retire.23 Thus, it appears that the Company
would have no need to acquire additional capacity resources until at least 2026. This
remains true even if the impact of anticipated load reductions from the proposed
programs are removed from the Company’s projected capacity position.24 Although the
Company has advised Staff that it will have some opportunities to realize capacity
related benefits in relation to the proposed BYOT Program,25 the extent to which such
benefits will be realized from 2019 to 2025 remains unclear to Staff.

Q26. HOW WOULD THE COST/BENEFIT TEST RESULTS FOR THE PROPOSED
BYOT PROGRAM CHANGE IF THERE WERE NO REALIZED AVOIDED
CAPACITY BENEFITS UNTIL AFTER 2025?

A26. Staff utilized the Company’s Cost/Benefit Model to recalculate the cost/benefit test
results of the proposed BYOT Program without the Company’s projected avoided

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24 See the Company’s response to Staff Interrogatory No. 6-023 and Staff Interrogatory No. 6-023, Attachment 1
included in Attachment No. BSP-4. The Company provided APCo’s “Going-In” Capacity Position with and
without the EE Programs. Both scenarios reflect a capacity surplus position where the Company’s available
capacity exceeds its PJM capacity obligation until 2026.
25 See the Company’s response to Staff Interrogatory No. 9-049 included in Attachment No. BSP-4.
capacity benefits for the years 2019 through 2025 ("Avoided Capacity Sensitivity").

These results are reflected in Attachment No. BSP-3, page 4 and summarized in Table 2 below for convenience.

### Table 2
**APCo's Cost/Benefit Results**
BYOT Program – Staff Avoided Capacity Sensitivity

<table>
<thead>
<tr>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
<th>Bring-Your-Own-Thermostat Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Benefits NPV</td>
<td>$4,571,231</td>
<td>($441,587)</td>
<td>($864,378)</td>
<td>($1,145,445)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>4.52</td>
<td>0.83</td>
<td>0.71</td>
<td>0.65</td>
</tr>
</tbody>
</table>

A review of the results in Table 2 shows that Staff's Avoided Capacity Sensitivity significantly reduces the cost benefit test results of the proposed BYOT Program. Specifically, the proposed BYOT fails three of the four requisite cost benefit tests (the UCT, RIM, and TRC test) under the Avoided Capacity Sensitivity scenario.

**Q27. WOULD THE COST/BENEFIT TEST RESULTS FOR THE OTHER PROPOSED PROGRAMS CHANGE IF THERE WERE NO REALIZED AVOIDED CAPACITY BENEFITS UNTIL AFTER 2025?**

**A27.** Yes; however, the ultimate impact would be immaterial. Staff performed the same capacity benefit adjustments used in Table 2 above for all of the programs in the Company’s proposed EE/DR Portfolio. The proposed BYOT Program is the only program that reflected any material change in results.
Q28. WHAT ARE STAFF’S RECOMMENDATIONS REGARDING THE PROPOSED BYOT PROGRAM?

A28. Due to Staff’s concerns regarding participation and the observations related to the Company’s projected capacity benefits stated above, Staff does not recommend approval of this program. Should the Company desire to pursue this program, it may be more appropriately implemented as a modification to the Company’s current Peak Reduction Program where the Company has previously stated that it would continue to explore alternative load-control options for inclusion in the program.26 Such a modification would also be consistent with Staff recommendations in Case. No. PUR-2017-00094.27

Q29. DOES STAFF HAVE ANY ADDITIONAL COMMENTS WITH RESPECT TO THE PROPOSED AR PROGRAM?

A29. Yes. As noted above in Table 1, which incorporates Staff’s corrections to APCo’s cost/benefit analysis, the proposed AR Program fails both the RIM Test and the TRC Test; however, there are additional factors which should be considered as well. According to the Company’s 2017 Annual Evaluation, Measurement, and Verification Report (“2017 EM&V Report”), the net-to-gross ratio for the AR Program in 2016 was 49 percent.28 In other words, for the APCo customers who participated in the AR Program, 51 percent of these customers were free riders, which means they

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26 In Case No. PUE-2014-00026, Company witness Fawcet stated on pages 6-7 of Schedule 1 of his pre-filed direct testimony that “...APCo will continue to explore other control device and communication options and utilize the best available options in the program.”

27 In Case No. PUR-2017-00094, Staff witness Pratt states on page 1 of his pre-filed direct testimony that “[i]f the Commission determines to extend the Peak Reduction Program, the Staff recommends that the Company study and analyze the Peak Reduction Program immediately for additional improvement opportunities...”

would have recycled refrigerators or freezers anyway. Furthermore, according to the 2017 EM&V Report, only 110 freezers and 322 refrigerators were recycled during 2016 for a combined total of 432 freezers and refrigerators. In its original petition seeking approval of the AR Program, however, the Company anticipated a combined total of 4,477 recycled units annually. In the currently proposed AR Program, the Company expects to recycle 2,300 freezers and refrigerators annually. Such an expectation appears unsupported based on the empirical results of the program to date.

Given the cost/benefit test results for this program reflected in Table 1 and the additional factors discussed immediately above, Staff does not recommend approval of this program.

Q30. HAS STAFF IDENTIFIED ANY MAJOR ISSUES AFFECTING THE COST/BENEFIT ANALYSIS OF APCO'S OTHER PROGRAMS?

A30. Yes. Beginning in 2020 the provisions of the Energy Independence and Security Act of 2007 ("EISA") require new lighting efficiency standards. It is Staff's understanding, by advice of counsel, that pursuant to EISA, if the Secretary of Energy fails to complete a rulemaking by January 1, 2017, to amend the standards in effect for general service incandescent lamps, the sale of any general service lamp that does not meet a minimum efficacy standard of 45 lumens per watt will be prohibited after January 1, 2020. It is Staff's understanding that the Department of Energy ("DOE") did not issue a final rule amending the standards in effect for general service incandescent lamps by January 1,

29 Petition of Appalachian Power Company, For approval to implement a portfolio of energy efficiency programs and for approval of a rate adjustment clause pursuant to §56-585.1 A 5 c of the code of Virginia, PUE-2014-00039, Attachment 2014 Castle C-B Workpapers Virginia multiyear_10_20_2014.xlsx ("Castle Workpapers").
31 See 42 U.S.C.A. §6295(i)(6).
2017. Accordingly, from 2020 forward, compact fluorescent bulbs ("CFLs") will, in effect, become the new commercial standard for required lighting efficiency rather than incandescent bulbs.\textsuperscript{32} This means that the baseline wattages against which LED savings are measured will shift from incandescent bulb wattages to CFL wattages.

Q31. DID APCO INCLUDE THE 2020 BASELINE SHIFT IN THE COMPANY'S COST/BENEFIT ANALYSIS FOR LEDS?

A31. No. APCo followed the Mid-Atlantic Technical Resource Manual ("Mid-Atlantic TRM") in calculating energy savings from LEDs. According to the Mid-Atlantic TRM, the lighting measure savings should be adjusted to account for the 2020 baseline shift;\textsuperscript{33} however the Company stated that no such baseline correction was applied in its analysis.\textsuperscript{34} The Mid-Atlantic TRM provides guidelines for making this 2020 baseline correction.\textsuperscript{35}

Q32. HOW DID STAFF INCORPORATE THE 2020 BASELINE SHIFT INTO THE COMPANY'S COST/BENEFIT ANALYSIS?

A32. To be consistent with the Company's cost/benefit analysis, Staff followed the instructions for calculating energy savings from LEDs in the Mid-Atlantic TRM; however, Staff incorporated the new efficiency standard that is set to take effect in 2020, which is recognized in the Mid-Atlantic TRM guidelines.

\textsuperscript{32} See Attachment No. BSP-5, page 2.
\textsuperscript{34} See the Company's response to Staff Interrogatory No. 10-53, included in Attachment No. BSP-4. The Company interprets EISA to include a requirement that DOE determine that the 2020 standards are technically and economically feasible. APCo states that, to the Company's knowledge, DOE has not yet done so.
Q33. HOW DOES THE 2020 BASELINE SHIFT AFFECT THE COST/BENEFIT RESULTS OF THE PROPOSED MULTI-FAMILY DIRECT INSTALL PROGRAM?

A33. The direct installation of LEDs in place of incandescent light bulbs is an integral component of the MFDI Program. Staff utilized the Company's Cost/Benefit Model, incorporating the 2020 baseline shift into APCo's cost/benefit analysis of the proposed programs. The effect of the 2020 baseline shift may be seen in the following tables.

Table 3
APCo's Cost/Benefit Results-As Filed by APCo
Multifamily Direct Install Program

<table>
<thead>
<tr>
<th></th>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Family Direct Install Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$5,937,690</td>
<td>$813,119</td>
<td>($5,004,900)</td>
<td>$610,109</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>5.68</td>
<td>1.29</td>
<td>0.42</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Table 4
APCo's Cost/Benefit Results-Staff Baseline Correction
Multifamily Direct Install Program

<table>
<thead>
<tr>
<th></th>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Family Direct Install Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$2,734,029</td>
<td>($1,103,393)</td>
<td>($3,781,935)</td>
<td>($1,305,969)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>3.16</td>
<td>0.61</td>
<td>0.31</td>
<td>0.57</td>
</tr>
</tbody>
</table>

As the comparison of Table 3 and Table 4 shows, when the appropriate 2020 baseline shift is incorporated into the Company's cost/benefit analysis, the proposed MFDI Program fails three of the four cost/benefit tests. Consequently, the Staff does not recommend approval of this program.
Q34. DOES STAFF HAVE ANY COMMENTS ON APCO'S PROPOSED EP PROGRAM?

A34. Yes. LED lighting is also a very significant component of the proposed EP Program. As with the MFDI Program, the Company neglected to make the appropriate 2020 baseline shift correction stemming from the EISA. When Staff incorporated the 2020 baseline shift into APCo's cost/benefit analysis, the cost/benefit results changed dramatically. Specifically, the proposed EP Program failed two tests: the RIM Test and the TRC Test. The comparison is shown below in Tables 5 and 6.

Table 5
APCo’s Cost/Benefit Results-As Filed by APCo
Efficient Products Program

<table>
<thead>
<tr>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficient Products Program</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$28,677,813</td>
<td>$11,900,797</td>
<td>($12,645,855)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>7.94</td>
<td>4.80</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Table 6
APCo’s Cost/Benefit Results-Staff Baseline Correction
Efficient Products Program

<table>
<thead>
<tr>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficient Products Program</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$5,769,687</td>
<td>$891,253</td>
<td>($5,620,253)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>2.40</td>
<td>1.28</td>
<td>0.42</td>
</tr>
</tbody>
</table>
Q35. DOES STAFF HAVE ANY ADDITIONAL COMMENTS RELATING TO THE PROPOSED EP PROGRAM?

A35. Yes. Staff questions several incremental cost assumptions utilized by APCo for certain measures proposed for this program: the EP Program Clothes Washer, and EP Program Clothes Dryer. The appropriate participant incremental cost is an important input to the TRC Test (and is a component of the Participant Test). Specifically, the Company’s incremental cost assumptions for these measures are clearly too low.36

As an example, Staff notes that the Company cited an incremental cost for the Clothes Washer measure in Case No. PUE-2014-00039 of $225. 37 In the instant case, the assumed incremental cost is $28. This lower assumed incremental cost over-inflates the cost/benefit tests for several of the measures. For example, while the proposed Clothes Washer measure in the instant case is cost effective in the Company’s cost/benefit analysis, when the Company proposed the Clothes Washer measure in Case No. PUE-2014-00039, the Commission rejected its implementation.38

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36 The reason that the incremental cost (or as referred to in the Company’s cost/benefit analysis, the “Measure Unit Cost”) is too low is rather technical. The incremental cost utilized by the Company is the lifecycle NPV incremental cost found in the Mid-Atlantic TRM. The lifecycle NPV incremental cost is not only too low, because it spreads the incremental cost of the measure over the lifetime of the appliance, but is a discounted value that is discounted a second time in the calculation of the cost/benefit test.

37 See Attachment No. BSP-7. The attachment contains the portion of the spreadsheet provided in Petition of Appalachian Power Company, For approval to implement a portfolio of energy efficiency programs and for approval of a rate adjustment clause pursuant to § 56-585.1 A 5 c of the Code of Virginia, PUE-2014-00039, Attachment 2014 Castle C-B Workpapers Virginia multiyear_10_20_2014.xlsx.

38 Petition of Appalachian Power Company, For approval to implement a portfolio of energy efficiency programs and for approval of a rate adjustment clause pursuant to § 56-585.1 A 5 c of the Code of Virginia, PUE-2014-00039, 2015 S.C.C. Ann. Rept. 215, Final Order (June 24, 2015).
Q36. WHAT ARE STAFF’S RECOMMENDATIONS REGARDING THE PROPOSED EP PROGRAM?

A36. Based on the results in Table 6 above and Staff’s comments related to the incremental cost assumptions stated above, Staff does not recommend approval of this program.

Q37. DOES STAFF HAVE ANY COMMENTS RELATED TO THE PROPOSED eSCORE PROGRAM?

A37. Yes. The proposed eScore program also has the installation of LEDs as a substantial component, and therefore, the energy savings expected to result from the installation of LEDs is diminished by the same 2020 baseline shift correction to the Company’s cost/benefit analysis as previously discussed. The results of Staff’s correction for the 2020 baseline shift are shown in Tables 7 and 8.

Table 7
APCo’s Cost/Benefit Results-As Filed by APCo eScore Program

<table>
<thead>
<tr>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eScore Program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$7,317,065</td>
<td>$1,779,019</td>
<td>($5,819,495)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>4.20</td>
<td>1.51</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Table 8
APCo’s Cost/Benefit Results-Staff Baseline Correction eScore Program

<table>
<thead>
<tr>
<th>Participant (PCT)</th>
<th>Utility (UCT)</th>
<th>Ratepayer (RIM)</th>
<th>Total Resource (TRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eScore Program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefits NPV</td>
<td>$6,127,703</td>
<td>$1,065,941</td>
<td>($5,368,097)</td>
</tr>
<tr>
<td>Benefit/Cost Ratio</td>
<td>3.68</td>
<td>1.31</td>
<td>0.46</td>
</tr>
</tbody>
</table>
While the reduced cost/benefit results are more moderate than those exhibited for the programs discussed above, Staff is concerned that the structure of the eScore Program, especially considering the lower, corrected cost/benefit results, may bring into question whether the eScore program will be cost-effective in practice.

The eScore Program is structured as a program that offers free home audits and direct installation (i.e., at no cost to the homeowner) of low cost energy measures (including LEDs) and rebate measures for more costly energy efficiency measures such as smart thermostats and high-efficiency heat pumps. The aim of the program is to show home owners how they can save energy by means of the free, direct install measures in a home audit in the hope that this will incentivize homeowners to then purchase more costly measures on their own initiative for which they are then able to obtain rebates from the Company. However, the cost effectiveness of the program is dependent on a substantial portion of customers who receive the free audit and direct install measures ultimately participating in the rebate component of the program where they incur out-of-pocket expense.

The cost effectiveness of the proposed eScore program is dependent on the realization of these assumptions relating to the rebate component of the program.

Q38. DOES STAFF BELIEVE THAT PARTICIPANTS IN THE eSCORE AUDIT WILL PARTICIPATE SUFFICIENTLY IN THE REBATE COMPONENT OF THE eSCORE PROGRAM?

A38. Staff does not believe so. The Company assumes that out of 1,500 participants expected to receive an in-home audit, 635 rebate measures will be installed. This
implies a rate of participation of 43.3 percent.\textsuperscript{39} Staff evaluated this assumption by examining the most recent EM&V reports from jurisdictions where AEP's subsidiaries have similar programs, including APCo's Virginia service territory.\textsuperscript{40}

In Virginia, APCo has implemented the Residential Home Performance Program. According to APCo's 2017 EM&V report, during 2016, 3,885 customers participated in the in-home assessment component of this program, while only 5 customers participated in the rebate phase of the program.

AEP has also implemented the Residential Home Smart Program, a program similar in design to the proposed eScore Program, in the service territories of APCo in West Virginia and Wheeling Power Company. The combined EM&V report for 2016 for this program in these service territories shows that for 1,674 in-home assessments performed, 416 rebate measures were installed (approximately 24.9 percent).

The most recent EM&V report, for 2016, for Indiana Michigan Power, an AEP subsidiary, shows results for another program similar to the proposed eScore Program. This EM&V report shows that of the homes receiving a home energy assessment, only approximately 23 percent undertook rebate measures.

Only the latest EM&V report for Kentucky Power ("KP"), another AEP subsidiary, shows substantial participation in the rebate component of a program similar to the proposed eScore Program. In 2016, of 1,748 of participants who received a home audit under KP's Whole House Efficiency Program, 884, or approximately 50.6 percent installed rebate measures.

\textsuperscript{39} Of course, a rebate participant could install more than one measure.

\textsuperscript{40} See Attachment No. BSP-8 for relevant EM&V pages.
AEP-Ohio has implemented a similar program, the In-Home Energy Program, but AEP-Ohio discontinued home audits and assessments as components of this program after May 2016.

Q39. DOES STAFF HAVE ANY COMMENTS REGARDING THE PROPOSED C&I LIGHTING PROGRAM, C&I STANDARD PROGRAM, OR THE SBDI PROGRAM?

A39. Yes. Staff examined these programs as well but did not find any substantive concerns associated these programs. Aside from the comments regarding these programs stated in my testimony above, Staff does not have concerns with the proposed C&I Lighting Program, C&I Standard Program, or SBDI Program.

JURISDICTIONAL ALLOCATION

Q40. PLEASE DISCUSS THE COMPANY'S METHODOLOGY FOR ALLOCATING THE REVENUE REQUIREMENT TO ITS VIRGINIA JURISDICTIONAL RATE CLASSES.

A40. The Company’s proposed allocation methodology is discussed in the Direct Testimony of Helen C. Marshall. Given that all program costs represented in the Company’s Petition are specific to APCo’s Virginia jurisdiction, the revenue requirement associated with the Company’s proposed EE/DR Portfolio is directly assigned to the Company’s Virginia jurisdiction.
PROJECTED COST AND COST RECOVERY

Q41. WHAT IS APCO'S PROJECTED COST FOR THE PROPOSED EE/DR PORTFOLIO?

A41. The Company's total projected three-year cost for the proposed EE/DR Portfolio, including the allowed margin on operating expenses, is approximately $27.3 million.41

Q42. DID THE COMPANY PROPOSE ANY LIMITS ON THE PROJECTED COSTS ASSOCIATED WITH THE PROPOSED EE/DR PORTFOLIO?

A42. No, the Company has not proposed any cost caps associated with the proposed EE/DR Portfolio. Staff witness Mangalam discusses Staff's position with respect to cost caps in her testimony.

Q43. DO THE COMPANY'S PROJECTED THREE-YEAR COSTS FOR THE PROPOSED EE/DR PORTFOLIO INCLUDE LOST REVENUES?

A43. No, the Company's cost projections for the three-year implementation period do not include any estimate of lost revenues.

Q44. DID THE COMPANY PROVIDE AN ESTIMATE OF LOST REVENUES ASSOCIATED WITH THE THREE-YEAR IMPLEMENTATION PERIOD FOR THE PROPOSED EE/DR PORTFOLIO?

A44. No; however, the Company included estimations of total measure life lost revenues42 in its Cost/Benefit Model. For the purposes of recommending a cost cap in this

proceeding, Staff was able to utilize the Cost/Benefit Model to calculate an estimation of annual lost revenues associated with the three-year implementation period of the proposed EE/DR Portfolio.

Q45. **WHAT IS STAFF'S ESTIMATE OF LOST REVENUES ASSOCIATED WITH THE THREE-YEAR IMPLEMENTATION PERIOD?**

A45. Based on the Company’s assumptions and inputs in the Cost/Benefit Model, Staff calculated an estimate of projected lost revenues over the three-year implementation period of approximately $26.9 million. Staff’s estimate of annual lost revenues for each year during the three-year implementation period can be found in the testimony of Staff witness Mangalam.

It should be noted that Staff’s lost revenues estimations reflect estimated projections of future lost revenues based on the assumptions and inputs contained in the Company’s Cost/Benefit Model. Should the Commission approve the proposed EE/DR Portfolio, it is important that these assumptions and inputs be subject to vigorous evaluation, measurement, and verification in order to assure that any actual lost revenues that APCo seeks to recover in the future meet the applicable standards for recovery from ratepayers.

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42 Total measure life lost revenues reflect the estimated total value of all future lost revenues that will be incurred over the expected useful life of each measure within a program. For the purposes of determining a cost-cap, annual lost revenues estimations for the first three years of a program’s implementation are needed.
Q46. IS THE COMPANY REQUESTING RECOVERY OF LOST REVENUES IN THIS INSTANT CASE?

A46. No, the Company is not seeking recovery of lost revenues at this time.43

RIDER EE-RAC RATE DESIGN

Q47. PLEASE DISCUSS THE CALCULATION OF THE PROPOSED EE-RAC SURCHARGES THAT WILL TAKE EFFECT ON JULY 1, 2018

A47. The Company allocated the EE-RAC revenue requirement to the various rate classes on an energy basis, adjusted to exclude large customers exempt under § 56-585.1 A 5 c of the Code. This allocation methodology is consistent with the methodology approved by the Commission in its 2015 EE-RAC Order.44

The Company determined the proposed rates for each class by dividing each class’s allocated costs by the respective class’s kilowatt-hour ("kWh") usage to arrive at the proposed rates per kWh. The class rates determined by this method are displayed in Schedule 1 of the direct testimony of Company witness Helen C. Marshall.

Q48. PLEASE DISCUSS THE IMPACT OF THE COMPANY’S PROPOSED EE-RAC SURCHARGES ON CUSTOMER BILLS.

A48. Typical bill impacts for APCo’s rate classes are shown in Schedule 2 of the direct testimony of Company witness Helen C. Marshall. If the Commission were to approve the EE/DR Portfolio as proposed by the Company, residential customers billed for

43 Petition at 6; Bacon Direct at 12.
44 2015 EE-RAC Order at 15.
1,000 kWh of monthly usage would see a $0.20, or approximately 0.17%, increase in their monthly bills. APCo customers in other rate classes would see a similar percentage increase in their monthly bills.

Q49. DOES STAFF HAVE ANY ADDITIONAL COMMENTS REGARDING THE EE-RAC SURCHARGES PROPOSED IN THIS INSTANT CASE?

A49. Yes. Should the Commission approve a revenue requirement that differs from the Company's proposed revenue requirement of approximately $6.9 million in this case, Staff recommends that the EE-RAC surcharges be adjusted proportionately. Consequently, if the approved revenue requirement is lower than proposed by the Company, the EE-RAC surcharges should be proportionately lower.

STAFF CONCLUSIONS AND RECOMMENDATIONS

Q50. WHAT ARE STAFF’S CONCLUSIONS AND RECOMMENDATIONS REGARDING THE PROPOSED EE/DR PORTFOLIO?

A50. Staff’s conclusions and recommendations regarding the proposed EE/DR Portfolio are as follows:

1. Staff has concerns related to the program participation and cost-effectiveness of the proposed BYOT Program. As a result of Staff’s concerns expressed herein, Staff does not recommend approval of this program. Should the Company desire to pursue this program, it may be appropriately implemented as a modification to the Company’s
current Peak Reduction Program, a similarly designed program currently approved by the Commission and recovered in frozen base rates.

2. After several corrections to the Company's cost/benefit test calculations, the proposed AR Program no longer passes two of the four cost/benefit tests. This program also reflects high free-ridership and participation estimates that appear unsupported based on the empirical EM&V results of the program to date. Consequently, Staff does not recommend approval of this program.

3. The Company did not appear to account for a federal change in lighting efficiency standards that will take place in 2020. This change affects the projected savings of many of the LED lighting measures within proposed MFDI program, EP Program, and eScore Program.

4. As a result of the federal change in lighting efficiency standards stated above, the proposed MFDI program no longer passes three of the four cost/benefit tests. As such, Staff does not recommend approval of this program.

5. As a result of the federal change in lighting efficiency standards stated above, the proposed EP Program no longer passes two of the four cost/benefit tests. Additionally, the Company's incremental cost assumptions associated with two measures in this program are too low. This lower assumed incremental cost further over-inflates several of the cost/benefit tests for the program. Consequently, Staff does not recommend approval of this program.

6. The cost effectiveness of the proposed eScore program is dependent on the realization of assumptions of the rebate component of the program. The realization of these assumptions appears unsupported based on EM&V reports from jurisdictions where
AEP has similar programs, including APCo's Virginia service territory. As such, Staff is unable to support approval of the program. Should the Commission approve the proposed eScore Program, Staff recommends close monitoring of the Company's future EM&V on this program.

7. The Company's proposed EE-RAC charges are based on the same methodology that was approved by the Commission in the most recent EE-RAC proceeding in Case No. PUE-2016-00089

8. If the Commission approves the EE/DR Portfolio as proposed by the Company, residential customers billed for 1,000 kWh of monthly usage would see a $0.20, or approximately 0.17%, increase in their monthly bills. APCo customers in other rate classes would see a similar percentage increase in their monthly bills.

9. Should the Commission approve a revenue requirement that differs from the Company's proposed revenue requirement of approximately $6.9 million in this case, Staff recommends that the EE-RAC surcharges be adjusted proportionately.

Q51. DOES THIS CONCLUDE YOUR TESTIMONY?

A51. Yes, it does.