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September 30, 2026

VIA E-Filing

Matthew Homsher, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: PUC Docket No. M-2020-3020830
Phase IV Energy Efficiency and Conservation Program Final Annual Report for
June 1, 2025 through May 31, 2026

Dear Secretary Homsher:

In accordance with Section IV.F.2 of the Commission's Opinion and Order Letter dated March 25, 2021 (Docket No. M-2020-3020830), enclosed is PECO's ("PECO" or "the Company") Phase IV Annual Energy Efficiency & Conservation Report for the period June 1, 2025 through May 31, 2026.

PECO is providing a copy of the report to the Act 129 Statewide Evaluator (NMR Group) and is also posting the report on the PECO website.

Thank you for your assistance in this matter and please direct any questions regarding the above to Kirthi Kothapalli, Senior Manager, Retail Rates at 267-533-1332 or via email at kirthi.kothapalli@exeloncorp.com.

Sincerely,

Matthew Homsher, Secretary
September 30, 2026
Page 2

Enclosures

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Final Annual Report to the Pennsylvania Public Utility Commission Phase IV of Act 129

Program Year 17
(June 1, 2025 - May 31, 2026)

Prepared for:



For Pennsylvania Act 129 of 2008
Energy Efficiency and Conservation Plan

Submitted by:

Guidehouse Inc.
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September 30, 2026

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Table of Contents

1. Introduction	1
2. Summary of Achievements	2
2.1 Carryover Savings from Phase III of Act 129	2
2.2 Phase IV Energy Efficiency Achievements to Date	3
2.2.1 Phase IV Performance, Multifamily Housing	7
2.3 Phase IV Performance by Customer Segment	7
2.4 Summary of Participation by Program	8
2.5 Summary of Impact Evaluation Results	10
2.6 Summary of Energy Impacts by Program	10
2.6.1 Incremental Annual Energy Savings by Program	11
2.6.2 Lifetime Energy Savings by Program	11
2.7 Summary of Peak Demand Reduction Impacts by Program	12
2.7.1 Peak Demand Savings Nominated to PJM Forward Capacity Market	13
2.8 Summary of Fuel Switching Impacts	14
2.9 Summary of Renewable Energy Impacts	14
2.10 Summary of Cost-Effectiveness Results	14
2.11 Comparison of Performance to Approved EE&C Plan	15
2.12 Findings and Recommendations	17
3. Evaluation Results by Program	18
3.1 Residential EE Program	20
3.1.1 Participation and Reported Savings by Customer Segment	22
3.1.2 Gross Impact Evaluation	22
3.1.3 Net Impact Evaluation	26
3.1.4 Verified Savings Estimates	29
3.1.5 Process Evaluation	30
3.1.6 Program Finances and Cost-Effectiveness Reporting	36
3.1.7 Status of Recommendations	37
3.2 Income-Eligible EE Program	40
3.2.1 Participation and Reported Savings by Customer Segment	41
3.2.2 Gross Impact Evaluation	41
3.2.3 Net Impact Evaluation	43
3.2.4 Verified Savings Estimates	44
3.2.5 Process Evaluation	44
3.2.6 Program Finances and Cost-Effectiveness Reporting	44
3.2.7 Status of Recommendations	46
3.3 Residential HER Program	47
3.3.1 Participation and Reported Savings by Customer Segment	47

3.3.2 Gross Impact Evaluation	47
3.3.3 Net Impact Evaluation	48
3.3.4 Verified Savings Estimates	48
3.3.5 Process Evaluation	49
3.3.6 Program Finances and Cost-Effectiveness Reporting	49
3.3.7 Status of Recommendations	50
3.4 Income-Eligible HER Program	50
3.4.1 Participation and Reported Savings by Customer Segment	50
3.4.2 Gross Impact Evaluation	51
3.4.3 Net Impact Evaluation	52
3.4.4 Verified Savings Estimates	52
3.4.5 Process Evaluation	52
3.4.6 Program Finances and Cost-Effectiveness Reporting	52
3.4.7 Status of Recommendations	53
3.5 Non-Residential EE Program	53
3.5.1 Participation and Reported Savings by Customer Segment	55
3.5.2 Gross Impact Evaluation	55
3.5.3 Net Impact Evaluation	60
3.5.4 Verified Savings Estimates	62
3.5.5 Process Evaluation	62
3.5.6 Program Finances and Cost-Effectiveness Reporting	67
3.5.7 Status of Recommendations	69
4. Portfolio Finances and Cost Recovery	72
4.1 Program Financials	72
4.2 Cost Recovery	73
Appendix A. Site Inspection Summary	75
Appendix B. HER Impact Evaluation Detail	78
B.1 Billing Data Management	78
B.2 Impact Regression Results	78
B.3 Recipient Household Counts	82
B.4 Dual Participation Analysis	83
B.5 Persistence and First-Year Savings	84
B.6 Demand Savings	87
B.7 Summary	88
Appendix C. PY17 and P4TD Summary by Customer Segment and IE Carveout..	90
Appendix D. Summary of Program-Level Impacts, Cost-Effectiveness, and HIM	
NTG	91
D.1 Program- and Component-Level Impacts Summary	91
D.2 Program-Level Cost-Effectiveness Summary	92

D.3 High Impact Measure Net-To-Gross Research	94
D.4 Program-Level Comparison of Performance to the Approved EE&C Plan.....	94
Appendix E. Residential and Income-Eligible EE Programs	96
E.1 Rebates and Marketplace (Market-Rate)	96
E.1.1 Gross Impact Evaluation	96
E.1.2 Net Impact Evaluation	97
E.1.3 Process Evaluation.....	107
E.2 Appliance Recycling (Market-Rate and IE).....	107
E.2.1 Gross Impact Evaluation.....	108
E.2.2 Net Impact Evaluation	110
E.2.3 Process Evaluation.....	114
E.3 In-Home Assessment (Market-Rate).....	114
E.3.1 Gross Impact Evaluation.....	114
E.3.2 Net Impact Evaluation	115
E.3.3 Process Evaluation.....	116
E.4 New Construction (Market-Rate).....	116
E.4.1 Gross Impact Evaluation.....	116
E.4.2 Net Impact Evaluation	117
E.4.4 Process Evaluation.....	117
E.5 Multifamily (Market-Rate and IE).....	117
E.5.1 Gross Impact Evaluation.....	117
E.5.2 Net Impact Evaluation	118
E.5.3 Process Evaluation.....	118
E.6 Single-Family and Long-Term Savings (IE).....	118
E.6.1 Gross Impact Evaluation.....	119
E.6.2 Net Impact Evaluation	120
E.6.3 Process Evaluation.....	120
Appendix F. Residential and Income-Eligible HER Programs	121
F.1 Gross Impact Evaluation	121
F.2 Net Impact Evaluation	121
F.3 Process Evaluation	121
Appendix G. Non-Residential EE Program	122
G.1 Downstream Rebates	122
G.1.1 Gross Impact Evaluation	122
G.1.2 Net Impact Evaluation	124
G.1.3 Process Evaluation	129
G.2 Midstream Rebates	134
G.2.1 Gross Impact Evaluation	134
G.2.2 Net Impact Evaluation	136

G.2.3 Process Evaluation	136
G.3 Small Business Direct Install.....	137
G.3.1 Gross Impact Evaluation	137
G.3.2 Net Impact Evaluation	137
G.3.3 Process Evaluation	137
G.4 New Construction	138
G.4.1 Gross Impact Evaluation	138
G.4.2 Net Impact Evaluation	140
G.4.3 Process Evaluation	140
Appendix H. PY17 Unverified Projects	141
H.1 Residential Program Projected Carryover Projects	141
H.2 Income-Eligible Program Projected Carryover Projects.....	142
H.3 Non-Residential Program Carryover Projects	142
Appendix I. PY14-PY16 Duplicate Projects	143

List of Figures

Figure 2-1. Portfolio Carryover Savings from Phase III of Act 129.....	2
Figure 2-2. Income-Eligible Carryover from Phase III.....	3
Figure 2-3. EE&C Plan Performance Toward Phase IV Portfolio Compliance Target (MWh)	5
Figure 2-4. EE&C Plan Performance Toward Phase IV Portfolio Compliance Target (MW)	6
Figure 2-5. EE&C Plan Performance Toward Phase IV Income-Eligible Compliance Target.....	7
Figure 3-1. PECO Phase IV Verified Savings Pathways	18
Figure 3-2. Rebates and Marketplace Satisfaction for Solar.....	32
Figure 3-3. Likelihood to Recommend Solar (n=67).....	33
Figure 3-4. Whether Respondents Recommended Solar (n=58).....	33
Figure 3-5. Sources of Rebates and Marketplace Awareness for Solar (n=66)	34
Figure 3-6. Timing of Solar Rebate Awareness (n=53).....	35
Figure 3-7. Sources of Solar Installation Interest (n=68)	35
Figure 3-8. Non-Residential Downstream Rebates Component Overall Satisfaction (n=2).....	64
Figure 3-9. Non-Residential Downstream Rebates Component Satisfaction (n=3).....	65
Figure 3-10. Non-Residential Downstream Rebates Component Likelihood to Recommend (n=2).....	66
Figure 3-11. Sources of Non-Residential Downstream Rebates Component Awareness (n=3)67	
Figure E-1. Free Ridership Algorithm – Downstream Pathway – Solar.....	100
Figure E-2. Free Ridership Algorithm – Downstream Pathway – Non-Solar	101
Figure E-3. Free Ridership Algorithm – Rebates and Marketplace – Marketplace	105
Figure E-4. Diagram for Determining Net Savings.....	111
Figure G-1. Free Ridership Algorithm – Downstream Rebates – Solar.....	127
Figure G-2. Downstream Rebates Satisfaction.....	131
Figure G-3. Likelihood of Recommending PECO’s Downstream Rebates Component (n=2)	132
Figure G-4. Recommendation of Ways to Save (n=2)	132
Figure G-5. Contact from Ways to Save Representative (n=3).....	133
Figure G-6. Awareness of PECO’s Downstream Rebates Component (n=3)	134

List of Tables

Table 2-1. PY17 Summary Statistics by Customer Segment.....	7
Table 2-2. Phase IV Summary Statistics by Customer Segment	8
Table 2-3. PY17 and P4TD EE&C Portfolio Participation by Program	9
Table 2-4. PY17 and P4TD Point of Purchase and Giveaway Measures	9
Table 2-5. PY17 Impact Evaluation Results Summary	10
Table 2-6. PY17 and P4TD Incremental Annual Energy Savings by Program (MWh/Yr).....	11
Table 2-7. PY17 and P4TD Lifetime Energy Savings by Program (MWh)	11
Table 2-8. PY17 and P4TD Peak Demand Savings by Energy Efficiency Program (MW/Yr)...	12
Table 2-9. Planned FCM Nominations by Act 129 Program Year and PJM Delivery Year	13
Table 2-10. PY17 and P4TD Fuel Switching Summary	14
Table 2-11. PY17 and P4TD Renewables Summary.....	14
Table 2-12. PY17 Summary of Portfolio Finances – Gross Verified.....	15
Table 2-13. Comparison of Expenditures to Phase IV EE&C Plan (\$1,000)	15
Table 2-14. Comparison of Actual Program Savings to EE&C Plan Projections	16
Table 3-1. Phase IV Gross Impact Evaluation Activities	19

Table 3-2. Phase IV Process and NTG Evaluation Activities	20
Table 3-3. Residential EE Program Participation and Reported Impacts	22
Table 3-4. Residential EE Program PY17 Impact Sample Targets and Completes	23
Table 3-5. Residential EE Program PY17 Gross Impact Results for Energy	23
Table 3-6. Residential EE Program PY17 Gross Impact Results for Demand	24
Table 3-7. Residential EE Program PY17 Energy Ratios	24
Table 3-8. Residential EE Program PY17 Demand Ratios	25
Table 3-9. Residential EE Program PY17 Net Impact Evaluation Results	28
Table 3-10. Residential EE Program PY17 Sample Targets and Completes	29
Table 3-11. Residential EE Program PY17 and P4TD Savings Summary	30
Table 3-12. Residential EE Program PY17 Process Activities by Component	30
Table 3-13. Rebates and Marketplace Solar PY17 Sample Targets and Completes	31
Table 3-14. PY17 Summary of Program Finances – Gross Verified	36
Table 3-15. PY17 Summary of Program Finances – Net Verified	37
Table 3-16. Summary of Residential EE PY17 Evaluation Recommendations	38
Table 3-17. Income-Eligible EE Program Participation and Reported Impacts	41
Table 3-18. Income-Eligible EE Program PY17 Gross Impact Results for Energy	41
Table 3-19. Income-Eligible EE Program PY17 Gross Impact Results for Demand	42
Table 3-20. Income-Eligible EE Program PY17 Energy Ratios	42
Table 3-21. Income-Eligible EE Program PY17 Demand Ratios	42
Table 3-22. Income-Eligible EE Program PY17 and P4TD Savings Summary	44
Table 3-23. PY17 Summary of Program Finances – Gross Verified	44
Table 3-24. Summary of Income-Eligible EE PY17 Evaluation Recommendations	46
Table 3-25. Residential HER Program Participation and Reported Impacts	47
Table 3-26. Residential HER Program PY17 Gross Impact Results for Energy	48
Table 3-27. Residential HER Program PY17 Gross Impact Results for Demand	48
Table 3-28. Residential HER Program PY17 and P4TD Savings Summary	49
Table 3-29. PY17 Summary of Program Finances – Gross Verified	49
Table 3-30. Income-Eligible HER Program Participation and Reported Impacts	51
Table 3-31. Income-Eligible HER Program PY17 Gross Impact Results for Energy	51
Table 3-32. Income-Eligible HER Program PY17 Gross Impact Results for Demand	51
Table 3-33. Income-Eligible HER Program PY17 and P4TD Savings Summary	52
Table 3-34. PY17 Summary of Program Finances – Gross Verified	53
Table 3-35. Non-Residential EE Program Participation and Reported Impacts	55
Table 3-36. Non-Residential EE Program PY17 Project Count by Evaluation Method	56
Table 3-37. Non-Residential EE Program PY17 Gross Impact Results for Energy	56
Table 3-38. Non-Residential EE Program PY17 Gross Impact Results for Demand	57
Table 3-39. Non-Residential EE Program PY17 Energy Ratios	57
Table 3-40. Non-Residential EE Program PY17 Demand Ratios	57
Table 3-41. Non-Residential Program PY17 NTG Survey Sample Targets and Completes	61
Table 3-42. Non-Residential EE Program PY17 Net Impact Evaluation Results	61
Table 3-43. Non-Residential EE Program PY17 and P4TD Savings Summary	62
Table 3-44. Non-Residential EE Program PY17 Process Activities by Component	62
Table 3-45. Non-Residential EE Program PY17 Sample Targets and Completes	63
Table 3-46. PY17 Summary of Program Finances – Gross Verified	67
Table 3-47. PY17 Summary of Program Finances – Net Verified	68
Table 3-48. Summary of Non-Residential EE Program PY17 Evaluation Recommendations ..	70
Table 4-1. PY17 Program and Portfolio Total Finances (\$1,000)	72
Table 4-2. P4TD Program and Portfolio Total Finances (\$1,000)	72
Table 4-3. PY17 and Phase IV EE&C Plan Expenditures by Cost-Recovery Category	73

Table 4-4. PY17 and Phase IV FCM Proceeds from Recognized Peak Demand Reductions (\$1,000)	73
Table A-1. PY17 Non-Residential Site Visit Summary	75
Table B-1. HER Program PY17 Energy Regression Details (kWh/day)	80
Table B-2. HER Program PY17 Percentage Energy Savings	81
Table B-3. HER Program PY17 Active Recipient Households	82
Table B-4. HER Program PY17 Default Upstream Reduction Factors	83
Table B-5. HER Program PY17 Double-Counting Savings Adjustments	83
Table B-6. HER Program PY17 Persistence (MWh)	85
Table B-7. HER Program PY17 First-Year Savings (MWh)	86
Table B-8. HER Program PY17 Demand Regression Details (kW)	87
Table B-9. HER Program PY17 Impacts Summary	89
Table C-1. PY17 and P4TD Summary of Income-Eligible Carveout Energy Savings (MWh/Yr)	90
Table D-1. PY17 and P4TD Incremental Annual Energy Savings by Program and Component (MWh/Yr)	91
Table D-2. PY17 and P4TD Peak Demand Savings by Energy Efficiency Program and Component (MW/Yr)	91
Table D-3. PY17 Gross TRC Ratios by Program (\$1,000) ¹	92
Table D-4. PY17 Net TRC Ratios by Program (\$1,000) ¹	93
Table D-5. P4TD Gross TRC Ratios by Program (\$1,000) ¹	93
Table D-6. P4TD Net TRC Ratios by Program (\$1,000) ¹	93
Table D-7. Comparison of PY17 Expenditures with Phase IV EE&C Plan (\$1,000)	94
Table D-8. Comparison of P4TD Expenditures to Phase IV EE&C Plan (\$1,000)	94
Table D-9. Comparison of PY17 Actual Program Savings with EE&C Plan Projections	94
Table D-10. Comparison of P4TD Actual Program Savings with EE&C Plan Projections	95
Table E-1. Detailed Tracking Database Findings for Rebates and Marketplace	97
Table E-2. Intention Scoring for Rebates and Marketplace - Downstream	98
Table E-3. Influence Ratings for Rebates and Marketplace - Downstream	99
Table E-4. Influence Scoring for Rebates and Marketplace - Downstream	99
Table E-5. Intention Scoring for Rebates and Marketplace - Marketplace	103
Table E-6. Influence Ratings for Rebates and Marketplace - Marketplace	103
Table E-7. Influence Scoring for Rebates and Marketplace - Marketplace	104
Table E-8. Detailed Tracking Database Findings for Appliance Recycling	108
Table E-9. Detailed Survey Findings for Appliance Recycling	109
Table E-10. Appliance Recycling Sample Measure Count	110
Table E-11. Detailed Tracking Database Findings for In-Home Assessment	115
Table E-12. Detailed Tracking Database Findings for Single-Family	119
Table G-1. Downstream Rebates PY17 Project Count by Evaluation Method	123
Table G-2. Intention Scoring for Downstream Rebates - Solar	125
Table G-3. Influence Ratings for Downstream Rebates - Solar	126
Table G-4. Influence Scoring for Downstream Rebates - Solar	126
Table G-5. Midstream Rebates Project Count by Evaluation Method	136
Table G-6. New Construction Project Count by Evaluation Method	139
Table H-1. PY17 Estimate of Unverified Reported Energy and Peak Demand Savings for PY18 Evaluation	141
Table I-1. Savings Adjustments from Duplicate Projects	143

Acronyms

ASHP	Air Source Heat Pump
ATE	Average Treatment Effect
BAS	Building Automation System
C&I	Commercial and Industrial
CACS	Central Air Conditioner Switch
CADR	Clean Air Delivery Rate
CAP	Customer Assistance Program
CF	Coincidence Factor
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CI	Confidence Interval
CL	Confidence Level
CSP	Conservation Service Provider, Curtailment Service Provider
CV	Coefficient of Variation
DLC	Design Lights Consortium
DR	Demand Response
DRA	Demand Response Aggregator
ECM	Electronically Commutated Motor
EDC	Electric Distribution Company
EDT	Eastern Daylight Time
EE	Energy Efficiency
EE&C	Energy Efficiency and Conservation
EEMF	Energy Efficiency Marketing Firm
EFLH	Effective Full Load Hours
EISA	Energy Independence and Security Act of 2007
EM&V	Evaluation, Measurement, and Verification
EPA	US Environmental Protection Agency
ETDF	Energy to Demand Factor
EUL	Effective Useful Life
FPL	Federal Poverty Level
GNI	Government/Education/Nonprofit
HER	Home Energy Report
HIM	High Impact Measure
HOU	Hours of Use
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilating, and Air Conditioning
ICSP	Implementation Conservation Service Provider
IE	Income-Eligible

IMC	Incremental Measure Cost
IMEF	Integrated Modified Energy Factor
IMP	Interim Measure Protocol
kBtu	Kilo British Thermal Units
kW	Kilowatt
kWh	Kilowatt-Hour
L	Liter
LAH	Lighting, Appliances, and HVAC
LDV	Lagged Dependent Variable
LED	Light-Emitting Diode
LIURP	Low Income Usage Reduction Program
M&V	Measurement and Verification
MF	Multifamily
MMBtu	Million British Thermal Units
MSRP	Manufacturer Suggested Retail Price
MW	Megawatt
MWh	Megawatt-Hour
MWh/yr	Megawatt-Hour per Year
NPV	Net Present Value
NTG	Net-to-Gross
NTGR	Net-to-Gross Ratio
O&M	Operations and Maintenance
P3TD	Phase III to Date
P4TD	Phase IV to Date
PA PUC	Pennsylvania Public Utility Commission
PILD	PECO Instant Lighting Discounts
PSA	Phase IV to Date Preliminary Savings Achieved; equal to VTD+PYRTD
PSA+CO	PSA Savings plus Carryover from Phase III
PSD	Performance Systems Development
PUF	Part-Use Factor
PY	Program Year—e.g., PY8, from June 1, 2016, to May 31, 2017
PYRTD	Program Year Reported to Date
PYTD	Program Year to Date
PYVTD	Program Year Verified to Date
QC	Quality Control
RCx	Retrocommissioning
RTD	Phase IV to Date Reported Gross Savings
RTO	Regional Transmission Organization
RUL	Remaining Useful Lifetime
SEER	Seasonal Energy Efficiency Ratio

SF	Single-Family
SIDS	Smart Ideas Data System
SKU	Stock Keeping Unit
SO	Spillover
SSMVP	Site-Specific Measurement and Verification Plan
SWE	Statewide Evaluator
T&D	Transmission and Distribution
TDR	Tracking Database Ratio
TRC	Total Resource Cost
TRM	Technical Reference Manual
UEC	Unit Energy Consumption
VFD	Variable Frequency Drive
VR	Verification Ratio
VTD	Phase IV to Date Verified Gross Savings
VTD+CO	Phase IV to Date Verified Gross Savings plus Carryover from Phase III
W	Watt

Types of Savings

Gross Savings: The change in energy consumption and/or peak demand that results directly from program-related actions taken by participants in an energy efficiency and conservation (EE&C) program, regardless of why they participated.

Net Savings: The total change in energy consumption and/or peak demand that is attributable to an EE&C program. Depending on the program delivery model and evaluation methodology, the net savings estimates may differ from the gross savings estimates due to adjustments for the effects of free riders, changes in codes and standards, market effects, participant and non-participant spillover, and other causes of changes in energy consumption or demand not directly attributable to the EE&C program.

Reported Gross: Also referred to as ex ante (Latin for “beforehand”) savings. The energy and peak demand savings values calculated by the electric distribution company (EDC) or its program implementation conservation service providers (ICSPs) and stored in the program tracking system.

Unverified Reported Gross: The Phase IV Evaluation Framework allows EDCs and the evaluation contractors the flexibility to not evaluate each program every year. If an EE&C program is being evaluated over a multiyear cycle, the reported savings for a program year where evaluated results are not available are characterized as unverified reported gross (referred to as unverified savings in this report) until the impact evaluation is completed and verified savings can be calculated and reported.

Verified Gross: Also referred to as ex post (Latin for “from something done afterward”) gross savings. The energy and peak demand savings estimates reported by the independent evaluation contractor after the gross impact evaluation and associated measurement and verification (M&V) efforts have been completed.

Verified Net: Also referred to as ex post net savings. The energy and peak demand savings estimates reported by the independent evaluation contractor after application of the results of the net impact evaluation. Typically calculated by multiplying the verified gross savings by a net-to-gross (NTG) ratio (NTGR).

Adjusted Database Savings: Energy and peak demand savings resulting from adjustments made to the reported gross savings to align the inputs and algorithms with the technical reference manual (TRM) and interim measure protocols (IMPs). The independent evaluation contractor calculates these savings as an interim step in determining the verified gross savings.

Tracking Database Ratio (TDR): The ratio of the adjusted database savings to reported gross savings (excluding unverified savings).

Verification Ratio: The ratio of the verified gross savings to the adjusted database savings.

Annual Savings: Energy and demand savings expressed on an annual basis, or the amount of energy and/or peak demand an EE&C measure or program can be expected to save over the course of a typical year. Annualized savings are noted as MWh/year or MW/year. The Pennsylvania TRM¹ provides algorithms and assumptions to calculate annual savings, and Act 129 compliance targets for consumption reduction are based on the sum of the annual savings estimates of installed measures or behavior change.

Lifetime Savings: Energy and demand savings expressed in terms of the total expected savings over the useful life of the measure. Typically calculated by multiplying the annual savings of a measure by its effective useful life (EUL). The total resource cost (TRC) test uses savings from the full lifetime of a measure to calculate the cost-effectiveness of EE&C programs.

Program Year Reported to Date (PYRTD): The reported gross energy and peak demand savings achieved by an EE&C program or portfolio within the current program year. Program year to date (PYTD) values for energy efficiency will always be reported gross savings in a semiannual or preliminary annual report.

Program Year Verified to Date (PYVTD): The verified gross energy and peak demand savings achieved by an EE&C program or portfolio within the current program year as determined by the impact evaluation findings of the independent evaluation contractor.

Phase IV to Date (P4TD): The energy and peak demand savings achieved by an EE&C program or portfolio within Phase IV of Act 129. Reported in several permutations described here:

- **Phase IV to Date Reported Gross Savings (RTD):** The sum of the reported gross savings recorded to date in Phase IV of Act 129 for an EE&C program or portfolio.
- **Phase IV to Date Verified Gross Savings (VTD):** The sum of the verified gross savings recorded to date in Phase IV of Act 129 for an EE&C program or portfolio, as

¹ Pennsylvania Public Utility Commission, *Technical Reference Manual; State of Pennsylvania Act 129 Energy Efficiency and Conservation Program & Act 213 Alternative Energy Portfolio Standards*, dated August 2019, reissued February 2021, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

determined by the impact evaluation finding of the independent evaluation contractor.

- **Phase IV to Date Preliminary Gross Savings Achieved (PSA):** The sum of the verified gross savings (VTD) from previous program years in Phase IV where the impact evaluation is complete plus the reported gross savings from the current program year (PYTD).
- **Phase IV to Date Preliminary Gross Savings Achieved + Carryover (PSA+CO):** The sum of the verified gross savings from previous program years in Phase IV plus the reported gross savings from the current program year plus any verified gross carryover savings from Phase III of Act 129. This value is the best estimate of an EDC's progress toward the Phase IV compliance targets.
- **Phase IV to Date Verified Gross Savings + Carryover (VTD+CO):** The sum of the verified gross savings recorded to date in Phase IV plus any verified gross carryover savings from Phase III of Act 129.

Note that all values in the report are summed prior to rounding. Therefore, table totals may not equal the sum of all rows.



Portfolio at a glance



Implementation of Phase IV of the Act 129 programs began on June 1, 2021. Phase IV includes Program Years 13-17 (PY13-PY17).

PY17



295,163 MWh/yr
claimed of electric energy
savings, or 119% of
target



54.37 MW/yr
claimed of peak
demand savings,
or 116% of target



\$66,273,685
spent in the
program year

Phase IV



1,526,138 MWh/yr
claimed of electric energy
savings (including Phase
III carryover), or 111% of
target

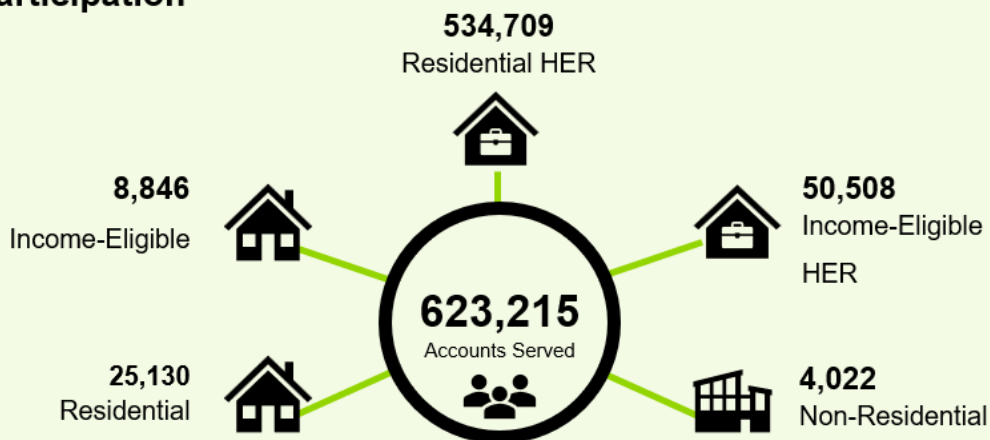


283.87 MW/yr
claimed of peak
demand savings,
or 111% of target



\$387,175,519
spent in the phase
to date

Participation



Benefit-Cost Ratios



1.64
Residential



1.18
Portfolio TRC



1.10
Non-Residential

Accounts Served excludes the Residential Rebates and Marketplace Point of Purchase delivery pathway and Giveaways through the Residential In-Home Assessment, Income-Eligible Single-Family, Multifamily, and Multifamily Income-Eligible components. Details on participation counts are found in Section 2.4. TRC results are P4TD.

1. Introduction

Pennsylvania Act 129 of 2008, signed on October 15, 2008, mandated energy savings and demand reduction goals for the largest electric distribution companies (EDCs) in Pennsylvania for Phases I (2008 through 2013), II (2013 through 2016), and III (2016 through 2021). In late 2020, each EDC filed a new energy efficiency and conservation (EE&C) plan with the Pennsylvania Public Utility Commission (PA PUC) detailing the proposed design of its portfolio for Phase IV. These plans were updated based on stakeholder input and subsequently approved by the PUC in 2021.

Implementation of Phase IV of the Act 129 programs began on June 1, 2021. This report documents the progress and effectiveness of the Phase IV EE&C accomplishments for PECO in Program Year 17 (PY17), which spans June 1, 2025, through May 31, 2026, as well as the cumulative accomplishments of the Phase IV programs since inception. This report additionally documents the energy savings carried over from Phase III and expected carryover into Phase V. The Phase III carryover savings count toward EDC savings compliance targets for Phase IV.

This report details the participation, spending, reported gross, verified gross energy (MWh) and peak demand (MW), and verified net impacts of the energy efficiency programs in PY17. Compliance with Act 129 savings goals is based on verified gross savings. This report also includes estimates of cost-effectiveness according to the total resource cost (TRC) test.

PECO has retained Guidehouse Inc. (Guidehouse) as an independent evaluation contractor for Phase IV of Act 129. Guidehouse is responsible for the measurement and verification (M&V) of the savings and calculation of gross verified and net verified savings. Guidehouse also performed a process evaluation for selected program components in PY17 to examine the design, administration, implementation, and market response to the EE&C program. This report presents the key findings and recommendations identified by evaluation activities and documents any changes to EE&C program delivery based on the recommendations.

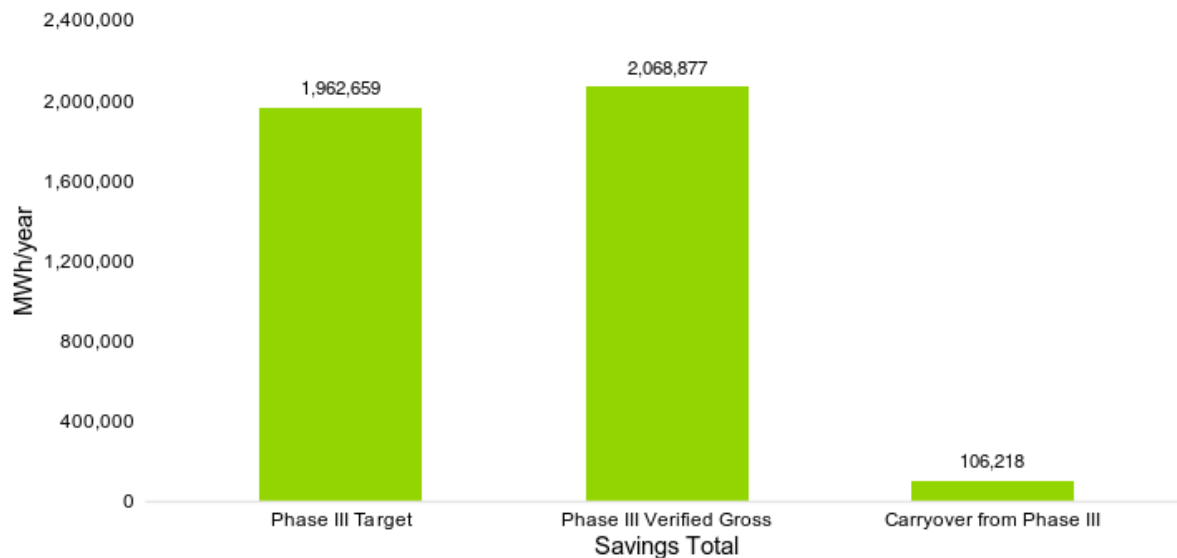
Guidehouse worked with the Statewide Evaluator (SWE) throughout the report's development to address questions related to compliance as they arose, and appreciates the SWE's collaboration to confirm this final report is accurate and agreeable to relevant parties.

2. Summary of Achievements

2.1 Carryover Savings from Phase III of Act 129

PECO has a total of 106,218 MWh/year of portfolio-level carryover savings from Phase III. Figure 2- compares PECO's Phase III verified gross savings total with the Phase III compliance target to illustrate the carryover calculation.

Figure 2-1. Portfolio Carryover Savings from Phase III of Act 129



Source: SWE Phase III Report²

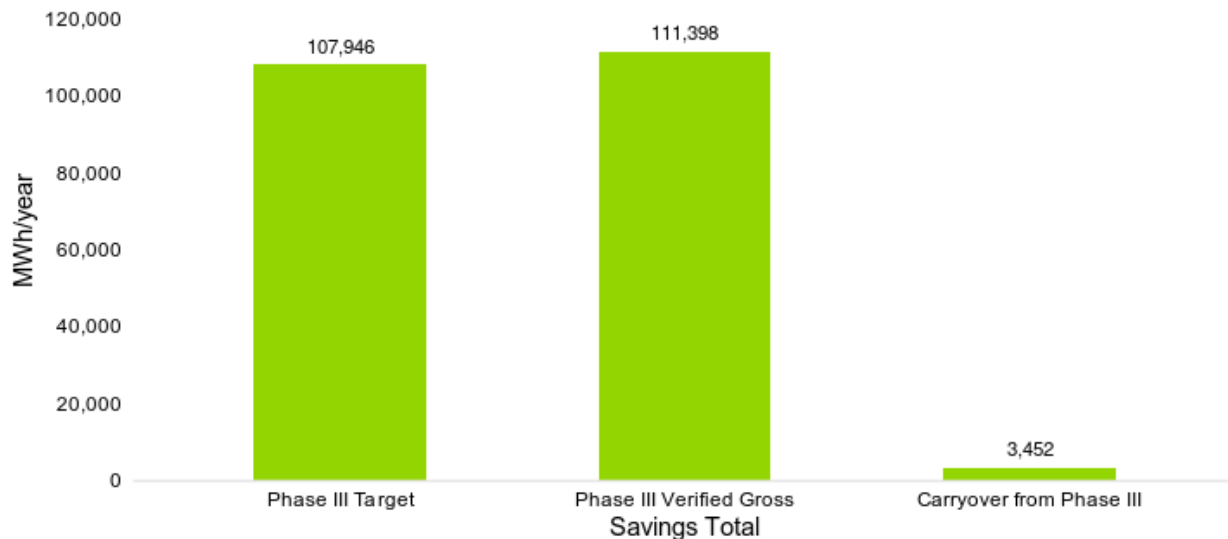
The Commission's Phase IV Implementation Order³ also allowed EDCs to carry over savings in excess of the Phase III income-eligible (IE) savings goal.⁴ Figure 2- shows the calculation of carryover savings for the IE customer segment.

² Pennsylvania Statewide Evaluator, *SWE Annual Report Act 129 Phase III and Program Year 12*, March 31, 2022, <https://www.puc.pa.gov/pcdocs/1746475.pdf>.

³ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2020-3015228, (*Phase IV Implementation Order*), entered June 18, 2020.

⁴ Proportionate to those savings achieved by dedicated Phase III IE programs.

Figure 2-2. Income-Eligible Carryover from Phase III



Source: SWE Phase III Report⁵

2.2 Phase IV Energy Efficiency Achievements to Date

Phase IV energy savings targets (MWh) were established at the meter level and peak demand reduction targets (MW) were set at the system level. Accordingly, the MWh totals in this report are presented at the meter level, while peak demand savings are adjusted for transmission and distribution (T&D) losses to reflect system-level savings. Since the beginning of PY17 on June 1, 2025, PECO has claimed:

- 308,853 MWh/yr of reported gross electric energy savings (PYRTD)
- 50.64 MW/yr of reported gross peak demand savings (PYRTD)
- 295,163 MWh/yr of verified gross electric energy savings (PYVTD), including 728 MWh/yr of verified gross electric energy savings from the tranche of savings that were unverified in PY16
- 54.37 MW/yr of verified gross peak demand savings (PYVTD), including 0.02 MW/yr of verified gross peak demand savings from the tranche of savings that were unverified in PY16

Since the beginning of Phase IV of Act 129 on June 1, 2021, PECO has claimed:

- 1,556,854 MWh/yr of reported gross electric energy savings (RTD)
- 275.05 MW/yr of reported gross peak demand savings (RTD)
- 1,526,138 MWh/yr of verified gross electric energy savings (VTD)

⁵ Pennsylvania Statewide Evaluator, *SWE Annual Report Act 129 Phase III and Program Year 12*, <https://www.puc.pa.gov/pcdocs/1746475.pdf>.

- 283.87 MW/yr of verified gross peak demand savings (VTD)
 - These savings represent 111% of the May 31, 2026, peak demand savings compliance target of 256 MW/yr

PECO and DNV, the Non-Residential Program Implementation CSP, discovered 37 Non-Residential projects throughout Phase IV that were invoiced and reported twice, resulting in duplicated savings reported in the tracking database and previously claimed in PY14-PY16 annual reports. Guidehouse confirmed that savings associated with these projects were in fact reported twice in the tracking database and developed a process to back out duplicate savings to ensure that the VTD savings accurately represent program activity. Savings associated with these projects and further detail can be found in 4.2Appendix I.

Including carryover savings from Phase III, PECO has achieved:

- 1,632,356 MWh/yr of VTD + portfolio-level carryover energy savings
 - These savings represent 118% of the May 31, 2026, energy savings compliance target of 1,380,837 MWh/yr

Looking ahead to Phase V:

- With 1,526,138 MWh/yr of VTD energy savings achieved during Phase IV, PECO has achieved an estimated 145,301 MWh/yr of carryover energy savings from Phase IV to Phase V.⁶ This value represents 13% of the Phase V portfolio energy savings target.
- With 283.87 MW/yr of VTD peak demand savings achieved during Phase IV, PECO has achieved an estimated 27.87 MW/yr of carryover demand savings from Phase IV to Phase V.⁷ This value represents 14% of the Phase V portfolio peak demand savings target. Carryover peak demand savings from Phase IV to Phase V are discounted by a factor of 50%, resulting in an estimate of 13.93 MW carryover.
- There are 15,097 MWh/yr and 2.00 MW/yr of unverified PY17 savings. These projects were completed close to the end of PY17, but the project applications were not submitted in time for inclusion in the Guidehouse verified savings analysis and this PY17 annual report. Per SWE guidance,⁸ Guidehouse intends to provide verified savings estimates for these projects in an addendum to the PY18 semi-annual report due January 15, 2027. This addendum will provide the final verified gross savings for Phase IV and include an updated and final estimate of carryover savings from Phase IV into Phase V.

⁶ Carryover of Phase IV MWh is capped at a maximum of 20% of the respective portfolio and low-income consumption reduction targets. See Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2025-3052826, (*Phase V Implementation Order*), entered June 18, 2025, <https://www.puc.pa.gov/pcdocs/1883669.pdf>.

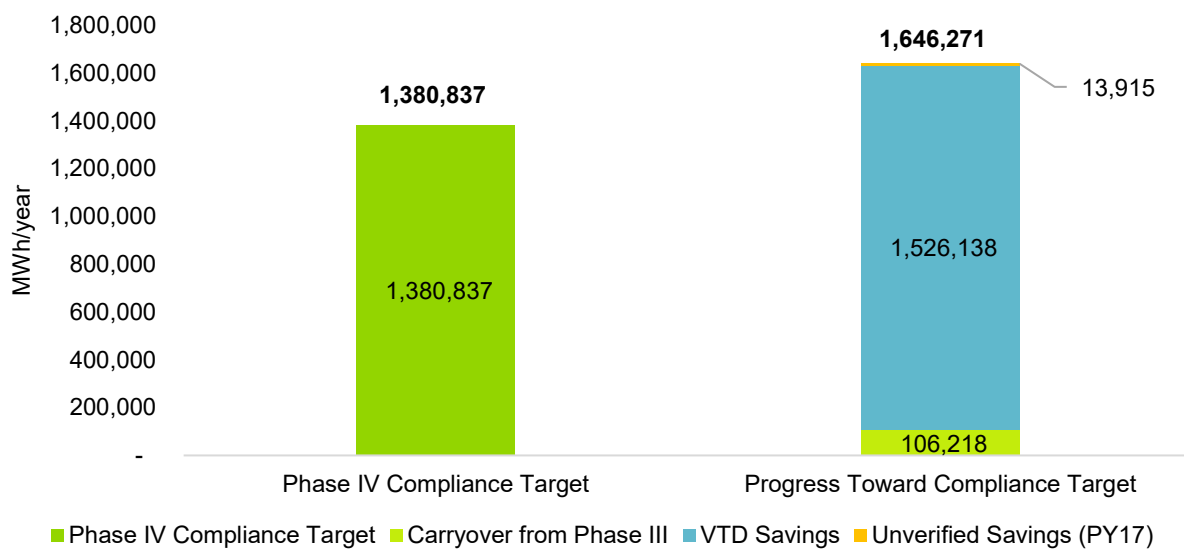
⁷ Carryover of Phase IV MW is capped at a maximum of 50% of the excess peak demand savings acquired in Phase IV. See Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2025-3052826, (*Phase V Implementation Order*), entered June 18, 2025, <https://www.puc.pa.gov/pcdocs/1883669.pdf>.

⁸ Guidance Memo for Verifying End of Phase IV Rebate Applications, PA SWE Memo_End of Ph IV rebates & verified savings timeline_06.29.26.docx.

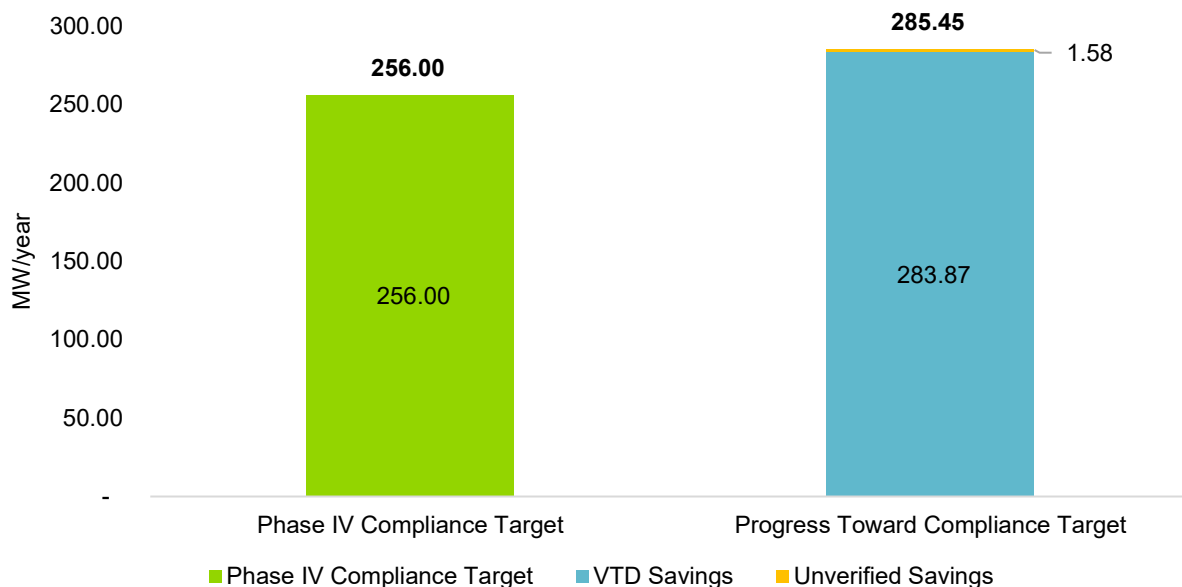
- 13,915 MWh/yr and 1.71 MW/yr of the unverified PY17 savings come from the Non-Residential Program. These unverified savings are included in reported savings values and excluded from verified savings values.
- 1,175 MWh/yr and 0.29 MW/yr of the unverified PY17 savings come from the Residential and Income-Eligible Programs. These unverified projects were not submitted in time for inclusion in the Guidehouse evaluation and thus are not included in PYRTD numbers throughout this report.

Figure 2- summarizes PECO's progress toward the Phase IV MWh portfolio compliance target, and Figure 2- summarizes progress toward the Phase IV MW portfolio compliance target.

Figure 2-3. EE&C Plan Performance Toward Phase IV Portfolio Compliance Target (MWh)



Source: Guidehouse analysis

Figure 2-4. EE&C Plan Performance Toward Phase IV Portfolio Compliance Target (MW)


Source: Guidehouse analysis

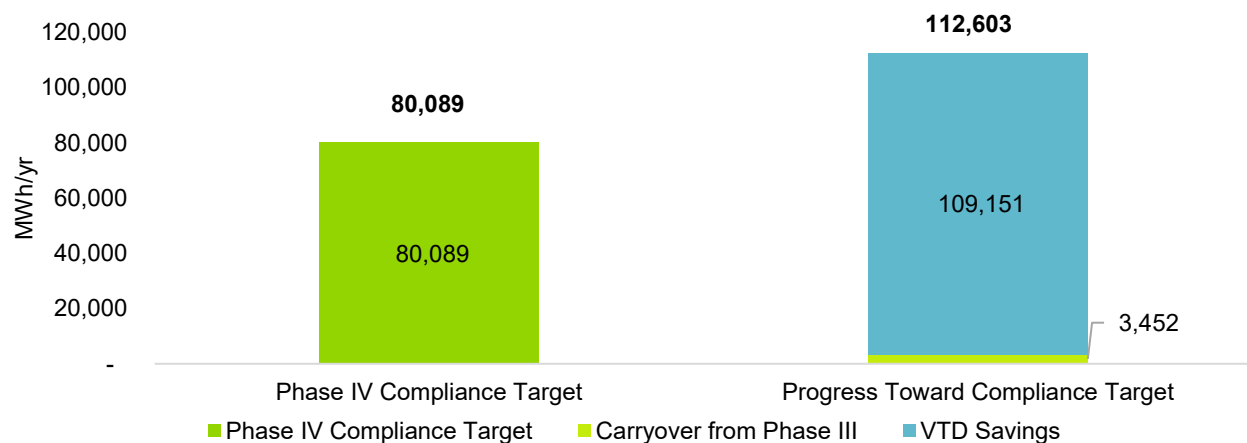
The Phase IV Implementation Order directed EDCs to offer conservation measures to the IE customer segment based on the proportion of electric sales attributable to IE households. The proportionate number of measures target for PECO is 8.8%. PECO offers a total of 74 EE&C measures to its residential and non-residential customer classes. There are 22 measures available to the IE customer segment at no cost to the customer. This number of measures represents 29.7% of the total measures offered in the EE&C Plan⁹ and exceeds the proportionate number of measures target.

The PA PUC also established an IE energy savings target of 5.8% of the portfolio savings goal. The IE savings target for PECO is 80,089 MWh/yr and is based on verified gross savings. Figure 2- compares the VTD performance for the IE customer segment with the Phase IV savings target. Based on the latest available information, PECO has achieved 141% of the Phase IV IE energy savings target.

Looking ahead to Phase V, with 112,603 MWh/yr of VTD low-income energy savings achieved during Phase IV, PECO has achieved an estimated 14,891 MWh/yr of low-income carryover energy savings from Phase IV to Phase V.¹⁰ These savings represent 20% of the Phase IV low-income carveout savings target. PECO exceeded its low-income energy savings target by 29,062 MWh/yr, but carryover savings are capped at 20%.

⁹ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

¹⁰ Carryover of Phase IV MWh is capped at a maximum of 20% of the respective portfolio and low-income consumption reduction targets. See Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2025-3052826, (*Phase V Implementation Order*), entered June 18, 2025. <https://www.puc.pa.gov/pcdocs/1883669.pdf>

Figure 2-5. EE&C Plan Performance Toward Phase IV Income-Eligible Compliance Target


Source: Guidehouse analysis

2.2.1 Phase IV Performance, Multifamily Housing

PECO has achieved 6,272 MWh/yr of verified gross electric energy savings (PYVTD) from multifamily housing. This savings includes 829 MWh/yr of verified gross electric savings through the Residential Program Multifamily component; 1,309 MWh/yr of verified gross electric energy savings (PYVTD) through the Income-Eligible Program Multifamily component; and 4,134 MWh/yr PYVTD in multifamily common areas, which is incentivized through the Non-Residential Program.

2.3 Phase IV Performance by Customer Segment

Table 2-1 presents the participation, savings, and spending by customer sector for PY17. The residential, small commercial and industrial (C&I), and large C&I sectors are defined by EDC tariff, and the residential IE and government/education/nonprofit (GNI) sector are defined by statute (66 Pa. C.S. § 2806.1). The residential IE segment is a subset of the residential customer class, and the GNI segment includes customers who are part of the small C&I or large C&I rate classes. The savings, spending, and participation values for the IE and GNI segments have been removed from the parent sectors in Table 2-1.

Table 2-1. PY17 Summary Statistics by Customer Segment

Parameter	Residential (Non-IE)	Income-Eligible ⁴	Small C&I (Non-GNI)	Large C&I (Non-GNI)	Small C&I (GNI) ⁴	Large C&I (GNI) ⁴	Municipal Lighting	Total
Number of participants ¹	558,423	59,780	3,927	947	80	48	10	623,215
PYVTD MWh/yr ³	88,580	20,123	62,955	70,596	5,351	15,217	32,341	295,163
PYVTD MW/yr (system) ³	21.34	2.38	14.13	12.48	1.29	2.74	0.00	54.37

Parameter	Residential (Non-IE)	Income-Eligible ⁴	Small C&I (Non-GNI)	Large C&I (Non-GNI)	Small C&I (GNI) ⁴	Large C&I (GNI) ⁴	Municipal Lighting	Total
Incentives ² (\$1000)	6,931	4,652	5,697	7,603	606	2,131	9,038	36,657

¹ Excludes giveaways and upstream measures (lighting and spray foam) from participants.

² Incentive totals also include Giveaway Costs as listed in the tracking data.

³ For the Non-Residential Program, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

⁴ The savings, spending, and participation values for the IE and GNI segments have been removed from the parent sector.

Source: Guidehouse analysis

Table 2-2 summarizes plan performance by sector since the beginning of Phase IV.

Table 2-2. Phase IV Summary Statistics by Customer Segment

Parameter	Residential (Non-IE)	Income-Eligible ⁴	Small C&I (Non-GNI)	Large C&I (Non-GNI)	Small C&I (GNI) ⁴	Large C&I (GNI) ⁴	Municipal Lighting	Total
Number of participants ¹	694,050	96,424	21,737	4,849	2,113	1,033	74	820,280
VTD MWh/yr ³	370,268	99,998	113,261	133,873	426,092	334,837	47,808	1,526,138
VTD MW/yr (system) ³	74.98	10.67	24.87	24.52	91.36	57.46	0.01	283.87
Incentives ² (\$1000)	33,076	29,692	83,610	48,334	11,075	10,965	12,594	229,347

¹ Excludes giveaways and upstream measures (lighting and spray foam) from participants.

² Incentive totals also include Giveaway Costs as listed in the tracking data.

³ For the Non-Residential Program, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

⁴ The savings, spending, and participation values for the IE and GNI segments have been removed from the parent sector.

Source: Guidehouse analysis

2.4 Summary of Participation by Program

The definition of who counts as a participant differs by program and program component depending on the program delivery pathway and data tracking practices. Participants are defined as a unique account number by program, program component, customer segment, and program year, with the following notes and exceptions:

- For Residential New Construction, participation is defined as the count of unique job identifiers by program year.
- P4TD participant counts are additive across program years for all program components, except for the behavioral program component where participation is equal to the highest program year participation count observed in any program year during Phase IV.

- Master metered buildings with a single account number are counted as a single participant even if the program serves multiple units.
- Account numbers are not tracked for the Residential Rebates and Marketplace Point of Purchase delivery channel and Giveaways through the Residential In-Home Assessment, Income-Eligible Single-Family, Multifamily, and Multifamily Income-Eligible components. Participation for those delivery channels and components is calculated as the sum of rebated measures. These are summarized separately in Table 2-4.

Table 2-3 provides the current participation for PY17 and Phase IV, and Table 2-4 provides participation for upstream lighting and giveaways.

Table 2-3. PY17 and P4TD EE&C Portfolio Participation by Program

Program and Component	PYTD Participation	P4TD Participation
Residential Rebates and Marketplace (excluding Point of Purchase)	15,101	75,143
Residential Appliance Recycling	1,269	22,398
Residential In-Home Assessment (excluding giveaways)	3,166	17,804
Residential New Construction	2,692	11,192
Residential Multifamily (excluding giveaways)	1,770	4,704
Residential Multifamily Income-Eligible (excluding giveaways)	425	15,506
Residential Total	24,423	146,747
Income-Eligible Single-Family (excluding giveaways)	8,593	39,166
Income-Eligible Appliance Recycling	237	5,150
Income-Eligible Total	8,830	44,316
Residential HER	534,709	550,187
Income-Eligible HER	50,508	50,508
Non-Residential Downstream Rebates	760	3,915
Non-Residential Midstream Rebates	3,179	21,111
Non-Residential Small Business Direct Install	9	2,498
Non-Residential New Construction	73	274
Non-Residential Total	4,021	27,798
Portfolio Total	622,491	819,556

Source: Guidehouse analysis

Table 2-4. PY17 and P4TD Point of Purchase and Giveaway Measures

Program and Component	PYTD Participation	P4TD Participation
Rebates and Marketplace - Point of Purchase	83,873	4,664,138
Income-Eligible Single-Family - Giveaways	156,828	638,496
Residential In-Home Assessment - Giveaways	213,004	738,522
Residential Multifamily - Giveaways	-	18,858
Residential Multifamily Income-Eligible - Giveaways	-	47,265
Point of Purchase and Giveaway Total	453,705	6,107,279

Participation is calculated as the sum of rebated measure units.

Source: Guidehouse analysis

2.5 Summary of Impact Evaluation Results

During PY17, Guidehouse completed impact evaluations for several program components in the portfolio. Table 2-5 summarizes the realization rates and net-to-gross (NTG) ratios (NTGRs) by evaluation component. Guidehouse outlines the process to arrive at the following realization rates in Section 3.

Table 2-5. PY17 Impact Evaluation Results Summary

Program and Component	Energy Realization Rate	Demand Realization Rate	NTGR
Residential Rebates and Marketplace ¹	1.00	1.25	0.52
Residential Appliance Recycling	0.39	0.58	0.45
Residential In-Home Assessment	0.90	1.34	0.82
Residential New Construction	1.00	1.18	0.55
Residential Multifamily	1.21	1.18	0.86
Residential Multifamily Income-Eligible	0.90	0.96	1.00
Residential Total	0.97	1.15	0.58
Income-Eligible Single-Family	1.24	1.24	1.00
Income-Eligible Appliance Recycling	0.89	0.91	1.00
Income-Eligible Total	1.23	1.23	1.00
Residential HER	0.97	1.10	1.00
Income-Eligible HER	0.63	0.60	1.00
Non-Residential Downstream Rebates	0.95	1.10	0.74
Non-Residential Midstream Rebates	1.14	1.12	0.67
Non-Residential Small Business Direct Install	0.91	0.89	0.93
Non-Residential New Construction	0.87	0.95	0.30
Non-Residential Total	1.00	1.10	0.70
Portfolio Total	1.00	1.11	0.73

¹ The Smart Home Energy Management System Pilot (SHEMS) is excluded from the Residential Rebates and Marketplace component realization rate because it is not reflective of component delivery results.

Source: Guidehouse analysis

2.6 Summary of Energy Impacts by Program

Act 129 compliance targets are based on annualized savings estimates (MWh/year). Each program year, the annual savings achieved by EE&C program activity are recorded as incremental annual, or first-year, savings and added to an EDC's progress toward compliance. Incremental annual savings estimates are presented in Section 2.6.1. Lifetime energy savings incorporate the effective useful life (EUL) of installed measures and estimate the total energy savings associated with EE&C program activity. Lifetime savings are used in the TRC test by program participants when assessing the economics of upgrades and by the SWE when calculating the emissions benefits of Act 129 programs. Section 2.6.2 presents the lifetime energy savings by program.

2.6.1 Incremental Annual Energy Savings by Program

Table 2-6 presents a summary of the PY17 and P4TD energy savings by program. The energy impacts in this report are presented at the meter level and do not reflect adjustments for T&D losses. The verified gross savings are adjusted by the energy realization rate and the verified net savings are adjusted by both the realization rate and NTGR.

Table 2-6. PY17 and P4TD Incremental Annual Energy Savings by Program (MWh/Yr)

Program	PYRTD (MWh/yr)	PYVTD Gross (MWh/yr)	PYVTD Net (MWh/yr)	RTD (MWh/yr)	VTD Gross (MWh/yr)	VTD Net (MWh/yr)
Residential	54,285	52,849	30,531	262,898	241,750	154,270
Residential Income-Eligible	13,391	16,533	16,533	86,804	90,891	90,891
Residential HER	38,300	37,146	37,146	146,858	142,449	142,449
Income-Eligible HER	3,625	2,281	2,281	7,047	4,754	4,754
Non-Residential ¹	199,252	186,353	129,838	1,053,248	1,046,293	718,070
Portfolio Total	308,853	295,163	216,329	1,556,854	1,526,138	1,110,436

¹ For the Non-Residential Program, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Source: Guidehouse analysis

The previously reported VTD savings from prior years for the following programs have changed since the PY16 final annual report was submitted:

- **Residential:** SWE audit activities recommended an adjustment of ~212 MWh/year to the PY16 gross verified savings due to adjustments to assumptions around In-Home Assessment education measures.
- **Income-Eligible:** SWE audit activities recommended an adjustment of ~17 MWh/year to the PY16 gross verified savings due to adjustments to assumptions around single-family IE education measures.

2.6.2 Lifetime Energy Savings by Program

Table 2-7 presents the PYTD lifetime energy savings by program. The rebate programs' weighted average measure EUL in PY17 ranges from 9-12 years while the home energy report (HER) programs' EULs are between 1 year and 3 years. The weighted average portfolio EUL is ~10 years.

Table 2-7. PY17 and P4TD Lifetime Energy Savings by Program (MWh)

Program	PYVTD Gross Lifetime (MWh)	PYVTD Net Lifetime (MWh)	VTD Gross Lifetime (MWh)	VTD Net Lifetime (MWh)
Residential	684,688	395,540	3,056,605	1,971,202
Residential Income-Eligible	145,349	145,349	931,323	931,323
Residential HER	148,585	148,585	463,341	463,341
Income-Eligible HER	7,440	7,440	14,898	14,898
Non-Residential	1,965,603	1,369,494	10,213,096	6,996,867
Portfolio Total	2,951,664	2,066,408	14,679,263	10,377,632

Source: Guidehouse analysis

The previously reported VTD lifetime savings from prior years, for the following programs, have changed since the PY16 final annual report was submitted:

- **Residential:** SWE audit activities recommended an adjustment of ~212 MWh/year to the PY16 gross verified savings primarily due to adjustments to assumptions around multifamily education measures. This recommendation corresponds to an adjustment of ~849 MWh to the VTD gross and net lifetime savings.
- **Income-Eligible:** SWE audit activities recommended an adjustment of ~17 MWh/year to the PY16 gross verified savings due to adjustments to assumptions around multifamily and single-family IE education measures. This recommendation corresponds to an adjustment of ~70 MWh to both the VTD gross and net lifetime savings.

2.7 Summary of Peak Demand Reduction Impacts by Program

Act 129 defines peak demand savings from energy efficiency as the average expected reduction in electric demand from 2:00 p.m. to 6:00 p.m. EDT on non-holiday weekdays from June through August. Peak demand impacts from energy efficiency in this report are presented at the system level, meaning they have been adjusted to account for T&D losses. PECO uses the following line loss multipliers by sector:

- Residential = 1.0799
- Small C&I = 1.0799
- Large C&I = 1.0799

Table 2-8 presents a summary of the peak demand impacts by energy efficiency program through the current reporting period.

Table 2-8. PY17 and P4TD Peak Demand Savings by Energy Efficiency Program (MW/Yr)

Program	PYRTD (MW/yr) (system)	PYVTD Gross (MW/yr) (system)	PYVTD Net (MW/yr) (system)	RTD (MW/yr)	VTD Gross (MW/yr)	VTD Net (MW/yr)
Residential	11.89	13.69	7.72	43.05	44.62	27.29
Residential Income-Eligible	1.52	1.88	1.88	9.26	9.55	9.55
Residential HER	7.13	7.83	7.83	24.80	32.34	32.34
Income-Eligible HER	0.55	0.33	0.33	1.11	0.45	0.45
Non-Residential ¹	29.54	30.63	21.57	196.84	196.90	136.13
Portfolio Total	50.64	54.37	39.33	275.05	283.87	205.77

¹ For the Non-Residential Program, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Source: Guidehouse analysis

The previously reported VTD savings from prior years for the following programs have changed since the PY16 final annual report was submitted:

- **Residential:** SWE audit activities recommended an adjustment of ~0.02 MW/year to the PY16 gross and net verified savings primarily due to adjustments to assumptions around In-Home Assessment education measures.
- **Income-Eligible:** SWE audit activities recommended an adjustment of ~-0.01 MW/year to the PY16 gross and net verified savings due to adjustments to assumptions around single-family IE education measures.

2.7.1 Peak Demand Savings Nominated to PJM Forward Capacity Market

For Phase IV of Act 129, EDCs are expected to retain the capacity rights to Act 129 projects and nominate a portion of the resources acquired to PJM Forward Capacity Market (FCM). If the resources are clear, proceeds flow back to the rate class that generated the Act 129 savings to offset cost recovery via riders. In September 2024, PJM filed a proposal with FERC to end payments to EE resource providers and prevent future participation in auctions starting with the Base Residual Auction for the 2026/2027 Delivery Year.

PECO planned to submit no less than 10 MW and up to 50 MW of PJM-verified peak demand savings associated with each Act 129 program year eligible into the PJM FCM on behalf of its customers over the 5-year Phase IV EE&C Plan. PECO targeted installed energy efficiency measures from the Residential, Non-Residential, and Income-Eligible Programs. PECO prioritized PJM-qualified energy efficiency measures for submittal to PJM based on PJM eligibility and M&V requirements as well as anticipated resulting MW savings in the PJM FCM. The measures included lighting, retrocommissioning (RCx), variable speed drives, new construction, and more.

PECO hired a turnkey service provider to manage the strategy and details for bidding into PJM's FCM.¹¹ This approach balances the benefits to PECO customers with the risk posed to customers by the potential for deficiency charges from PJM. All revenue, net of those paid to the provider, are returned to customers as an offset to plan costs. Table 2-9 summarizes PECO's plans for wholesale recognition of Phase IV peak demand savings by Act 129 program year and PJM delivery year.

Table 2-9. Planned FCM Nominations by Act 129 Program Year and PJM Delivery Year

Act 129 Program Year	Estimated MW Acquisition for FCM	DY 23/24 MW	DY 24/25 MW Range	DY 25/26 MW Range	DY 26/27 MW Range	DY 27/28 MW Range	DY 28/29 MW Range	DY 29/30 MW Range
PY13	24.9	24.9	23.9					
PY14	26.6	25.2	26.6					
PY15	24.9		24.9	23.8				
PY16	23.4			23.4				
PY17	-							
Phase IV Total	99.8	50.1	75.4	47.2				

DY = Delivery Year for PJM

Source: Guidehouse analysis

¹¹ PECO has assigned capacity rights to CPower to nominate to the PJM FCM.

2.8 Summary of Fuel Switching Impacts

Act 129 allows EDCs to achieve electric savings by converting electric equipment to non-electric equipment. Table 2-10 summarizes key fuel switching metrics to date in Phase IV.

Table 2-10. PY17 and P4TD Fuel Switching Summary

Metric	PY17	P4TD
Fuel Switching Measures Offered	CHP	CHP
Fuel Switching Measures Implemented	4	6
Energy Savings Achieved via Fuel Switching (MWh/yr)	3,032	57,560
Increased Fossil Fuel Consumption Due to Fuel Switching Measures (MMBtu/yr)	36,641	268,428
Incentive Payments for Fuel Switching Measures (\$1,000)	333	2,388

CHP = Combined heat and power

Source: Guidehouse analysis

2.9 Summary of Renewable Energy Impacts

Act 129 allows EDCs to incentivize behind-the-meter solar photovoltaics (PV) and other renewable energy generation measures that offset the need for electricity from the grid. Table 2-11 summarizes the energy savings, peak demand reduction, and incentive totals for renewable energy measures in PY17 and Phase IV to date.

Table 2-11. PY17 and P4TD Renewables Summary

Metric	PY17	P4TD
Renewable Energy Measures Implemented	Solar	Solar
Residential Energy Savings Achieved via Renewables (MWh/yr)	24,634	33,179
Residential Peak Demand Savings Achieved via Renewables (MW/yr)	8.06	10.89
Incentive Payments for Residential Renewable Energy Measures (\$1000)	1,216	1,683
Non-Residential Energy Savings Achieved via Renewables (MWh/yr)	10,793	20,613
Non-Residential Peak Demand Savings Achieved via Renewables (MW/yr)	2.78	5.26
Incentive Payments for Non-Residential Renewable Energy Measures (\$1000)	1,932	2,956

Source: Guidehouse analysis

2.10 Summary of Cost-Effectiveness Results

Table 2-12 presents a detailed breakdown of portfolio finances and cost-effectiveness. TRC benefits in Table 2-12 were calculated using gross verified impacts. Net present value (NPV) PY17 costs and benefits are expressed in 2025 dollars. NPV costs and benefits for Phase IV values are expressed in 2021 dollars.

Table 2-12. PY17 Summary of Portfolio Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	Incremental Measure Costs (IMCs)	\$139,674		\$634,838	
2	Rebates to Participants and Trade Allies	\$0		\$90,005	
3	Upstream/Midstream Incentives	\$0		\$76,288	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$0		\$9,165	
5	Direct Installation Program Materials and Labor	\$217		\$19,242	
6	Participant Costs (row 1 minus the sum of rows 2-5)	\$139,457		\$440,138	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$23,287	\$0	\$123,230	\$0
9	Marketing	\$4,013	\$0	\$20,995	\$0
10	Program Delivery	\$129	\$0	\$129	\$0
11	EDC Evaluation Costs	\$2,188	\$0	\$13,475	\$0
12	SWE Audit Costs	\$0	\$0	\$0	\$0
13	Program Overhead Costs (sum of rows 7-12)	\$29,617	\$0	\$157,830	\$0
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$169,291		\$792,668	
15	Total NPV Lifetime Electric Energy Benefits	\$93,272		\$432,126	
16	Total NPV Lifetime Electric Capacity Benefits	\$81,336		\$375,728	
17	Total NPV Lifetime Operations and Maintenance (O&M) Benefits	\$6,748		\$76,973	
18	Total NPV Lifetime Fossil Fuel Impacts	-\$2,630		-\$40,780	
19	Total NPV Lifetime Water Impacts	\$14,904		\$92,159	
20	Total NPV TRC Benefits (sum of rows 15-19)	\$193,630		\$936,205	
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	1.14		1.18	

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025).

Source: Guidehouse analysis

TRC benefit-cost ratios are calculated by comparing the total NPV TRC benefits and the total NPV TRC costs. It is important to note that TRC costs are materially different from the EDC spending and rate recovery tables presented later in the report. TRC costs include estimates of the full cost incurred by program participants to install efficient equipment, not just the portion covered by the EDC rebate. 4.2Appendix D shows the TRC ratios by program and for the portfolio.

2.11 Comparison of Performance to Approved EE&C Plan

Table 2-13 presents PY17 expenditure compared with the budget estimates set forth in the EE&C Plan for PY17 and P4TD. PY17 values are presented in 2025 dollars and P4TD values are presented in 2021 dollars. Program-level comparisons of expenditures to plans are presented in 4.2Appendix D.

Table 2-13. Comparison of Expenditures to Phase IV EE&C Plan (\$1,000)

Expenditures	Budget from EE&C Plan	Actual Expenditures	Ratio (Actual/Plan)
PY17 Portfolio	62,470	56,014	0.90

Expenditures	Budget from EE&C Plan	Actual Expenditures	Ratio (Actual/Plan)
P4TD	377,360	334,571	0.89

Source: Guidehouse analysis

Table 2-14 compares PY17 and P4TD verified gross program savings with the energy savings projections set forth in the EE&C Plan. Program-level comparisons of expenditures to plans are presented in 4.2Appendix D.

Table 2-14. Comparison of Actual Program Savings to EE&C Plan Projections

Savings	EE&C Plan Projections	VTD Gross MWh Savings	Ratio (Actual/Plan)
PY17 Portfolio MWh	247,500	295,163	1.19
P4TD MWh	1,545,778	1,526,138	0.99
PY17 Portfolio MW	46.92	54.37	1.16
P4TD MW	285.10	283.87	1.00

Source: Guidehouse analysis

The following list briefly discusses specific reasons verified savings exceeded or fell short of projected savings in PY17:

- The Residential EE Program achieved 103% of EE&C Plan projections for PY17 for energy savings and 179% of EE&C Plan projections for PY17 for demand savings. This is a result of verified savings differing from reported savings for a variety of Technical Reference Manual (TRM)-based measures, as well as adjustments made based on recycled appliance functionality rates determined by online surveys. Detailed evaluation activities can be found in Section 3.1.
- The Income-Eligible EE Program achieved 94% of EE&C Plan projections for PY17 for energy savings and 35% of EE&C Plan projections for PY17 for demand savings. This is a result of the program measure mix. For example, ductless heat pumps and heat pump water heaters are costly for IE programs because they incentivize 100% of each project. The program budget makes these measures prohibitive, and therefore the portfolio has had to achieve demand savings from other residential program components. Detailed evaluation activities can be found in Section 3.2.
- The Residential HER Program achieved 173% of EE&C Plan projections for PY17 for energy savings and 119% of EE&C Plan projections for PY17 for demand savings. Differences between verified savings and EE&C Plan projections for PY17 are due to modeled evaluation findings, discussed in Section 3.3.
- The Income-Eligible HER Program achieved 221% of EE&C Plan projections for PY17 for energy savings and 1,272% of EE&C Plan projections for PY17 for demand savings. Differences between verified savings and EE&C Plan projections for PY17 are discussed in Section 3.4.
- The Non-Residential EE Program achieved 119% of EE&C Plan projections for PY17 for energy savings and 102% of EE&C Plan projections for PY17 for demand savings. This is a result of verified savings differing from reported savings. The most influential items driving the differences were updates to input parameters such as hours of use (HOU), coincidence factors (CFs), and heating and cooling types based on evaluation findings. Additionally, collecting and making use of longer periods of site-specific data for custom

measures and changes to demand savings methodology for solar measures were driving factors for the realization rates. These details are discussed in Section 3.5.

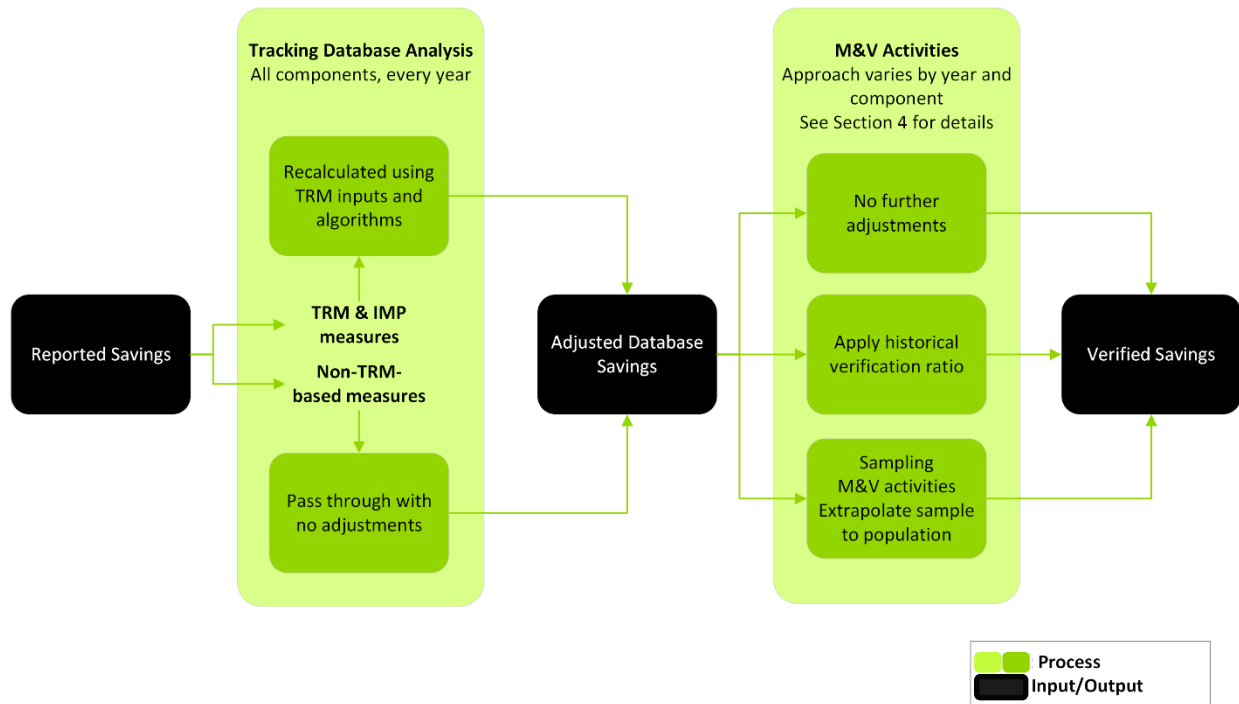
2.12 Findings and Recommendations

Guidehouse makes no overarching portfolio recommendations this year. See Sections 3.1.7, 1.1.1, 3.3.7, 3.4.7, and 3.5.7 for program-specific findings and recommendations.

3. Evaluation Results by Program

This section documents the gross impact, net impact, and process evaluation activities conducted in PY17 along with the outcomes of those activities. Guidehouse used a two-part approach to determine verified gross impacts as described in the Evaluation Plan¹² and illustrated in Figure 3-. In the first part, Guidehouse conducted a tracking database analysis for each program component to determine the adjusted database savings.

Figure 3-1. PECO Phase IV Verified Savings Pathways



Note: This graphic does not show unverified savings. PY17 unverified savings do not go through the PY17 analysis activities; they will be evaluated and included in an appendix to the PY18 semi-annual report and are reported separately throughout the report.

Source: Guidehouse Evaluation Plan

In the second part, Guidehouse determined the verified savings following the PY17 evaluation activities shown in Table 3-1, where X denotes M&V activities and a blank value denotes application of a historical verification ratio. The relative impact of each step in the two-part process was characterized by calculating the ratio between each output. The tracking database ratio (TDR) is defined as the adjusted database savings divided by the reported savings. The verification ratio is defined as the verified savings divided by the adjusted database savings. A ratio close to one indicates that step in the process had minimal impact on the gross savings. A ratio further from one indicates that step had a larger impact on the gross savings.

¹² Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Table 3-1. Phase IV Gross Impact Evaluation Activities

Program	Component	PY13	PY14	PY15	PY16	PY17
Residential	Rebates and Marketplace	X	X ¹	X ²	X ⁴	
Residential	Appliance Recycling		X			X
Residential	In-Home Assessment		X		X	
Residential	New Construction	X		X		
Residential	Multifamily		X	X		
Residential HER	HER	X	X	X	X	X
Income-Eligible	Single-Family		X		X	
Income-Eligible	Appliance Recycling		X			X
Income-Eligible	Long-Term Savings		X		X	
Income-Eligible HER	HER	X	X	X	X	X
Non-Residential	Downstream Rebates	X	X	X ³	X ³	X ³
Non-Residential	Midstream Rebates	X	X	X	X	X
Non-Residential	New Construction	X		X		X
Non-Residential	Small Business Direct Install		X		X	

Note: X denotes M&V activities. A blank value denotes application of a historical verification ratio.

¹ Guidehouse conducted limited additional verification in PY14 of thermostat installations for the Marketplace delivery pathway because of meaningful changes to implementation in PY13, including more detailed installation collateral, offering wiring kits to expand compatibility with a variety of wiring configurations, and connecting customers to installation contractors as needed.

² Guidehouse conducted an intercept survey (based on QR codes scanned in-store by participants) for spray foam measures, which are not fully deemed in the TRM in PY15 to verify savings.

³ Guidehouse reviewed reported projects for RCx projects that use IPMVP Option C to assess their implementation date. IPMVP Option C projects lacking 12 months of post-measure data at the time of the evaluation were classified as unverified savings during that year, to be evaluated and verified the following program year.

⁴ Guidehouse evaluated ductless heat pumps and residential solar measures in PY16.

Source: *Guidehouse Evaluation Plan*¹³

Guidehouse similarly conducted process evaluation activities and determined verified net impacts as described in the Evaluation Plan¹⁴ and shown in Table 3-2, where X denotes both process and NTG evaluation activities, and a blank value denotes no specific research was undertaken in PY17.

¹³ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

¹⁴ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Table 3-2. Phase IV Process and NTG Evaluation Activities

Program	Component	PY13	PY14	PY15	PY16	PY17
Residential	Rebates and Marketplace		X	X	X ¹	NTG ⁴
Residential	Appliance Recycling		Process			NTG
Residential	In-Home Assessment		X			
Residential	New Construction		X			
Residential	Multifamily		X			
Residential HER	HER	Process				
Income-Eligible	Single-Family			Process		
Income-Eligible	Appliance Recycling		Process			
Income-Eligible	Long-Term Savings			Process		
Income-Eligible HER	HER	Process				
Non-Residential	Downstream Rebates		X		NTG ²	X ⁵
Non-Residential	Midstream Rebates	X			X ³	
Non-Residential	New Construction		X	X		
Non-Residential	Small Business Direct Install		Process		NTG	

Note: X indicates both process and NTG activities will be conducted in the same year. If only process or NTG activities occur in a given year, it is specified.

¹ Guidehouse performed Process and NTG evaluations for solar projects in the Downstream pathway, spray foam projects in the Point of Purchase pathway, and contacted Upstream retail store managers in the Point of Purchase pathway only.

² Guidehouse performed NTG research for select high impact measures (HIMs) and solar projects through customer surveys.

³ Guidehouse contacted lighting distributors in PY13 for the Non-Residential Midstream Rebates component and conducted lighting distributor interviews again in PY16 to estimate a new NTG result for use in Phase V planning. Guidehouse also conducted non-lighting NTG and process research in PY16.

⁴ NTG surveys also included process questions for solar projects only.

⁵ Process and NTG surveys were conducted for solar measures only in PY17.

Source: Guidehouse Evaluation Plan¹⁵

3.1 Residential EE Program

The Residential EE Program offers customers in single-family and multifamily buildings opportunities to save energy across their electric end uses. The Residential Program includes five components, with some components having multiple pathways to participate. The Residential EE Program is designed to serve customers who have a household income greater

¹⁵ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

than 150% of the federal poverty level (FPL), also referred to as market-rate customers.¹⁶ The Appliance Recycling and Multifamily components serve both the Residential and Income-Eligible EE Programs.

CMC Energy is the prime conservation service provider (CSP) for the program, managing additional CSPs to implement specific program components:

- **Rebates and Marketplace:** The Rebates and Marketplace component includes customer instant discounts and rebates for HVAC, appliances, and energy-saving devices. There are multiple delivery pathways to receive product rebates: Downstream, Marketplace, and Point of Purchase. Additionally, a rebate for solar projects was added as a measure in PY16. CLEAResult implements the Rebates and Marketplace component.
- **Appliance Recycling:** The Appliance Recycling component traditionally has focused on responsibly recycling refrigerators, freezers, dehumidifiers, and window air conditioning (AC) units. The component serves both IE and market-rate customers. Historically, ARCA implemented the Appliance Recycling component. However, ARCA was unable to fulfill its obligations early in the phase, which resulted in the program being put on hold until an alternative implementation methodology could be adopted. The program later partnered with eForce Recycling, which facilitates drop-off events within the greater Philadelphia area, and continues that relationship and implementation pathway. Currently, these drop-off events are advertised as “anything with a plug” to collect old electronics, but the program only incentivizes and claims electric savings for low-capacity refrigerators and freezers, dehumidifiers, and window ACs or room ACs. The program also offers a separate pathway, supporting the recycling of primary refrigerators replaced through the combination of the Single-Family Income-Eligible and Low Income Usage Reduction Program (LIURP).
- **In-Home Assessment (Single-Family):** The In-Home Assessment component provides in-home assessments and comprehensive audits to educate customers, install energy efficient measures, and identify additional, potentially larger, energy efficiency opportunities (such as insulation and air sealing). CLEAResult implements the In-Home Assessment (market-rate) component.

All In-Home Assessment component participants receive an assessment of their home’s energy performance and direct installation of basic efficiency measures (e.g., LED lighting, water conservation devices, hot water pipe insulation, smart strips). A subset of eligible participants may opt in for additional In-Home Assessment instant rebates for more comprehensive measures (such as insulation, air sealing, and HVAC services).

The In-Home Assessment component also provides a small kit to any new PECO customer who has recently opened a new account as a result of a recent move. Measures reported as part of these kits in PY17 include outlet gaskets, advanced power strips, low flow faucet aerators, low flow showerheads, and pipe insulation for hot water pipes.

¹⁶ The Residential EE programs are designed to serve customers who have a household income greater than 150% of the FPL, also referred to as market-rate customers. However, customers who fall under the 150% FPL, also known as Income-Eligible, are not excluded from participating in the residential programs as some programs (such as the online marketplace) are open to all customers.

- **New Construction:** The Residential New Construction component supports the construction of more comfortable, durable, and energy efficient homes compared with those simply built to code. This component works with Home Energy Rating System raters and builders to create more energy efficient homes during the design and construction phases. PSD implements the New Construction component.
- **Multifamily:** The Multifamily component provides an energy efficiency audit of the building, direct install measures, and larger, investment-level upgrades to improve the energy efficiency of multifamily buildings, both in tenant units and common areas. The component serves buildings with market-rate customers, IE customers, and a mix of residential and commercial customer types. CMC implements the Multifamily component for both the residential and IE segments. The IE and market-rate services are delivered consistently across sectors, although incentives may vary. Verifying, sampling, and reporting program savings will differentiate between and allocate savings to either the residential or IE customer segment accordingly.

Program participants receive an assessment of their building's energy performance and direct installation of basic efficiency measures (e.g., LED lighting, water conservation devices, hot water pipe insulation, smart strips). A subset of participants may opt in for additional rebates of more comprehensive measures (such as insulation and air sealing).

3.1.1 Participation and Reported Savings by Customer Segment

Table 3-3 presents the participation counts, reported energy and demand savings, and incentive payments for the Residential EE Program in PY17 by customer segment.

Table 3-3. Residential EE Program Participation and Reported Impacts

Parameter	Residential (Non-IE)	Income-Eligible	Small C&I (Non-GNI) ¹	Large C&I (Non-GNI) ¹	Total
PY17 # Participants ²	23,712	428	986	4	25,130
PYRTD MWh/yr	52,827	1,454	3	1	54,285
PYRTD MW/yr	11.72	0.18	0.00	0.00	11.89
PY17 Incentives (\$1,000)	6,848	438	-	-	7,286

¹ In certain circumstances, customers in the Small C&I or Large C&I rate classes participate in the Residential EE Program. Savings for those measures are captured in the Residential EE Program.

² Participant counts exclude upstream point of purchase measures.

Source: Guidehouse analysis

3.1.2 Gross Impact Evaluation

Guidehouse conducted the gross impact evaluation for the Residential EE Program following the approach outlined in its Evaluation Plan¹⁷ for PY17. The Residential EE Program gross impact evaluation included a comprehensive tracking database analysis of all TRM-based and interim measure protocol (IMP)-based measures to confirm that reported savings align with TRM and IMP standards, including relevant PY17 codes and standards updates. Guidehouse reviewed all measures within the Residential EE Program. Guidehouse adjusted the reported savings based on discrepancies identified in the tracking database analysis. This adjustment results in adjusted database savings and the TDR.

¹⁷ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Additionally, for the Appliance Recycling component, in PY17, Guidehouse conducted a customer survey and analyses based on survey responses for a sample of 121 measures. The sample was drawn randomly from the combined population of Appliance Recycling components from both Residential (market-rate) and Income-Eligible programs.

Guidehouse defined the survey population based on customer activity data from eTRACK+. Customer activity data included contact information for the Appliance Recycling component.

All samples were designed and implemented to meet the targets set in Guidehouse's sampling design memos.¹⁸ Table 3-4 outlines the impact survey sample targets and completes.

Survey completes are defined as a survey where the participant successfully completed the entire survey through to the end and excludes partial completes and respondents who were screened out of the survey due to ineligibility or respondents who were screened out for responding "don't know" to critical questions. Additional PY17 impact evaluation detail can be found in 4.2Appendix E. Details on the survey activities, approach, and analysis for the Appliance Recycling surveys can be found in 4.2Appendix E.

Table 3-4. Residential EE Program PY17 Impact Sample Targets and Completes

Component	Stratum	Number Contacted	Target Completes	Actual Completes	Response Rate	Percentage of Target Achieved
Appliance Recycling	Dehumidifiers	535	15	69	13%	460%
	Room Air Conditioners	253	14	38	15%	271%
	Low-Capacity Refrigerators and Freezers	131	13	14	11%	108%
	Total	925	42	121¹	13%	288%

¹ Actual Completes is the number of measure lines that were evaluated via survey. Two RAC recycling projects included two measure lines each, meaning only 36 RAC recycling projects were evaluated.

Source: Guidehouse analysis

For the Dehumidifier Retirement, Room AC (RAC) Retirement, and Low-Capacity Refrigerators (Mini-Fridges) and Freezer Retirement measures, new verification ratios were established for PY17. For all other measures, prior verification ratios were used to determine final verified gross savings. This, combined with the tracking database analysis results, led to the overall realization rates.

Table 3-5 presents the gross impact results for energy, and Table 3-6 presents gross impact results for demand.

Table 3-5. Residential EE Program PY17 Gross Impact Results for Energy

Component	PYRTD MWh/yr	Energy Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Rebates and Marketplace ¹	38,343	1.00	0.54	0.06
Appliance Recycling	1,009	0.39	4.05	0.14
In-Home Assessment	6,792	0.90	2.04	0.22
New Construction	6,000	1.00	0.01	0.00

¹⁸ Guidehouse, *PECO PY17 Residential Impact Sample Design Memo FINAL*, dated January 21, 2026.

Component	PYRTD MWh/yr	Energy Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Multifamily	688	1.21	0.11	0.22
Multifamily Income-Eligible	1,454	0.90	0.26	0.13
Program Total²	54,285	0.97	0.68	0.06 [90% CL]

¹ SHEMS is excluded from the Residential Rebates and Marketplace component realization rate because it is not reflective of component delivery results.

² Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Appliance Recycling components in PY17. For all other components, Guidehouse applied the energy and demand verification ratios from the previous evaluations to the results of the PY17 tracking database analysis.

Source: Guidehouse analysis

Table 3-6. Residential EE Program PY17 Gross Impact Results for Demand

Component	PYRTD MW/yr	Demand Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Rebates and Marketplace ¹	9.07	1.25	0.35	0.06
Appliance Recycling	0.40	0.58	3.14	0.11
In-Home Assessment	0.62	1.34	2.11	0.26
New Construction	1.54	1.18	1.38	0.39
Multifamily	0.09	1.18	0.10	0.21
Multifamily Income-Eligible	0.18	0.96	0.21	0.14
Program Total²	11.89	1.15	1.03	0.08 [90% CL]

¹ SHEMS is excluded from the Residential Rebates and Marketplace component realization rate because it is not reflective of component delivery results.

² Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Appliance Recycling components in PY17. For all other components, Guidehouse applied the energy and demand verification ratios from previous evaluations to the results of the PY17 tracking database analysis.

Source: Guidehouse analysis

The introduction to Section 3 describes the two-step evaluation method that results in the ratios shown in Table 3-7 and Table 3-8. The tracking database analysis is conducted annually while the verification ratio may be historical based on the evaluation plan.¹⁹ The TDR and the verification ratio together represent the overall energy or demand realization rate.

Table 3-7. Residential EE Program PY17 Energy Ratios

Component	Energy TDR	Energy Verification Ratio ²	Energy Realization Rate
Rebates and Marketplace ¹	0.99	1.00	1.00
Appliance Recycling	0.99	0.39	0.39
In-Home Assessment	1.06	0.85	0.90
New Construction	1.00	1.00	1.00
Multifamily	1.25	0.97	1.21
Multifamily Income-Eligible	1.08	0.83	0.90
Residential Total	1.01	0.97	0.97

¹ SHEMS is excluded from the Residential Rebates and Marketplace component realization rate because it is not reflective of component delivery results.

² Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Appliance Recycling components in PY17. For all other components, Guidehouse applied the energy and demand verification ratios from previous evaluations to the results of the PY17 tracking database analysis.

¹⁹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Source: Guidehouse analysis

Table 3-8. Residential EE Program PY17 Demand Ratios

Component	Demand TDR	Demand Verification Ratio ²	Demand Realization Rate
Rebates and Marketplace ¹	1.00	1.16	1.16
Appliance Recycling	0.99	0.58	0.58
In-Home Assessment	1.08	1.24	1.34
New Construction	1.00	1.18	1.18
Multifamily	1.24	0.96	1.18
Multifamily Income-Eligible	1.08	0.89	0.96
Residential Total	1.01	1.14	1.15

¹ SHEMS is excluded from the Residential Rebates and Marketplace component realization rate because it is not reflective of component delivery results.

² Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Appliance Recycling components in PY17. For all other components, Guidehouse applied the energy and demand verification ratios from previous evaluations to the PY17 tracking database analysis.

Source: Guidehouse analysis

The following factors led to variation between the reported and verified savings and to the observed realization rates:

- Tracking Database Analysis:** For all components, Guidehouse adjusted savings across several measures including electronically commutated motor (ECM) fans, heat pump water heaters, shell insulation measures, and more. The adjustment with the largest impact on savings was made for heat pump water heaters. The tracking database analysis resulted in an overall TDR of 1.01 for both energy and demand for the Residential EE program. Further measure-level details can be found in 4.2Appendix E. A TDR close to one indicates that PECO and its CSPs are accurately reporting savings in accordance with the TRM and reducing the likelihood of systemic data errors.
- Rebates and Marketplace Heat Pump Water Heaters:** The reported savings for units between 50 and 120 gallons use an outdated baseline efficiency calculation equation. The TRM errata memo issued for PY15, dated 01/30/2023,²⁰ provides updated equations to calculate the baseline Uniform Energy Factor (UEF) for these measures.
- Appliance Recycling Low-Capacity Refrigerators and Freezers:** Reported savings use a custom $PART_{USE}$ factor from a research study based on a replacement/pick-up program delivery design that targeted primary full-size refrigerators. The target equipment and program delivery model of this older program component were different from the current component's low-capacity units and drop-off design, meaning the $PART_{USE}$ factor derived from the study is not applicable to the current program design and equipment. Guidehouse used the appropriate default deemed factor from the IMP, 72.8% for refrigerators and 84.5% for freezers.
- In-Home Assessment Shell Measures:** Within the Ceiling/Attic, Wall, Floor and Rim Joist Insulation measure type, for some ceiling and all wall insulation measures, the tracking data reports R_{base} and R_{ee} values. Some R_{base} values for walls are below

²⁰ NMR Group, *Guidance for Updating TRM Measure 2.3.1 Heat Pump Water Heater*, revised January 30, 2023.

the minimum R_{base} allowed by the TRM. The reported savings do not use the reported R_{base} and R_{ee} values but instead use the TRM-deemed R_{base} and R_{ee} values for calculations, but do not track the values used.

- **In-Home Assessment and Rebates and Marketplace ECM Circulation Fans:** Reported savings use an ECM_{kW} reduced power factor of 0.11 when they should have used the TRM-deemed value of 0.116.
- **In-Home Assessment Education:** The CSP uses placeholder values of 1 kWh and 0 kW for tracked savings for education measures. Guidehouse used survey research to update these savings values in PY16. Evaluated savings values vary by measure type, but range from 19 kWh-50 kWh and 1 W-5 W per measure.
- **Survey Analysis:** Guidehouse's impact evaluation included survey outreach to all customers, Residential (market-rate) and Income Eligible, who had recycled eligible appliance types at drop-off events in PY17 up until the time the survey outreach was performed. Survey responses included 137 customers who dropped off plug-in appliances at appliance recycling drop-off events. Of these, 12 customer responses were excluded from analysis due to answering "don't know" to critical questions, and six more were excluded due to complex responses that made evaluation inconclusive. There were two customers that dropped off two types of equipment, counting as a complete for two measures each. The total number of measure lines with valid survey responses for evaluation was 121:
 - 65% of customers who knew whether their dehumidifier was functional reported that their recycled unit was not functional. 35% of dehumidifiers were functional when they were recycled.
 - 21% of customers recycling window ACs or room air conditioners (RACs) who knew whether their RAC was functional reported that their recycled unit was not functional. 79% of RACs were functional when they were recycled.
 - 46% of customers who knew whether their low-capacity refrigerator was functional reported that their recycled unit was not functional. 54% of low-capacity refrigerators and freezers were functional when they were recycled.

3.1.3 Net Impact Evaluation

As described in the Phase IV Evaluation Plan²¹ for PY17 and in Table 3-2, Guidehouse conducted NTG research for the Residential EE Program Downstream and Online Marketplace pathways of the Rebates and Marketplace component, and the Appliance Recycling component. Table 3-9 summarizes the pathway-level NTGRs evaluated in PY17. Further details of the survey responses are in Section 3.1.5.1 and **Error! Reference source not found.**

3.1.3.1 Methodology

Guidehouse followed the Evaluation Framework²² for conducting NTG research and analysis for the Rebates and Marketplace and Appliance Recycling components. The guidance included

²¹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

²² Pennsylvania Public Utilities Commission, *Evaluation Framework for Pennsylvania Act 129 Phase IV Energy Efficiency and Conservation Programs*, dated July 16, 2021, prepared by the Statewide Evaluation Team.

details for gathering feedback from downstream participants about the program’s impact on their decisions for purchasing and installing energy efficiency equipment. The guidance also provided details for understanding how efficiency programs impact customer decision-making on recycling or keeping secondary appliances.

Rebates and Marketplace

The following describes the general downstream pathway methodology for estimating the Residential EE Program NTGR including definitions of free ridership and spillover, and how each is used to calculate the final NTGR:

- **Free Ridership:** The self-reported free ridership survey battery is brief to avoid customer burden and includes two metrics to assess free ridership: 1) the intention to install the energy efficient equipment without program funds and 2) the influence of the program in the decision to install the energy efficient equipment at the time it was installed. When scored, each metric results in a value ranging from 0 to 0.5, and a combined total free ridership score from 0 to 1.0.
- **Spillover:** The self-reported spillover battery collects data on additional energy efficient equipment installations in homes that did not receive a program incentive but were installed at least in part because of the program. Survey questions gather high-level information on the type of equipment installed, including quantity and the replaced equipment, to allow for estimates of energy savings. Guidehouse divides the total spillover savings by the total gross savings for the sample to arrive at the spillover result.

Guidehouse estimated the final NTGR score using Equation 3-1 **Error! Reference source not found..**

Equation 3-1. NTGR Equation

$$NTG = 1 - Free\ Ridership + Spillover$$

Where:

<i>Free Ridership</i>	Quantifies the percentage of savings (reduction in energy consumption or demand) from participants who would have implemented the measure in the absence of the program or component
<i>Spillover</i>	Quantifies the percentage reduction in energy consumption (that is, additional savings) caused by the presence of the program or component; spillover savings happen when customers invest in additional energy efficient measures or activities without receiving a financial incentive from the program or component

The following bullets summarize the methods used to estimate the NTG for each pathway in the Rebates and Marketplace component. 4.2E.1.2 provides details on the NTG methods and algorithms used for the Rebates and Marketplace component:

- **Rebates and Marketplace Component – Downstream:** For the program known to customers as the PECO Rebates and Discounts Program, and in alignment with the process evaluation survey activity detailed in Section 3.1.5, Guidehouse completed online surveys with residential customers receiving a PECO rebate through the Downstream pathway. The survey asked participants to rate the amount of influence (on a 0-10 influence scale) the program had on their decision to purchase and install

the measure. The survey also asked about the intentions of each participant if the program had not been available. Guidehouse defined the survey population and sample based on customer activity data from eTRACK+, as described in Section 3.1.2. As Table 3-10 presents, Guidehouse created target completes based on eTRACK+ participation data. The SWE reviewed and approved sample design memos and survey instruments prior to fielding.

- Rebates and Marketplace Component – Online Marketplace:** Guidehouse completed online surveys with residential customers visiting PECO’s Online Marketplace and receiving discounts for purchasing energy efficient items online. The survey asked participants to rate the amount of influence (on a 0-10 influence scale) the program had on their decision to purchase the equipment that day, as well as the intentions of each participant if the online discounts had not been available. Guidehouse defined the survey population and sample based on customer activity data from eTRACK+, as described in Section 3.1.2. As Table 3-10 presents, Guidehouse created target completes based on eTRACK+ participation data. The SWE reviewed and approved sample design memos and survey instruments prior to fielding.

Appliance Recycling

NTG research for PECO’s Appliance Recycling component in PY17 relied on a self-reported approach survey effort with Residential PECO customers who dropped off functioning small appliances at recycling drop-off events. The online survey verified that recycled units were functioning at the time of drop-off, and that customers had their recycling fee covered by PECO at the drop-off event.

The nature of the Appliance Recycling program requires a unique approach to estimating free ridership, and ultimately, net savings. Free ridership is based on the participants’ anticipated plans had the program not been available—a free rider is classified as one who would have removed the unit from service irrespective of the program. Net savings for the Appliance Recycling program is therefore based on the participants’ anticipated continued operation of the appliance within their home or transferred to another home (either directly or indirectly). See Appendix E.2.2 Net Impact Evaluation for the full Appliance Recycling NTG methodology.

3.1.3.2 NTG Results

Table 3-9 shows the NTG results and relative precision by Residential component and pathway.

Table 3-9. Residential EE Program PY17 Net Impact Evaluation Results

Component	PYVTD (MWh)	Free Ridership	Spillover	NTGR	Relative Precision (@ 85% CL)
Rebates and Marketplace – Downstream – Solar	24,634	0.43	0.00	0.57	0.05
Rebates and Marketplace – Downstream – Non-Solar	5,707	0.56	0.02	0.46	0.06
Rebates and Marketplace – Marketplace	1,001	0.27	0.01	0.74	0.12
Appliance Recycling	393	0.55	-	0.45	0.28

Source: Guidehouse analysis

Table 3-10 shows sample targets and completes. As mentioned earlier, the SWE reviewed and approved sample design memos²³ prior to survey fielding. Sample design is described in Section 3.1.2.

Table 3-10. Residential EE Program PY17 Sample Targets and Completes

Component	Number Contacted	Target Completes	Actual Completes ¹	Response Rate	Percentage of Target Achieved
Rebates and Marketplace – Downstream					
Solar	1,049	30	68	6%	227%
Central A/C and Ducted Heat Pumps	95	8	7	7%	88%
Clothes Washers and Dryers	569	6	84	15%	1,400%
Furnace Fans	1,958	7	196	10%	2,800%
Ductless Heat Pumps	357	5	33	9%	660%
Other (Air Source Heat Pump: Maintenance, Heat Pump Water Heater)	177	6	18	10%	300%
Refrigerators and Freezers	676	8	88	13%	1,100%
Rebates and Marketplace – Online Marketplace					
Advanced Power Strips	97	10	12	12%	120%
Purifiers & Dehumidifiers	11	3	2	18%	67%
Smart Thermostats	1,927	16	73	4%	456%
Appliance Recycling²					
Dehumidifier Retirement	535	15	20	4%	133%
Mini-Fridge Retirement	131	13	7	5%	54%
Room AC Retirement	259	14	20	8%	143%

¹ Guidehouse removed respondents who screened out of the survey or started but did not fully complete the survey.

² For the Appliance Recycling program, Guidehouse included in the counts of actual completes only respondents who reported their recycled appliance to be in working condition.

Source: Guidehouse analysis

3.1.3.3 High Impact Measure Research

Guidehouse did not conduct high impact measure (HIM) NTG research for the Residential Program in PY17.

3.1.4 Verified Savings Estimates

In Table 3-11., the realization rates and NTGRs determined by Guidehouse are applied to the reported energy and demand savings estimates to calculate the verified net savings estimates for the Residential EE Program in PY17. Additional details of the savings calculations performed in PY17 can be found in 4.2Appendix E.

²³ Guidehouse, *PECO PY17 Residential Impact Sample Design Memo FINAL*, dated January 21, 2026.

Table 3-11. Residential EE Program PY17 and P4TD Savings Summary

Savings Type	Energy (MWh/yr)	Demand (MW/yr)
PYRTD	54,285	11.89
PYVTD Gross	52,849	13.69
PYVTD Net	30,531	7.72
RTD	262,898	43.05
VTD Gross	241,750	44.62
VTD Net	154,270	27.29

Source: Guidehouse analysis

3.1.5 Process Evaluation

The PY17 process evaluation of the Residential EE Program included PECO program manager and CSP staff interviews, and participant surveys for one component. This section summarizes the evaluation methods, data collection techniques, sample design, and key results related to the surveys.

3.1.5.1 Methodology

Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program in PY17, identify significant implementation changes, and identify current areas of strength and improvement. Guidehouse conducted interviews for each component of the program.

Guidehouse also conducted a participant survey with those customers who installed a solar PV system within the Downstream pathway of the Rebates and Marketplace component. Table 3-12. outlines these efforts. Additional details on methodology for the survey are provided below.

The surveys assessed participant satisfaction, likeliness to recommend the program to others (also known as net promoter score), and program awareness. This process evaluation survey was fielded in conjunction with the NTG survey to reduce burden on the participant base.

Table 3-12. Residential EE Program PY17 Process Activities by Component

Component	PM/CSP Interview	Participant Survey	Survey Recipient
Rebates and Marketplace	X	X	Downstream pathway customers who installed solar PV
Appliance Recycling	X	-	-
In-Home Assessment	X	-	-
New Construction	X	-	-
Multifamily	X	-	-

Source: Guidehouse analysis

Rebates and Marketplace Downstream Pathway Solar Measure

For the Downstream pathway solar measure (referred to throughout Section 3.1.5 as Solar) participants survey sample, Guidehouse defined the survey population and sample based on customer activity data from eTRACK+, as described in Section 3.1.2. As Table 3-13 presents,

Guidehouse created target completes based on eTRACK+ participation data. The SWE reviewed and approved sample design memos²⁴ and survey instruments prior to fielding.

Note that survey completes are defined as a survey where the participant successfully completed the entire survey through to the end and excludes partial completes and respondents who were screened out of the survey due to ineligibility. Guidehouse removed “don’t know” responses from analysis for most questions in the process survey analysis. Therefore, n values may vary between questions.

Table 3-13. Rebates and Marketplace Solar PY17 Sample Targets and Completes

Number Contacted	Target Completes	Actual Completes	Response Rate	Percentage of Target Achieved
1,049	30	494	6%	227%

Source: Guidehouse analysis

Guidehouse’s survey email outreach approach included sending sampled customers an initial invitation email and up to two reminder emails. Guidehouse offered customers who completed the survey a \$15 e-gift card through the Tango platform.

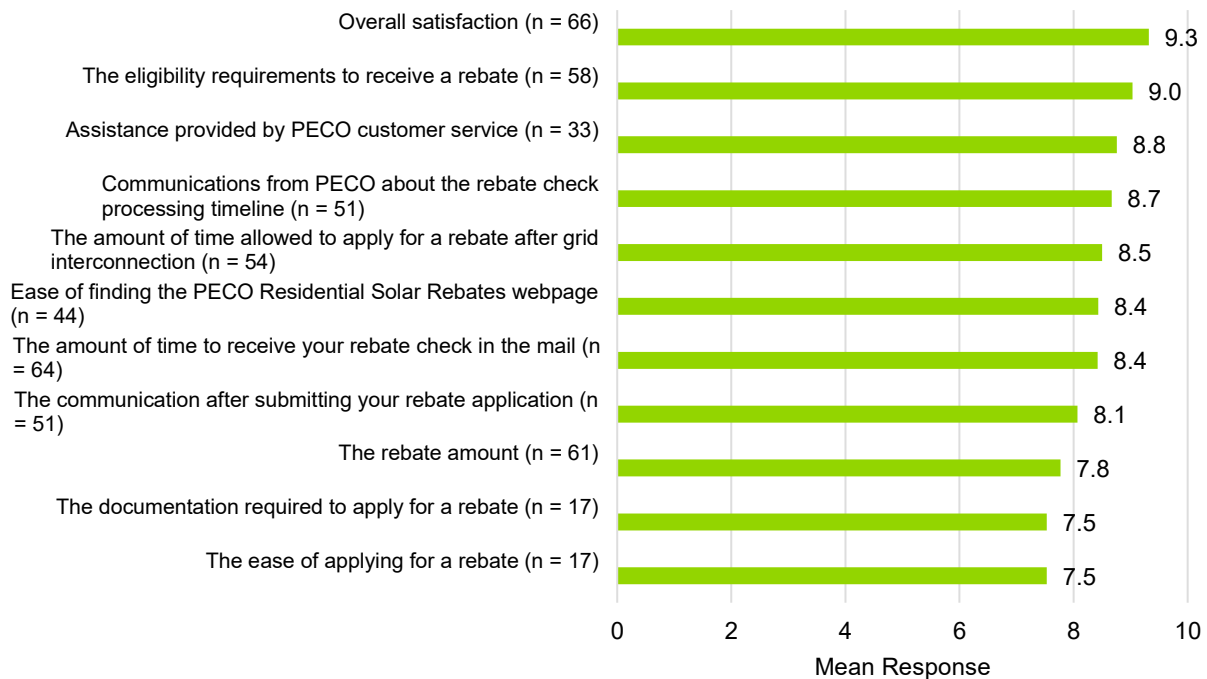
3.1.5.2 Key Findings from Process Evaluation

Guidehouse presents key findings here for the Solar participant survey. Guidehouse contacted 1,049 customers who received a rebate through the Solar measure to conduct the process evaluation. Sixty-eight Solar participants replied to the survey resulting in a 6% response rate.

As Figure 3-2 shows, respondents are overall satisfied with PECO’s solar offering. Respondents provided an overall satisfaction score of 9.3 out of 10 for the solar offering, using a scale where 0 is “extremely dissatisfied” and 10 is “extremely satisfied.”

Respondents also provided satisfaction scores for aspects of their participant experience. Solar respondents provided the highest satisfaction scores for the eligibility requirements to receive a rebate (9.0 out of 10; n=58) and assistance provided by PECO customer service (8.8 out of 10; n=33), as Figure 3-2 shows. Although respondents provided the lowest satisfaction score for ease of applying for a rebate (7.5 out of 10; n=17), the mean score is one point higher than it was in PY16 (6.5 out of 10; n=12). Satisfaction with assistance provided by PECO customer service also increased from 6.9 out of 10 in PY16 (n=25) to 8.8 out of 10 in PY17 (n=33).

²⁴ Guidehouse, *PECO PY17 Residential Impact Sample Design Memo FINAL*, dated January 21, 2026.

Figure 3-2. Rebates and Marketplace Satisfaction for Solar


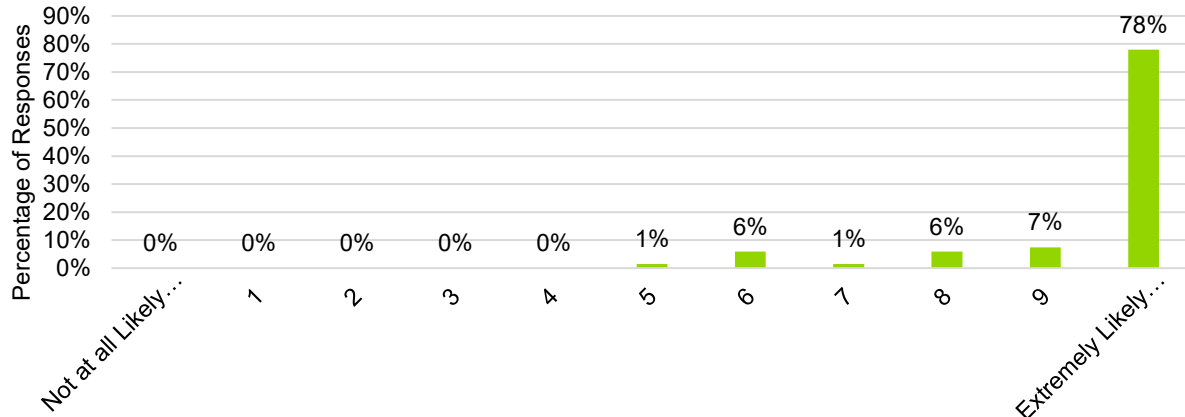
Respondents received the following question: “How would you rate your satisfaction with the PECO Residential Solar Rebates offering overall?”

Guidehouse excluded “don’t know” responses from analysis.

Source: Guidehouse analysis

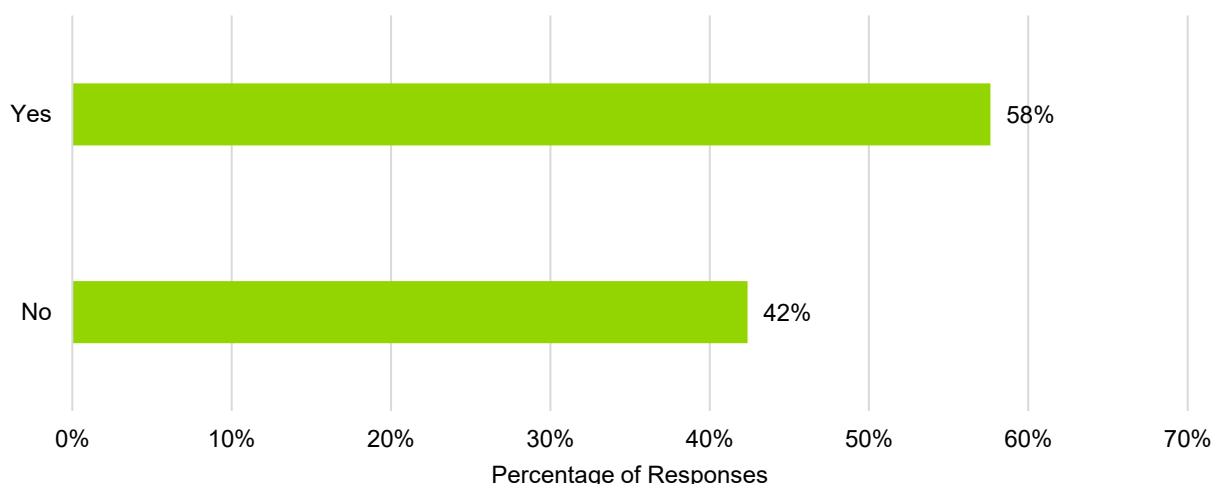
Figure 3-3 shows the likelihood to recommend PECO’s solar rebate offering. Seventy-eight percent of solar respondents indicated a score of 10 out of 10, and the mean score was 9.5 out of 10, using a scale where 0 is “Not at all Likely” and 10 is “Extremely Likely.” As Figure 3-4 shows, a smaller share of respondents reported having recommended the program to others (58%; n=58).

Respondents who reported a likelihood of recommending the component as a 7 out of 10 or lower were also asked what changes to the component would make them more likely to recommend it to others. These respondents noted increased monetary incentives or applying the rebate directly to a PECO bill would increase their likelihood to recommend the component.

Figure 3-3. Likelihood to Recommend Solar (n=67)


Respondents received the following question: “How likely are you to recommend the PECO Residential Solar Rebates offering to others?” Guidehouse excluded “don’t know” responses from analysis.

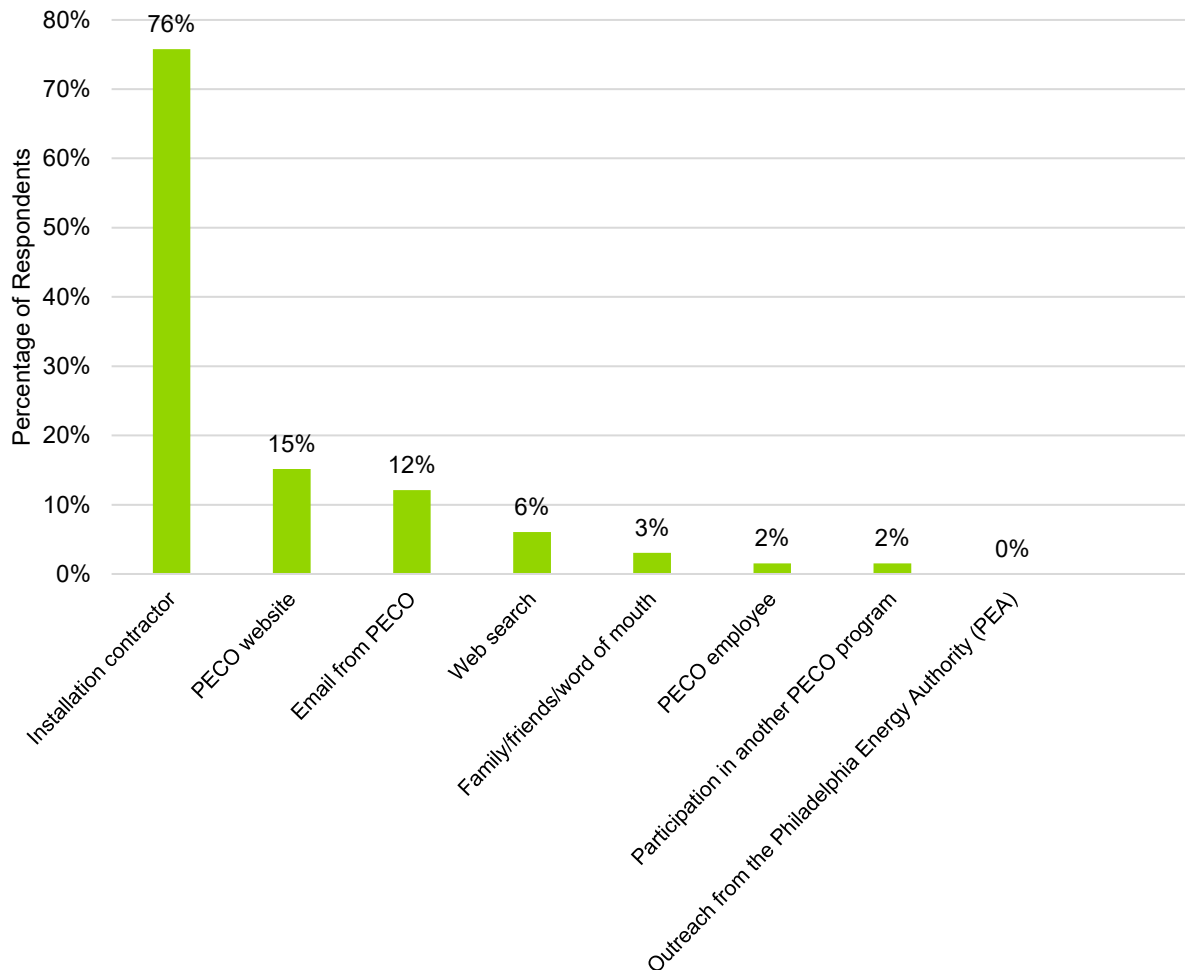
Source: Guidehouse analysis

Figure 3-4. Whether Respondents Recommended Solar (n=58)


Respondents received the following question: “Have you recommended the PECO Residential Solar Rebates offering to others?” Guidehouse excluded “don’t know” responses from analysis.

Source: Guidehouse analysis

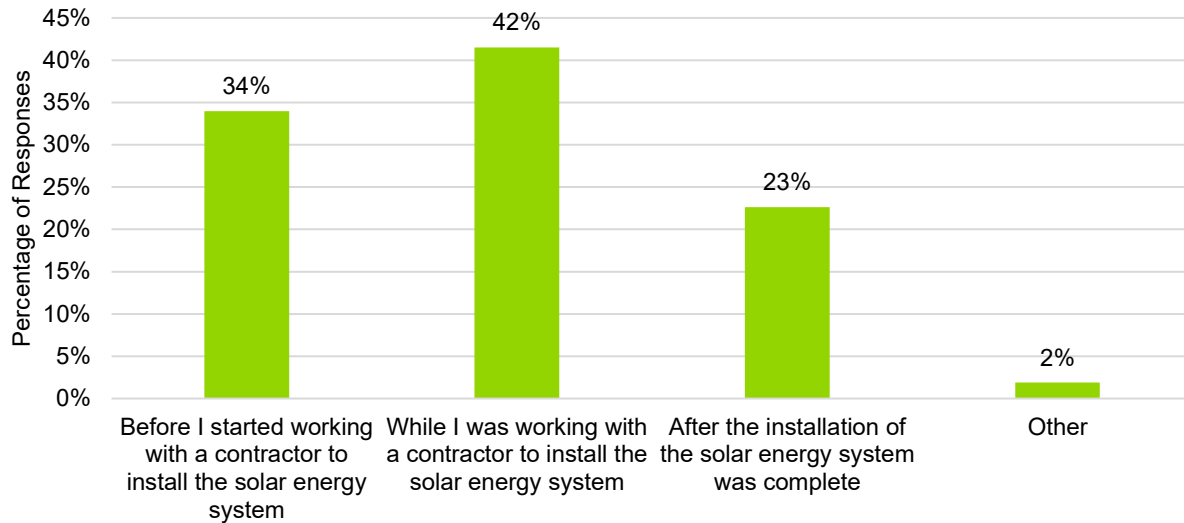
As Figure 3-5 shows, most Solar respondents (76%; n=66) learned about the component from their installation contractor. Reported awareness from an installation contractor increased 15 percentage points from 61% in PY16 (n=46) to 76% in PY17 (n=66). This finding is consistent with Guidehouse’s recommendation from PY16 to shift application processes to contractors. Most respondents (78%; n=67, as Figure 3-3 shows) indicated they were extremely likely to recommend the program to others, using a scale where 0 is “Not at all Likely” and 10 is “Extremely Likely.” However, installation contractors remained the primary method for Solar offering awareness. Few respondents (3%; n=66, as Figure 3-5 shows) heard about the program through word of mouth from other customers.

Figure 3-5. Sources of Rebates and Marketplace Awareness for Solar (n=66)


Respondents received the following question: “How did you learn about [Pathway Name]? Select all that apply.” Guidehouse excluded “don’t know” responses from analysis.

Source: Guidehouse analysis

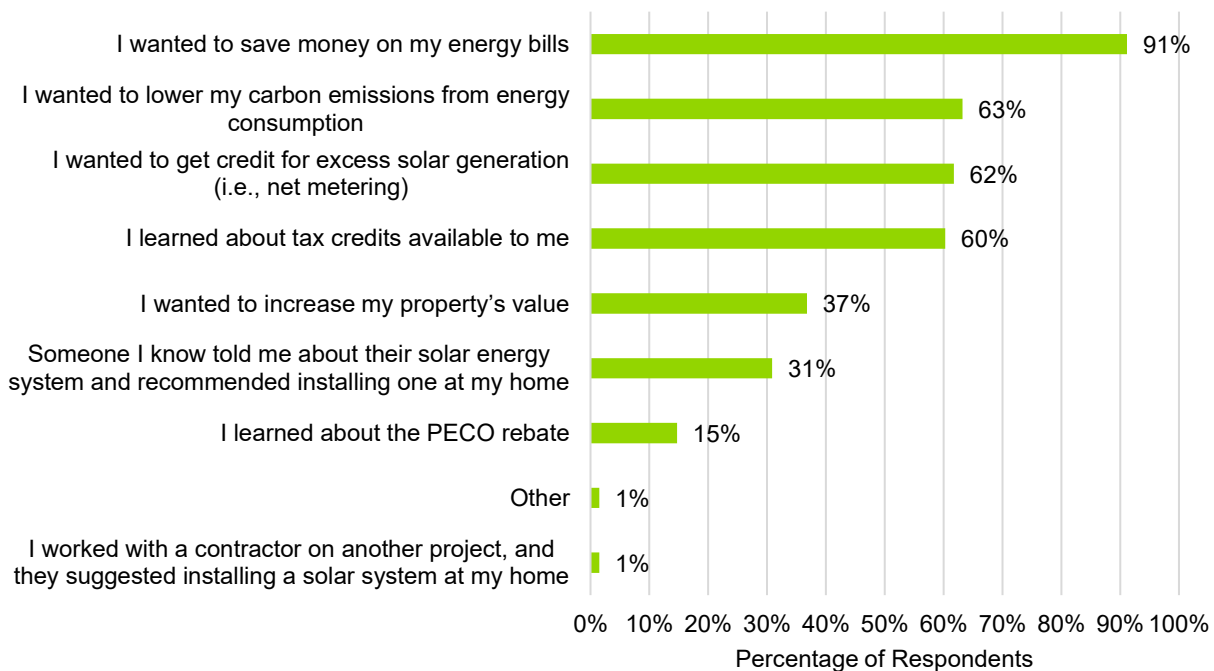
Regarding timing, nearly half of respondents (42%; n=53) first heard about the PECO solar offering while working with a contractor to install the solar energy system, as Figure 3-6 shows. Nearly a third of respondents (34%; n=53) first heard about the PECO solar offering before starting work with a contractor. Compared with PY16, the proportion of respondents who learned about the rebate before working with a contractor increased from 14% to 34% in PY17. This finding is consistent with PECO’s efforts to generate solar awareness earlier in the decision-making process.

Figure 3-6. Timing of Solar Rebate Awareness (n=53)


Respondents received the following question: “At what point in the process of adding a solar system to your home did you first hear about the PECO Residential Solar Rebates offering?”

Source: Guidehouse analysis

As Figure 3-7 shows, the most important factors that first made respondents interested in installing a solar system at their home were saving money on energy bills (91%; n=62), followed by lowering carbon emissions (63%; n=43).

Figure 3-7. Sources of Solar Installation Interest (n=68)


Respondents received the following question: What factors first made you interested in installing a solar project at your home? Select all that apply.” Guidehouse excluded “don’t know” responses from analysis.

Source: Guidehouse analysis

3.1.6 Program Finances and Cost-Effectiveness Reporting

Table 3-14. presents a detailed breakdown of program finances and cost-effectiveness. TRC benefits in Table 3-14. were calculated using gross verified impacts. NPV PY17 costs and benefits are expressed in 2025 dollars; Phase IV totals are in 2021 dollars.

Table 3-14. PY17 Summary of Program Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$33,144		\$155,795	
2	Rebates to Participants and Trade Allies	\$5,623		\$26,518	
3	Upstream/Midstream Incentives	\$1,008		\$6,898	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$656		\$3,399	
5	Direct Installation Program Materials and Labor	\$0		\$18	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$25,858		\$118,962	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$6,579	\$0	\$31,017	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$6,579		\$31,017	
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$39,723		\$186,811	
15	Total NPV Lifetime Electric Energy Benefits	\$21,494		\$89,736	
16	Total NPV Lifetime Electric Capacity Benefits	\$30,203		\$92,484	
17	Total NPV Lifetime O&M Benefits	\$242		\$25,065	
18	Total NPV Lifetime Fossil Fuel Impacts	\$155		-\$5,293	
19	Total NPV Lifetime Water Impacts	\$4,541		\$20,815	
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$56,633		\$222,806	
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	1.43		1.19	

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars

Source: Guidehouse analysis

Table 3-15 presents program financials and cost-effectiveness on a net savings basis. Guidehouse applied NTGRs, which are summarized in Table 2-5.

The 2021 TRC Test Final Order stated that the NTGR should be applied to all benefits in the net TRC test, including but not limited to avoided energy and capacity costs, operations and maintenance (O&M), interactive effects, and secondary fossil fuel impacts. In addition, the NTGRs are applied to the incremental measure costs (IMCs), therefore the IMCs are different on a net savings basis compared to the gross savings basis.

Table 3-15. PY17 Summary of Program Finances – Net Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$19,147		\$98,955	
2	Rebates to Participants and Trade Allies	\$5,623		\$26,518	
3	Upstream/Midstream Incentives	\$1,008		\$6,898	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$656		\$3,399	
5	Direct Installation Program Materials and Labor	\$0		\$18	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$11,861		\$62,122	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$6,579	\$0	\$31,017	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$6,579		\$31,017	
14	Total NPV TRC (sum of rows 1 and 13)	\$25,726		\$129,972	
15	Total NPV Lifetime Electric Energy Benefits	\$12,417		\$57,615	
16	Total NPV Lifetime Electric Capacity Benefits	\$17,448		\$57,872	
17	Total NPV Lifetime O&M Benefits	\$140		\$17,195	
18	Total NPV Lifetime Fossil Fuel Impacts	\$89		-\$3,585	
19	Total NPV Lifetime Water Impacts	\$2,623		\$13,589	
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$32,717		\$142,685	
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	1.27		1.10	

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars

Source: Guidehouse analysis

3.1.7 Status of Recommendations

The impact and process evaluation activities in PY17 led to the following findings and recommendations from Guidehouse to PECO, along with a summary of how PECO plans to address the recommendations in program delivery.

Table 3-16. Summary of Residential EE PY17 Evaluation Recommendations

Component	Evaluation Activity	Finding	Recommendation	EDC Status
Rebates and Marketplace; In-Home Assessment	Impact	For some instances of several measure types, including Residential Air Sealing, Ductless Heat Pump, Air Source Heat Pump, and Heat Pump Clothes Dryer, the reported savings cannot be reproduced using the reported parameters.	Guidehouse recommends the CSP review the parameters used to calculate the reported savings and those used to identify appropriate baselines, such as those that distinguish Replace on Burnout measures from Early Replacement measures.	Under Consideration
Rebates and Marketplace; In-Home Assessment	Impact	For the ECM Circulation Fan measure, reported savings' reduced energy demand factor is set to 0.11 rather than the TRM constant 0.116.	Use the TRM default of 0.116.	In Process
Rebates and Marketplace	Impact	For the Heat Pump Water Heater measure, units between 50 and 120 gallons use a UEF baseline calculation of $0.9307 - (0.0002 \times \text{volume})$. The TRM errata memo issued for PY15, dated 01/30/2023, provides updated equations to calculate UEF base for these larger measures.	Update the UEF baseline calculation for these larger measures to follow the TRM errata memo dated 01/30/2023.	In Process
Rebates and Marketplace – Downstream Pathway	NTG	NTG in PY16 was 0.29, improving to 0.57 in PY17 showing the adjustments to the program had an impact on new solar installations on homes.	Continue enhancing early-stage Residential customer awareness and education efforts when program incentives may have greater potential to influence installation decisions.	Under Consideration
Rebates and Marketplace – Downstream Pathway	Process	Respondents provided a high mean overall satisfaction (9.3 out of 10, n=66). Respondents also provided the lowest mean satisfaction scores for the ease of applying for a rebate (7.5 out of 10, n=17), the documentation required to apply for a rebate (7.5 out of 10, n=17), and the rebate amount (7.8, n=61). Although respondents provided the lowest satisfaction score for ease of applying for a rebate (7.5 out of 10; n=17), the mean score is one point higher than it was in PY16 (6.5 out of 10; n=12). Satisfaction with assistance provided by PECO customer service also increased from 6.9 out of 10 in PY16 (n=25) to 8.8 out of 10 in PY17 (n=33).	Build on existing program efforts from PY17 to continue improving application ease and customer service. Consider testing additional processes or resources to simplify the application process and address documentation requirements, such as providing automated checks and confirmations including completed and remaining steps.	Under Consideration

Component	Evaluation Activity	Finding	Recommendation	EDC Status
Rebates and Marketplace – Downstream Pathway	Process	The most important factors that first made respondents interested in installing solar at their home was saving money on energy bills (91%; n=62), followed by lowering carbon emissions (63%; n=43).	Continue to utilize these motivating factors in marketing materials and advertisements. Provide this information to validate, inform, or lead generation conversations.	Under Consideration
Rebates and Marketplace – Downstream Pathway	Process	Awareness of the solar rebate offerings prior to working with a contractor to install solar systems increased from 14% (n=36) in PY16 to 33% (n=54) in PY17.	Continue PY17 efforts to generate program awareness prior to customers working with a solar contractor.	Under Consideration
Appliance Recycling	Impact	Reported savings for the Low-Capacity Refrigerator/Freezer Recycling With And Without Replacement measure used a custom Part Use Factor (PARTUSE) from a survey of participants of an older program that operated differently and targeted different equipment.	Guidehouse recommends using TRM or IMP deemed values.	In Process
Appliance Recycling	Impact	Surveys of participating customers revealed that significant portions of recycled equipment were not functional and not eligible for savings, including 65% of dehumidifiers, 21% of RACs, and 46% of low-capacity refrigeration equipment.	Guidehouse recommends verifying equipment functionality and only reporting savings for equipment that is working at the time of recycling. Alternatively, if equipment functionality cannot be verified, consider using a "functional fraction" multiplier, similar to an ISR, to reduce claimed savings to align with an assumption that a portion of recycled equipment may be non-functional and ineligible for savings.	Under Consideration
In-Home Assessment	Impact	For the Water Heater Pipe Insulation measure, a number of reported kWh savings have a per-foot value of 3.087. The TRM states this value should be 8.82, as the rest of reported kWh use. A number of reported kW savings have a varying per-foot value. Most of the time, that value is 0.000233333. The TRM states this per-foot value should be 0.00071.	Reported savings should reflect the TRM deemed per-foot values.	In Process

Source: Guidehouse analysis

3.2 Income-Eligible EE Program

The Income-Eligible EE Program offers IE customers opportunities to save energy across all their electric end uses. The Income-Eligible EE Program serves customers with household incomes less than or equal to 150% of the FPL. The Residential EE Program serves all other customers, also referred to as market-rate. Some components (Multifamily and Appliance Recycling) allocate savings to both the Income-Eligible EE Program and the Residential EE Program.

CMC is the prime CSP for the program, managing additional CSPs to implement program components:

- **Appliance Recycling:** The Appliance Recycling component has focused on recycling refrigerators, freezers, dehumidifiers, and window AC units responsibly. The component serves both IE and market-rate customers. Historically, ARCA implemented the Appliance Recycling component. However, ARCA was unable to fulfill their obligations early in the phase, which resulted in the program being put on hold until an alternative implementation methodology could be adopted. The program later partnered with eForce Recycling, which facilitates drop-off events within the greater Philadelphia area, and continues that relationship and implementation pathway. Currently, these drop-off events are advertised as “anything with a plug” to collect old electronics, but only incentivize and claim electric savings for low-capacity refrigerators and freezers, dehumidifiers, and window ACs or Room ACs. The program also offers a separate pathway, supporting the recycling of primary refrigerators replaced through the combination Single-Family Income-Eligible and LIURP program. The program continues to investigate ways to offer the collection of refrigerators and freezers.
- **Single-Family:** The Single-Family component improves the energy efficiency of single-family homes for IE customers to help reduce their electric bills and make their homes more comfortable. CMC implements the Single-Family component. There are multiple pathways to receive program services. The Free Energy Checkup Program and LIURP²⁵ offer consistent services for IE households but are differentiated by funding sources. The program also mails energy efficient kits to anyone who has recently signed up for or been put on an IE payment program (i.e., Customer Assistance Program [CAP]). These kits include advanced power strips, a low flow faucet aerator, and a low flow showerhead.

All measures for the Single-Family component are 100% subsidized. When appropriate, measure installation funding is coordinated with the Long-Term Savings component. The implementation and evaluation approaches are consistent for these two components.

- **Long-Term Savings:** The Long-Term Savings component is implemented as an overlay service through the Single-Family component to encourage the installation of long-term, comprehensive measures. All Long-Term Savings projects are Single-Family component participants, but not all Single-Family participants will be Long-Term Savings participants. As a result, both the Single-Family and Long-Term

²⁵ LIURP funding is not part of the Act 129 program.

Savings components are evaluated and reported as a single component. CMC implements the Long-Term Savings component.

The Long-Term Savings component measures include insulation, air sealing, duct sealing, heat pumps, ACs, thermostats, and residential heat pump water heaters and solar water heaters. All measures are 100% subsidized.

3.2.1 Participation and Reported Savings by Customer Segment

Table 3-17. presents the participation counts, reported energy and demand savings, and incentive payments for the Income-Eligible EE Program in PY17 by customer segment.

Table 3-17. Income-Eligible EE Program Participation and Reported Impacts

Parameter	Income-Eligible	Total
PY17 # Participants ¹	8,846	8,846
PYRTD MWh/yr	13,391	13,391
PYRTD MW/yr	1.52	1.52
PY17 Incentives (\$1,000)	4,296	4,296

¹ Note: Participation totals do not include single-family giveaway measures.

Source: Guidehouse analysis

3.2.2 Gross Impact Evaluation

Guidehouse conducted the gross impact evaluation for the Income-Eligible EE Program following the general approach outlined in its Evaluation Plan²⁶ for PY17. The Income-Eligible EE Program gross impact evaluation included a comprehensive tracking database analysis of all TRM- and IMP-based measures to confirm that reported savings align with TRM and IMP standards. Guidehouse was able to review all measures within the Income-Eligible EE Program. Guidehouse adjusted the verified savings based on discrepancies identified in the tracking database analysis. Table 3-18 shows gross impact results for energy, and Table 3-19 shows gross impact results for demand.

A discussion of the Multifamily Income-Eligible evaluation is in Section 3.1.2. Guidehouse conducted the Multifamily Residential EE Program and Income-Eligible Multifamily EE Program impact evaluations together. See additional details on methodology in Sections 3.1.2 and 3.1.5.1. Additionally, for the Appliance Recycling component, in PY17, Guidehouse conducted a customer survey and analysis of the drop-off event delivery pathway. See Section 3.1.2 for more information.

Table 3-18. Income-Eligible EE Program PY17 Gross Impact Results for Energy

Component	PYRTD MWh/yr	Energy Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Single-Family/Long-Term Savings	13,280	1.24	1.24	0.08
Appliance Recycling ¹	111	0.89	4.05	0.14
Program Total²	13,391	1.23	1.25	0.08 [90% CL]

¹ Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the drop-off event delivery pathway of the Appliance Recycling component in PY17. For the other component and the

²⁶ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2026.

LIURP delivery pathway of the Appliance Recycling component, Guidehouse applied the energy verification ratios from the last time they were evaluated to the results of the PY17 tracking database analysis.

² The Multifamily IE component is not included in this table; it is included with Residential EE Program savings due to how this is reported in the tracking database; savings are credited to the IE carveout.

Source: Guidehouse analysis

Table 3-19. Income-Eligible EE Program PY17 Gross Impact Results for Demand

Component	PYRTD MW/yr	Demand Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Single-Family/Long-Term Savings	1.49	1.24	1.24	0.08
Appliance Recycling ¹	0.03	0.91	3.14	0.11
Program Total²	1.52	1.23	1.26	0.08 [90% CL]

¹ Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the drop-off event delivery pathway of the Appliance Recycling component in PY17. For the other component and the LIURP delivery pathway of the Appliance Recycling component, Guidehouse applied the energy verification ratios from the last time they were evaluated to the results of the PY17 tracking database analysis.

² The Multifamily IE component is not included in this table; it is included with Residential EE Program savings due to how this is reported in the tracking database; savings are credited to the IE carveout.

Source: Guidehouse analysis

The introduction to Section 3 describes the two-step evaluation method that results in the ratios that Table 3-20 and Table 3-21 show. The tracking database analysis is conducted annually while the verification ratio may be historical based on the Evaluation Plan.²⁷ The TDR multiplied by the verification ratio represents the overall energy or demand realization rate.

Table 3-20. Income-Eligible EE Program PY17 Energy Ratios

Component	Energy TDR	Energy Verification Ratio ¹	Energy Realization Rate
Single-Family/Long-Term Savings	1.00	1.24	1.24
Appliance Recycling	0.91	0.97	0.89
Income-Eligible Total	1.00	1.24	1.23

¹ Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the drop-off event delivery pathway of the Appliance Recycling component in PY17. For the other component and the LIURP delivery pathway of the Appliance Recycling component, Guidehouse applied the energy verification ratios from the last time they were evaluated to the results of the PY17 tracking database analysis.

Source: Guidehouse analysis

Table 3-21. Income-Eligible EE Program PY17 Demand Ratios

Component	Demand TDR	Demand Verification Ratio ¹	Demand Realization Rate
Single-Family/Long-Term Savings	0.99	1.25	1.24
Appliance Recycling	0.95	0.96	0.91
Income-Eligible Total	0.99	1.25	1.23

¹ Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the drop-off event delivery pathway of the Appliance Recycling component in PY17. For the other component and the LIURP delivery pathway of the Appliance Recycling component, Guidehouse applied the energy verification ratios from the last time they were evaluated to the results of the PY17 tracking database analysis.

²⁷ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Source: Guidehouse analysis

The following factors led to variation between the reported and verified savings, which led to the observed realization rates:

- **Tracking Database Analysis:** Guidehouse adjusted savings across a variety of measures, including low flow faucet aerators, shell measures, HVAC measures, and more. The adjustment that had the largest impact on savings was a correction to the kit inputs for low flow faucet aerators. These updates resulted in an energy TDR of 1.00 and a demand TDR of 0.99 for the Income-Eligible EE Program. 4.2Appendix E contains further measure-level detail.
- **Low-Flow Faucet Aerators:** Reported savings for some low flow faucet aerators distributed via mailed kits cited a specific space type where the aerators are assumed to be installed and use that space type to inform inputs for kit delivery rows. Guidehouse and the SWE use inputs that align with the space type Unknown for all kit delivery measures.
- **HVAC Measures:** For some HVAC measures, such as Air Source Heat Pump and Ductless Heat Pump (ductless heat pump or mini-split heat pump), the evaluation team was unable to reproduce the savings reported using the parameters reported. Some individual measures claim baseline or efficient-case efficiencies lower than the baseline efficiencies defined by the TRM, resulting in reduced or sometimes negative evaluated savings.
- **Shell Measures:** Within the Ceiling/Attic, Wall, Floor and Rim Joist Insulation measure type, for some ceiling and all wall insulation measures, the tracking data reports R_{base} and R_{ee} values, including R_{base} values for walls below the minimum R_{base} allowed by the TRM. The reported savings do not use these reported values but instead use the TRM-deemed R_{base} and R_{ee} values for calculations, but do not track the values used.
- **Education Measures:** The CSP uses placeholder values of 1 kWh and 0 kW for tracked savings for Education measures. Guidehouse used survey research to update these savings values in PY16. Evaluated savings values vary by measure type.
- **Survey Analysis:** Guidehouse's impact evaluation included survey outreach to all customers, Residential (market-rate) and Income-Eligible, who had recycled eligible appliance types at drop-off events in PY17 up until the time the survey outreach was performed. See Section 3.1.2 for further discussion of the survey analysis and results.

3.2.3 Net Impact Evaluation

Guidehouse does not assess net impacts for the Income-Eligible EE Program as per guidance from the SWE's Evaluation Framework.²⁸

²⁸ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

3.2.3.1 HIM Research

Guidehouse did not conduct HIM NTG research for the Income-Eligible Program in PY17.

3.2.4 Verified Savings Estimates

In Table 3-22, the realization rates and NTGRs determined by Guidehouse are applied to the reported energy and demand savings estimates to calculate the verified savings estimates for the Income-Eligible EE Program in PY17.

Table 3-22. Income-Eligible EE Program PY17 and P4TD Savings Summary

Savings Type	Energy (MWh/yr)	Demand (MW/yr)
PYRTD	13,391	1.52
PYVTD Gross	16,533	1.88
PYVTD Net	16,533	1.88
RTD	86,804	9.26
VTD Gross	90,891	9.55
VTD Net	90,891	9.55

Source: Guidehouse analysis

3.2.5 Process Evaluation

As described in the Phase IV Evaluation Plan²⁹ approved by the SWE, Guidehouse did not conduct in-depth process evaluation activities for the Residential Income-Eligible Program in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

3.2.6 Program Finances and Cost-Effectiveness Reporting

Table 3-23 presents a detailed breakdown of program finances and cost-effectiveness. TRC benefits in Table 3-23 were calculated using gross verified impacts. NPV PY17 costs and benefits are expressed in 2025 dollars; Phase IV totals are in 2021 dollars.

Table 3-23. PY17 Summary of Program Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$4,582		\$24,148	
2	Rebates to Participants and Trade Allies	\$2,689		\$22,623	
3	Upstream/Midstream Incentives	\$0		\$0	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$1,478		\$7,901	
5	Direct Installation Program Materials and Labor	\$128		\$140	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$286		-\$6,516	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$1,323	\$0	\$8,573	\$0

²⁹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$1,323		\$8,573	
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$5,905		\$32,721	
15	Total NPV Lifetime Electric Energy Benefits	\$4,691		\$28,252	
16	Total NPV Lifetime Electric Capacity Benefits	\$3,009		\$16,050	
17	Total NPV Lifetime O&M Benefits	\$247		\$3,713	
18	Total NPV Lifetime Fossil Fuel Impacts	\$367		-\$260	
19	Total NPV Lifetime Water Impacts	\$10,363		\$71,344	
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$18,678		\$119,099	
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	3.16		3.64	

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars.

Source: Guidehouse analysis

Program financials and cost-effectiveness on a net savings basis are the same values as in Table 3-23 because verified net savings equal the verified gross savings for the Income-Eligible EE Program.

3.2.7 Status of Recommendations

The impact and process evaluation activities in PY17 led to the following findings and recommendations from Guidehouse to PECO, along with a summary of how PECO plans to address the recommendations in program delivery.

Table 3-24. Summary of Income-Eligible EE PY17 Evaluation Recommendations

Component	Evaluation Activity	Finding	Recommendation	EDC Status
Appliance Recycling	Impact	For the Refrigerator Recycling With And Without Replacement measure, the reported savings do not reflect the information provided in the tracking data.	Use the age of the fridge to determine whether the fridge is Pre-1990 and the specific fridge configuration to estimate reported savings.	Under Consideration
Single-Family Income-Eligible	Impact	Reported savings for some low flow faucet aerators distributed via mailed kits report a specific "kitchen" space type where the aerators are assumed to be installed, and use that space type to inform inputs for kit delivery rows. Guidehouse and the SWE use inputs that align with the space type Unknown for all kit delivery measures.	Ensure kit delivery rows use savings inputs that align with the space type Unknown.	Under Consideration
Single-Family Income-Eligible, Long-Term Savings	Impact	For some instances of several measure types, including Residential Air Sealing, Ductless Heat Pump, Air Source Heat Pump, and Heat Pump Clothes Dryer, the reported savings cannot be reproduced using the reported parameters.	Guidehouse recommends the CSP review the parameters used to calculate the reported savings, and those used to identify appropriate baselines, such as those that distinguish Replace on Burnout measures from Early Replacement measures.	Under Consideration

Source: Guidehouse analysis

3.3 Residential HER Program

The objective of the Residential HER Program for market-rate customers is to encourage reduced home energy use through print (mail) and online (email) reports sent directly to customers that give insight into their household energy usage. These programs leverage social norming to drive persistent energy savings through smart energy practices.

Oracle implements the HER program as a randomized control trial (RCT). HER print and online content provides customers with usage summaries to compare their household energy use with the average energy use of similar households. In this way, these customers have a relative sense of where their energy use patterns fall. The reports also provide targeted recommendations or tips to customers, suggesting actions they can take to reduce consumption. The full content of HERs serves to encourage customers to reduce their consumption and enhance engagement and general satisfaction.

The reports are sent to targeted cohorts of customers on an opt-out basis. In Phase IV, cohort activity is on a rotating activity schedule, meaning that some report recipient cohorts will not receive HERs in certain years.³⁰ During PY17, 523,923 households received HERs across ten active residential cohorts, with reports paused for one legacy residential cohort.

3.3.1 Participation and Reported Savings by Customer Segment

Table 3-25 presents the participation counts, reported energy and demand savings, and incentive payments for the Residential HER Program in PY17 by customer segment. Participants are defined as HER recipients who have savings in at least one month during the program year.

Table 3-25. Residential HER Program Participation and Reported Impacts

Parameter	Residential (Non-IE)	Total
PY17 Number of Participants	534,709	534,709
PYRTD MWh/yr	38,300	38,300
PYRTD MW/yr	7.13	7.13
PY17 Incentives (\$1,000)	-	-

Source: Guidehouse analysis

3.3.2 Gross Impact Evaluation

Guidehouse evaluated savings for the ten active residential HER cohorts in PY17. Using a lagged dependent variable (LDV) model, Guidehouse estimated monthly energy savings separately for each cohort. Modeled energy savings are reduced through a double-counting (uplift) analysis on other EE program participation and through the application of persistence from past program years, which is also done by cohort. This approach results in first-year incremental savings compliant with Phase IV requirements. For peak demand, Guidehouse used a simple difference model to estimate savings for each wave and applied both the modeled and first-year incremental energy savings to these demand savings to indirectly

³⁰ In Phase III, all wave cohorts remained active after launch, but Phase IV uses a varied wave activation schedule for each program year due to now claiming only first-year incremental savings. For PY17, one residential cohort active in Phase III or previously active in Phase IV was not sent reports and thus did not claim savings.

account for uplift and persistence reductions. Refer to 1.1.1.1Appendix A for the full impact evaluation detail. Table 3-26 and Table 3-27 present evaluation results.

Table 3-26. Residential HER Program PY17 Gross Impact Results for Energy

	PYRTD MWh/yr	Energy Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Program Total	38,300	0.97	-	-

Source: Guidehouse analysis

Table 3-27. Residential HER Program PY17 Gross Impact Results for Demand

	PYRTD MW/yr	Demand Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Program Total	7.13	1.10	-	-

Source: Guidehouse analysis

The following factors led to variations between the reported and verified savings, which led to the observed realization rates:

- Guidehouse leveraged summer 2025 peak-hour metering data to conduct the peak demand analysis. Differences in data sources can drive discrepancies in reported and verified savings in either direction (e.g., using hourly data may provide a more accurate estimate of savings).
- All active residential HER recipients are in at least their fourth active year. After 3 years of exposure, measured energy savings are expected to increase modestly in subsequent years. However, the varied wave schedule in Phase IV may increase variability in savings as legacy waves are likely to experience fluctuations in savings after being untreated for one or more years.
- The peak demand analysis, which focuses on the summer months, found one or more of the demand regression coefficients for five residential cohorts are statistically insignificant.

Refer to 1.1.1.1Appendix A for the full impact evaluation detail.

3.3.3 Net Impact Evaluation

Guidehouse does not assess net impacts for the Residential HER Program as per guidance from the SWE's Evaluation Framework.³¹

3.3.4 Verified Savings Estimates

In Table 3-28, the realization rates and NTGRs determined by Guidehouse are applied to the reported energy and demand savings estimates to calculate the verified savings estimates for the Residential HER Program in PY17.

³¹ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

Table 3-28. Residential HER Program PY17 and P4TD Savings Summary

Savings Type	Energy (MWh/yr)	Demand (MW/yr)
PYRTD	38,300	7.13
PYVTD Gross	37,146	7.83
PYVTD Net	37,146	7.83
RTD	146,858	24.80
VTD Gross	142,449	32.34
VTD Net	142,449	32.34

Source: Guidehouse analysis

3.3.5 Process Evaluation

As described in the Phase IV Evaluation Plan³² approved by the SWE, Guidehouse did not conduct in-depth process evaluation activities for the Residential HER Program in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

3.3.6 Program Finances and Cost-Effectiveness Reporting

Table 3-29 presents a detailed breakdown of program finances and cost-effectiveness. TRC benefits in Table 3-29 were calculated using gross verified impacts. NPV PY17 costs and benefits are expressed in 2025 dollars; Phase IV totals are in 2021 dollars.

Table 3-29. PY17 Summary of Program Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$0		\$0	
2	Rebates to Participants and Trade Allies	\$0		\$0	
3	Upstream/Midstream Incentives	\$0		\$0	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$0		\$0	
5	Direct Installation Program Materials and Labor	\$0		\$0	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$0		\$0	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$2,857	\$0	\$10,859	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$2,857		\$10,859	
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$2,857		\$10,859	
15	Total NPV Lifetime Electric Energy Benefits	\$4,680		\$13,852	

³² Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Row	Cost Category*	PYTD (\$1,000)	P4TD (\$1,000)
16	Total NPV Lifetime Electric Capacity Benefits	\$6,182	\$20,980
17	Total NPV Lifetime O&M Benefits	\$0	\$0
18	Total NPV Lifetime Fossil Fuel Impacts	\$0	\$0
19	Total NPV Lifetime Water Impacts	\$0	\$0
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$10,862	\$34,831
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	3.80	3.21

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars.

Source: Guidehouse analysis

Program financials and cost-effectiveness on a net savings basis are the same values as in Table 3-29 because verified net savings equal the verified gross savings for the Residential HER Program.

3.3.7 Status of Recommendations

Guidehouse makes no recommendations for the Residential HER program this year.

3.4 Income-Eligible HER Program

The Income-Eligible HER Program objective is to encourage reduced home energy use through print (mail) and online (email) reports sent directly to customers that give insight into their household energy usage. These programs leverage social norming to drive persistent energy savings through smart energy practices.

Oracle implements the Income-Eligible HER Program as an RCT. HER print and the online content provide customers with usage summaries to compare their household energy use to the average energy use of similar households. In this way, these customers have a relative sense of where their energy use patterns fall. The reports also provide targeted recommendations or tips to customers, suggesting actions they can take to reduce consumption.

Different from the Residential HER program, customers on IE rates receive messaging tailored toward low-cost and no-cost recommendations. The full content of HERs serves to encourage customers to reduce their consumption and enhance engagement and general satisfaction. The reports are sent to targeted cohorts of customers on an opt-out basis. During PY17, 50,508 IE households received HERs for the three active IE cohorts.

3.4.1 Participation and Reported Savings by Customer Segment

Table 3-30 presents the participation counts, reported energy and demand savings, and incentive payments for the Income-Eligible HER Program in PY17 by customer segment. Participants are defined as HER recipients who have savings in at least one month during the program year.

Table 3-30. Income-Eligible HER Program Participation and Reported Impacts

Parameter	Income-Eligible	Total
PY17 # Participants	50,508	50,508
PYRTD MWh/yr	3,625	3,625
PYRTD MW/yr	0.55	0.55
PY17 Incentives (\$1,000)	-	-

Source: Guidehouse analysis

3.4.2 Gross Impact Evaluation

Guidehouse evaluated savings for two IE HER cohorts. The evaluation follows the same approach as the Residential HER Program, as described in Section 3.3.2. Refer to 1.1.1.1 Appendix A for the full impact evaluation detail. Table 3-31 and Table 3-32 present evaluation results.

Table 3-31. Income-Eligible HER Program PY17 Gross Impact Results for Energy

	PYRTD MWh/yr	Energy Realization Rate	Sample C _y or Error Ratio	Relative Precision at 85% CL
Program Total	3,625	0.63	-	-

Source: Guidehouse analysis

Table 3-32. Income-Eligible HER Program PY17 Gross Impact Results for Demand

	PYRTD MW/yr	Demand Realization Rate	Sample C _y or Error Ratio	Relative Precision at 85% CL
Program Total	0.55	0.60	-	-

Source: Guidehouse analysis

The following factors led to variation between the reported and verified savings and led to the observed realization rates:

- Guidehouse leveraged summer 2025 peak-hour metering data to conduct the peak demand analysis. Differences in data sources can drive discrepancies in reported and verified savings (e.g., using hourly data may provide a more accurate estimate of savings).
- The population of active HER recipients in the Income-Eligible program are split across three waves, Waves 7 - 9 Income-Eligible. Wave 7 Income-Eligible is in its fifth year of exposure, Wave 8 Low Income is in its third year, and Wave 9 Low Income is in its first year. While measured savings typically trend upward in the first 3 years of exposure, savings for IE cohorts are highly variable and often statistically insignificant due to small group size and other potential influences on energy usage, such as income-based billing programs.
- IE HER customers may differ from their Residential HER counterparts. This difference is likely to cause wider variations in verified versus reported savings based on methodology or cause the magnitude and statistical significance of savings estimates to develop differently over the course of Phase IV. Savings for the Wave 8 Low Income

cohort in PY17 were statistically insignificant for all months of the program year while the Wave 9 Low Income savings are statistically insignificant for the first 8 months of PY17.

Refer to 1.1.1.1Appendix A for the full impact evaluation detail.

3.4.3 Net Impact Evaluation

Guidehouse does not assess net impacts for the Income-Eligible HER Program as per guidance from the SWE's Evaluation Framework.³³

3.4.4 Verified Savings Estimates

In Table 3-33, the realization rates and NTGRs determined by Guidehouse are applied to the reported energy and demand savings estimates to calculate the verified savings estimates for the Income-Eligible HER Program in PY17.

Table 3-33. Income-Eligible HER Program PY17 and P4TD Savings Summary

Savings Type	Energy (MWh/yr)	Demand (MW/yr)
PYRTD	3,625	0.55
PYVTD Gross	2,281	0.33
PYVTD Net	2,281	0.33
RTD	7,047	1.11
VTD Gross	4,754	0.45
VTD Net	4,754	0.45

Source: Guidehouse analysis

3.4.5 Process Evaluation

As described in the Phase IV Evaluation Plan³⁴ approved by the SWE, Guidehouse did not conduct in-depth process evaluation activities for the Income-Eligible HER Program in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

3.4.6 Program Finances and Cost-Effectiveness Reporting

Table 3-34 presents a detailed breakdown of program finances and cost-effectiveness. TRC benefits in Table 3-34 were calculated using gross verified impacts. NPV PY17 costs and benefits are expressed in 2025 dollars; Phase IV totals are in 2021 dollars.

³³ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

³⁴ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Table 3-34. PY17 Summary of Program Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$0		\$0	
2	Rebates to Participants and Trade Allies	\$0		\$0	
3	Upstream/Midstream Incentives	\$0		\$0	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$0		\$0	
5	Direct Installation Program Materials and Labor	\$0		\$0	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$0		\$0	
		EDC	CSP	EDC	CSP
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$168	\$0	\$451	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$168		\$451	
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$168		\$451	
15	Total NPV Lifetime Electric Energy Benefits	\$234		\$452	
16	Total NPV Lifetime Electric Capacity Benefits	\$174		\$421	
17	Total NPV Lifetime O&M Benefits	\$0		\$0	
18	Total NPV Lifetime Fossil Fuel Impacts	\$0		\$0	
19	Total NPV Lifetime Water Impacts	\$0		\$0	
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$408		\$873	
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	2.43		1.93	

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars.

Source: Guidehouse analysis

Program financials and cost-effectiveness on a net savings basis are the same as the values in Table 3-34 because verified net savings equal the verified gross savings for the Income-Eligible HER Program.

3.4.7 Status of Recommendations

Guidehouse makes no recommendations for the Income-Eligible HER Program this year.

3.5 Non-Residential EE Program

The Non-Residential EE Program offers an array of opportunities to assist C&I customers in reducing their energy consumption and associated energy costs. The program encompasses a variety of energy efficiency components and measures to achieve this goal. Common measures within the Non-Residential EE Program include efficient lighting equipment, lighting controls, HVAC equipment, HVAC RCx, variable frequency drives (VFDs), refrigeration, and building automation systems, among others. DNV implements the Non-Residential EE Program, which is made up of four components:

- **Downstream Rebates:** The Downstream Rebates component, including combined heat and power (CHP), includes both custom measures and prescriptive measures described by the TRM.³⁵ Baselines may be established as existing equipment (in situ), code minimum efficiency, or by using custom comparisons for custom projects. Downstream Rebates projects typically involve working directly with customers or with their contractors on potential projects and filling out an application for program incentives.
- **Midstream Rebates “Instant Discounts”:**³⁶ The Midstream Rebates component involves working directly with distributors to incentivize efficient equipment by reducing the sale price at the point of sale (POS) for customers. Midstream Rebates measures are all prescriptive, with baselines predefined by the TRM and IMP documents. The Midstream Rebates component also encompasses an LED aggregation pathway (which captures savings from manufacturer and national distributor direct-to-consumer transactions that did not go through the POS pathway). In Phase IV, most Midstream Rebates participation goes through the POS pathway. The Midstream component includes more than lighting, but non-lighting participation accounts for only approximately 0.2% of energy savings, less than 1.5% of Midstream measure lines, and less than 0.08% of units incentivized through the Midstream program.
- **Small Business Direct Install:** The Small Business Direct Install component offers rebates to small businesses for the direct installation of energy efficiency measures to improve overall energy performance. Typical measure offerings include efficient lighting and lighting controls, refrigeration lighting, door gaskets, and efficient motors on refrigerators and freezers. The Small Business Direct Install component was closed for PY17 after exhausting all available funding. The few projects included in PY17 were pre-approved carryover from the end of PY16. The Small Business Direct Install component is anticipated to be relaunched in Phase V as the Small Business Solutions component when new funding becomes available.
- **New Construction:** New Construction is the smallest component in terms of savings and number of participants, targeting customers at the time of building design, before construction or major renovations. Implementing ECMs at the time of construction or renovation is often the most time-efficient and cost-effective pathway to building energy efficiency. New Construction participants are typically either constructing new buildings, constructing new additions onto existing buildings, or performing renovations of existing buildings significant enough that the new modified building must be compared with modern energy efficiency codes. Baselines for New Construction projects are established by city, county, and state energy efficiency codes.

³⁵ Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

³⁶ “Midstream” is industry standard nomenclature used to describe the type of project in which incentives are provided at the distributor level and reflects the historical name for PECO’s Midstream Rebates component. The name of PECO’s Midstream Rebates component was changed in Phase IV to “Instant Discounts.” These two terms, Midstream Rebates and Instant Discounts, are used interchangeably throughout this report.

3.5.1 Participation and Reported Savings by Customer Segment

Table 3-35 presents the participation counts, reported energy and demand savings, and incentive payments for the Non-Residential EE Program in PY17 by customer segment.

Table 3-35. Non-Residential EE Program Participation and Reported Impacts

Parameter	Small C&I (Non-GNI)	Large C&I (Non-GNI)	Small C&I (GNI)	Large C&I (GNI)	Municipal Lighting	Total ¹
PY17 # Participants	2,941	943	80	48	10	4,022
PYRTD MWh/yr	58,259	79,661	5,230	22,626	33,476	199,252
PYRTD MW/yr	12.74	11.89	1.24	3.67	0.00	29.54
PY17 Incentives (\$1,000)	5,697	7,603	606	2,131	9,038	25,075

¹ For the Non-Residential Program, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Source: Guidehouse analysis

3.5.2 Gross Impact Evaluation

Guidehouse conducted the gross impact evaluation for the Non-Residential EE Program following the general approach outlined in its Evaluation Plan³⁷ for PY17. In PY17, the Non-Residential EE Program gross impact evaluation included both a tracking database analysis of all prescriptive measures and project-specific M&V activities for a sample of projects from the Downstream Rebates, Midstream Rebates, and New Construction components.

For the Non-Residential Program, 728 MWh and 0.02 MW of reported savings were unverified in PY16. These unverified savings from PY16 are included in the verified savings values in PY17.

The tracking database analysis included a review of prescriptive TRM- and IMP-based measures to confirm data completeness, reported savings algorithm assumptions aligned with TRM and IMP standards, and all values fell within expected ranges. The output is the adjusted database savings. The TDR is calculated by dividing the adjusted database savings by the reported savings.

Guidehouse conducted project-specific evaluation of the sampled projects, which included one or more of the following: engineering desk reviews, phone verifications, onsite verifications, and onsite metering.

- **Downstream Rebates:** Guidehouse conducted project-specific verification activities for a sample of 58 projects from the Downstream Rebates component in PY17.
- **Midstream Rebates:** Guidehouse conducted project-specific verification activities for a sample of 34 projects from the Midstream Rebates component in PY17.
- **Small Business Direct Install:** Guidehouse applied a combination of tracking database analysis and PY16 verification ratios to the PY17 reported savings.

³⁷ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

- **New Construction:** Guidehouse conducted project-specific verification activities for a sample of 19 projects from the New Construction component in PY17.

All samples were designed and implemented to meet the targets set in Guidehouse's sample design memo.³⁸ Table 3-36 outlines the PY17 impact evaluation targets and completions. Additional detail of the impact evaluation completed in PY17 can be found in 4.2Appendix G.

Table 3-36. Non-Residential EE Program PY17 Project Count by Evaluation Method

Component	Verification Level	Evaluation Target	Number of Projects Evaluated
Downstream Rebates	Tracking Database Analysis	952	952
	Engineering Desk Review Only	12	23
	Phone Verification	12	10
	Onsite Verification	28	25
	Total Sampled Projects	52	58
Midstream Rebates	Tracking Database Analysis	5,857	5,857
	Engineering Desk Review Only	18	20
	Phone Verification	15	7
	Onsite Verification	1	7
	Total Sampled Projects	34	34
New Construction	Tracking Database Analysis	74	74
	Engineering Desk Review Only	3	14
	Phone Verification	10	2
	Onsite Verification	1	3
	Total Sampled Projects	14	19

Source: Guidehouse analysis

Table 3-37 and Table 3-38 present the PY17 evaluation realization rates and statistical relative precision for energy and demand, respectively.

Table 3-37. Non-Residential EE Program PY17 Gross Impact Results for Energy

Component	PYRTD MWh/yr	Energy Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Downstream Rebates ¹	132,771	0.95	0.28	0.06
Midstream Rebates	55,244	1.14	0.32	0.08
Small Business Direct Install	459	0.91	0.13	0.09
New Construction	10,778	0.87	0.01	0.00
Program Total	199,252	1.00	0.31	0.04 [90% CL]

¹ For the Non-Residential Downstream Rebates component, 13,915 MWh of reported savings were unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values and accompanying realization rates.

Note: Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Downstream Rebates, Midstream Rebates, and New Construction components in PY17. Guidehouse applied the verification ratio from PY16 to the PY17 adjusted database savings for the Small Business Direct Install component.

³⁸ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

Source: Guidehouse analysis

Table 3-38. Non-Residential EE Program PY17 Gross Impact Results for Demand

Component	PYRTD MW/yr	Demand Realization Rate	Sample CV or Error Ratio	Relative Precision at 85% CL
Downstream Rebates ¹	16.10	1.10	0.50	0.10
Midstream Rebates	11.64	1.12	0.32	0.08
Small Business Direct Install	0.13	0.89	0.24	0.14
New Construction	1.67	0.95	0.01	0.00
Program Total	29.54	1.10	0.43	0.06 [90% CL]

¹ For the Non-Residential Downstream Rebates component, 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values and accompanying realization rates.

Note: Guidehouse conducted tracking database analysis for all components and primary data collection and analysis for the Downstream Rebates, Midstream Rebates, and New Construction components in PY17. Guidehouse applied the verification ratio from PY16 to the PY17 adjusted database savings for the Small Business Direct Install component.

Source: Guidehouse analysis

The introduction to Section 3 describes the two-step evaluation method that results in the ratios that Table 3-39 and Table 3-40 show. The tracking database analysis is conducted annually while the verification ratio may be historical based on the evaluation plan.³⁹ The TDR and the verification ratio together represent the overall energy or demand realization rate. Unverified savings are subtracted from reported savings before the tracking database review step and therefore the TDR and realization rates shown are relative to reported savings excluding unverified savings. A TDR close to one indicates that PECO and its CSPs are accurately reporting savings in accordance with the TRM and reducing the likelihood of systemic data errors.

Table 3-39. Non-Residential EE Program PY17 Energy Ratios

Component	Energy TDR	Energy Verification Ratio	Energy Realization Rate
Downstream Rebates	1.00	0.95	0.95
Midstream Rebates	0.99	1.15	1.14
Small Business Direct Install ¹	1.00	0.92	0.91
New Construction	0.99	0.88	0.87
Non-Residential Total	1.00	1.00	1.00

¹ The Small Business verification ratio is from the PY16 analysis.

Source: Guidehouse analysis

Table 3-40. Non-Residential EE Program PY17 Demand Ratios

Component	Demand TDR	Demand Verification Ratio	Demand Realization Rate
Downstream Rebates	1.00	1.10	1.10
Midstream Rebates	0.99	1.14	1.12
Small Business Direct Install ¹	1.00	0.89	0.89
New Construction	0.99	0.97	0.95

³⁹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Component	Demand TDR	Demand Verification Ratio	Demand Realization Rate
Non-Residential Total	0.99	1.11	1.10

¹ The Small Business verification ratio is from the PY16 analysis.

Source: Guidehouse analysis

The following sections detail the factors that led to variation between the reported and verified savings and the resultant realization rates.

3.5.2.1 Downstream Rebates

As illustrated by the ratios in Table 3-39 and Table 3-40, the Downstream Rebates realization rates were predominantly driven by the site-specific verification activities. The site-specific verification activities resulted in updating TRM-deemed parameters to site-specific values.

Fourteen of the 58 sampled Downstream Rebates projects were solar projects. For 13 of the 14 sampled solar projects, Guidehouse adjusted the demand savings using an 8,760 output from PVWatts rather than estimating demand savings using energy to demand factors (ETDFs). Guidehouse also capped the demand savings for five solar projects to the site's 2024 usage because the installed array was oversized. At the component level, these updates decreased the demand savings.

Twenty-five of the 58 sampled Downstream Rebates projects were lighting projects. Guidehouse made changes to lighting control types, HVAC types, and HOU for lighting measures based on site-specific data collected from customer interviews and trend data. Updates to input parameters affected 16 of the 25 lighting projects. Updates to HOU were the most influential change for two of these 16 projects, with both increasing energy savings relative to the ex ante savings estimates.

Guidehouse assigned zero energy and demand savings for two of the Downstream Rebates projects. One of the projects was given zero savings because the savings estimates were calculated based on a regression analysis using end-of-life equipment as a baseline while the load of the facility was ramping up in the post-period. The second project claimed savings based on an engineering algorithm with no post data, when 3 years of post-data was available. A whole-building analysis approach was also not suitable for evaluation because the facilities loads were also increasing in the post-period.

Guidehouse's tracking data analysis identified several discrepancies with minimal overall impact on component-level realization rates. For High-Efficiency Evaporator Fan Motors for Walk-In or Reach-In Refrigerated Cases, the TRM provides a methodology to calculate motor input wattage from motor horsepower. The reported savings did not follow this algorithm, instead reporting horsepower and input wattages that did not agree and used quantities that did not align. For Evaporator Fan Controllers, the efficiency of the baseline motor is omitted from the calculation.

3.5.2.2 Midstream Rebates

The Midstream Rebates component is built to streamline and simplify participation for customers. As such, minimal information is collected at the POS for the purchased energy efficient equipment, such as light bulbs and fixtures. Because limited information is collected at the POS, reported equipment HOU are assumed and deemed based on the building type

identified through an address lookup. During evaluation, Guidehouse updates the assumed or deemed HOU with actual HOU confirmed on an individual site-specific basis, which can lead to variability in project savings at the individual site level, including an increase or decrease in savings estimates. There were 34 projects in the Midstream Rebates component sample. For energy and demand savings, updated HOU/CF values were the most significant change for three projects, updated heating or cooling types were the most significant change for five projects, and updated lighting control types caused the most significant change for three projects. Eleven projects had minor edits to the efficient wattages based on using the latest test input wattage available from DLC.

Guidehouse's tracking data analysis identified one midstream lighting measure line that included fixtures that were ineligible for savings as of June 1, 2023. The savings associated with reflector lamps (R, ER, BR) ≥ 2.25 inches (57 mm) in diameter; all ER30, BR30, ER40, and BR40 lamps; all PAR, MR, and MRX lamps; ceiling-mounted fixtures that replace those lamps; and downlights were dropped to zero for those projects.

Guidehouse's tracking data analysis also identified issues with HVAC measures. The packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs), and ductless mini-splits installed through the midstream program were using incorrect baselines in the savings calculations. The rated efficiencies of the newly installed units were equivalent to or slightly greater than the baseline efficiencies deemed in the 2021 Commercial HVAC IMP. Savings claimed are using the nonstandard size values from Table 3-26⁴⁰ in the 2021 TRM rather than the IMP. Table 3-39 and Table 3-40 show the overall impacts of the changes to the Midstream Rebates component.

3.5.2.3 Small Business Direct Install

Guidehouse's tracking database analysis identified that the lighting controls retrofit measure did not include an interactive effect in some cases, and in other cases, the sign of the interactive effect was flipped in the savings calculation. For the PY17 analysis, Guidehouse applied strata-level verification ratios from PY16. The overall impacts of the changes to the Small Business Direct Install component are found in Table 3-39 and Table 3-40.

3.5.2.4 New Construction

As illustrated by the ratios in Table 3-39 and Table 3-40, the New Construction realization rates were predominantly driven by the site-specific verification activities. The site-specific verification activities resulted in updating TRM-deemed parameters to site-specific values. Three of the 19 sampled New Construction projects used effective full load hours (EFLH) for multifamily common spaces rather than the more suitable residential based in-dwelling EFLH numbers for HVAC units that serve residential areas. This change in HOU was the primary driving factor for the drop in energy and demand savings. One energy modeling project was using TMY2 weather data instead of TMY3. Running the model with TMY3 weather data drove the energy realization rate for this project to 101%.

⁴⁰ Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

From Guidehouse's tracking data analysis, two projects were using lighting power density (LPD) values of 1.45 for their baseline wattage calculations. Based on the building types, the implementation CSP should have used an LPD less than 1.00 for these projects.

3.5.3 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁴¹ for PY17 and in Table 3-2, Guidehouse conducted NTG research for solar projects in the Non-Residential Downstream Rebates component, with results summarized in Table 3-42.

3.5.3.1 Methodology

Guidehouse followed the SWE's Evaluation Framework⁴² for conducting NTG research and analysis for the Non-Residential EE Program. The SWE guidance included detail on gathering feedback from participants in the evaluated Non-Residential Downstream Rebates component using self-reported surveys. These surveys were part of the process evaluation survey efforts detailed in Section 3.5.5 and approved by the SWE prior to fielding.

The following describes the general methodology for estimating the Non-Residential EE Program NTGR including definitions of free ridership and spillover and how they are used to calculate the final NTGR. See Appendix G.1.2 Net Impact Evaluation, Appendix G.2.2 Net Impact Evaluation, and Appendix G.3.2 Net Impact Evaluation for further detail on the methodology and algorithms used to estimate component-level NTGRs in PY17:

- **Free Ridership:** The self-reported free ridership survey battery is brief to avoid customer burden and includes two metrics for assessing free ridership: 1) the intention to carry out the energy efficient project without program funds and 2) the influence of the program in the decision to carry out the energy efficient project at the time it was conducted. When scored, each metric results in a value ranging from 0 to 0.5, and a combined total free ridership score from 0 to 1.0.
- **Spillover:** The self-reported spillover battery collects data on additional efficiency improvement projects conducted at participating non-residential facilities that did not receive a program incentive but were conducted at least in part because of the program. Survey questions gather high-level information on the type of projects conducted including type and number of units installed to allow for estimates of energy savings. Guidehouse divides the total spillover savings by the total gross savings for the sample to arrive at the spillover result.

Guidehouse used Equation 3-2 to estimate the final NTGR score.

Equation 3-2. NTGR Equation

$$NTGR = 1 - Free\ Ridership + Spillover$$

Where:

⁴¹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁴² Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

<i>Free Ridership</i>	Quantifies the percentage of savings (reduction in energy consumption or demand) from participants who would have implemented the measure in the absence of the program or component
<i>Spillover</i>	Quantifies the percentage reduction in energy consumption (i.e., additional savings) caused by the presence of the utility program; spillover savings happen when customers invest in additional energy efficient measures or activities without receiving a financial incentive from the program or component

The following bullet summarizes the methods used to estimate the NTG for each Non-Residential EE Program component. 4.2Appendix G provides details on the NTG methods and algorithms used for the NTG research:

- **Downstream Rebates – Solar:** For the program known to customers as the PECO Ways to Save Program, in alignment with the process evaluation survey activity detailed in Section 3.5.5, Guidehouse completed online surveys with non-residential customers receiving a PECO rebate for installing solar equipment through the Downstream Rebates component. The survey asked participants to rate the amount of influence (on a 0-10 influence scale) the program had on their decision to install the solar array through the program. The survey also asked about the intentions of each participant if the program incentives had not been available.

3.5.3.2 NTG Results

Guidehouse conducted surveys with customers in PECO's Downstream Rebates component in PY17. Table 3-41 and Table 3-42 show the NTG results and relative precision for the Downstream Rebates component Solar measure.

Table 3-41. Non-Residential Program PY17 NTG Survey Sample Targets and Completes

Component	Number Contacted	Target Completes	Actual Completes	Response Rate	Percentage Achieved
Downstream Rebates - Solar	30	9	4	13%	44%

Source: Guidehouse analysis

Table 3-42. Non-Residential EE Program PY17 Net Impact Evaluation Results

Component	PYVTD (MWh)	Free Ridership	Spillover	NTGR	Relative Precision (@ 85% CL)
Downstream Rebates - Solar	10,793	0.16	-	0.84	0.77

Source: Guidehouse analysis

3.5.3.3 HIM Research

Guidehouse did not conduct HIM NTG research for the Non-Residential EE Program in PY17.

3.5.4 Verified Savings Estimates

In Table 3-43, realization rates and NTGRs determined by Guidehouse are applied to the reported energy and demand savings estimates to calculate the verified net savings estimates for the Non-Residential EE Program in PY17.

Table 3-43. Non-Residential EE Program PY17 and P4TD Savings Summary

Savings Type	Energy (MWh/yr)	Demand (MW/yr)
PYRTD	199,252	29.54
PYVTD Gross ¹	186,353	30.63
PYVTD Net ¹	129,838	21.57
RTD	1,053,248	196.84
VTD Gross	1,046,293	196.90
VTD Net	718,070	136.13

¹ For the Non-Residential Downstream Rebates component, 13,915 MWh and 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values. 746 MWh and 0.01 MW of reported savings were unverified in PY16. These unverified savings are excluded from reported savings values and included in verified savings values for PY17.

Source: Guidehouse analysis

3.5.5 Process Evaluation

The PY17 process evaluation of the Non-Residential EE Program included PECO program manager and CSP staff interviews and a survey for participants of the Downstream Rebates Solar component. This section summarizes the evaluation methods, data collection techniques, sample design, and key results related to the survey.

3.5.5.1 Methodology

Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program in PY17, identify significant implementation changes, and identify areas of strength and areas for improvement. Guidehouse also conducted a survey of Downstream Rebates Solar participants, as Table 3-44 outlines. The survey assessed customer satisfaction, likeliness to recommend the program to others (also known as net promoter score), and program awareness for customers who installed solar measures through the component. The survey was fielded in conjunction with the NTG survey to reduce burden on the participant base. The survey was similar to that for the PY16 evaluation for the Downstream Rebates component Solar measure.

Table 3-44. Non-Residential EE Program PY17 Process Activities by Component

Component	PM/CSP Interview	Survey	Survey Recipient
Downstream Rebates	X	X	Solar Participants
Midstream Rebates	X	-	-
Small Business Direct Install	X	-	-
New Construction	X	-	-

Source: Guidehouse analysis

Guidehouse fielded the Downstream Rebates Solar survey to sampled participants via an online survey. Guidehouse defined the survey population based on customer activity data from eTRACK+. The SWE reviewed and approved sample design memos⁴³ and survey instruments prior to fielding.

Guidehouse removed “don’t know” responses from analysis for most questions. Therefore, n values may vary between questions.

Table 3-45. Non-Residential EE Program PY17 Sample Targets and Completes

Component	Stratum	Number Contacted	Target Completes	Actual Completes	Response Rate	Percentage Achieved
Downstream Rebates	Solar	30 ¹	9	3 ²	10%	33%
	Total	30	9	3	10%	33%

¹ Guidehouse contacted all available solar participants for this survey effort.

² The process evaluation notes one fewer complete than the NTG evaluation because Guidehouse conducted one survey over the phone and, due to time constraints, prioritized NTG questions. No process questions were recorded for this one respondent.

Source: Guidehouse analysis

Guidehouse anticipated that the Downstream Rebates component may not meet its target completes and took extra steps to bolster response rates and survey completes. Guidehouse took these steps in addition to the standard email invitation and up to two email reminders sent to all sampled survey participants. Actions included the following:

- **Incentive offered:** Guidehouse offered a \$100 e-gift card through the Tango platform.
- **PECO email:** In PY17, Guidehouse provided PECO an email template and a list of customers (name and email only). While Guidehouse was fielding the survey, PECO sent an email to customers encouraging them to complete the survey.
- **Guidehouse phone calls:** Guidehouse called customers who had not yet completed the survey to make sure they saw the initial invite email and encourage them to take the survey.

3.5.5.2 Key Findings from Process Evaluation

Guidehouse presents key findings here for the Downstream Rebates component. 4.2Appendix G includes process evaluation sections for each component, though most components were not evaluated in PY17.

As Figure 3-8 shows, respondents were overall satisfied with PECO’s Non-Residential EE Program Downstream Rebates component. Two out of two respondents listed their satisfaction as a 9 out of 10, using a scale where 0 is “Extremely Dissatisfied” and 10 is “Extremely Satisfied.” The third respondent selected “don’t know” and was removed from analysis.

⁴³ Guidehouse, *PECO PY17 Residential Impact Sample Design Memo FINAL*, dated January 21, 2026.

Figure 3-8. Non-Residential Downstream Rebates Component Overall Satisfaction (n=2)

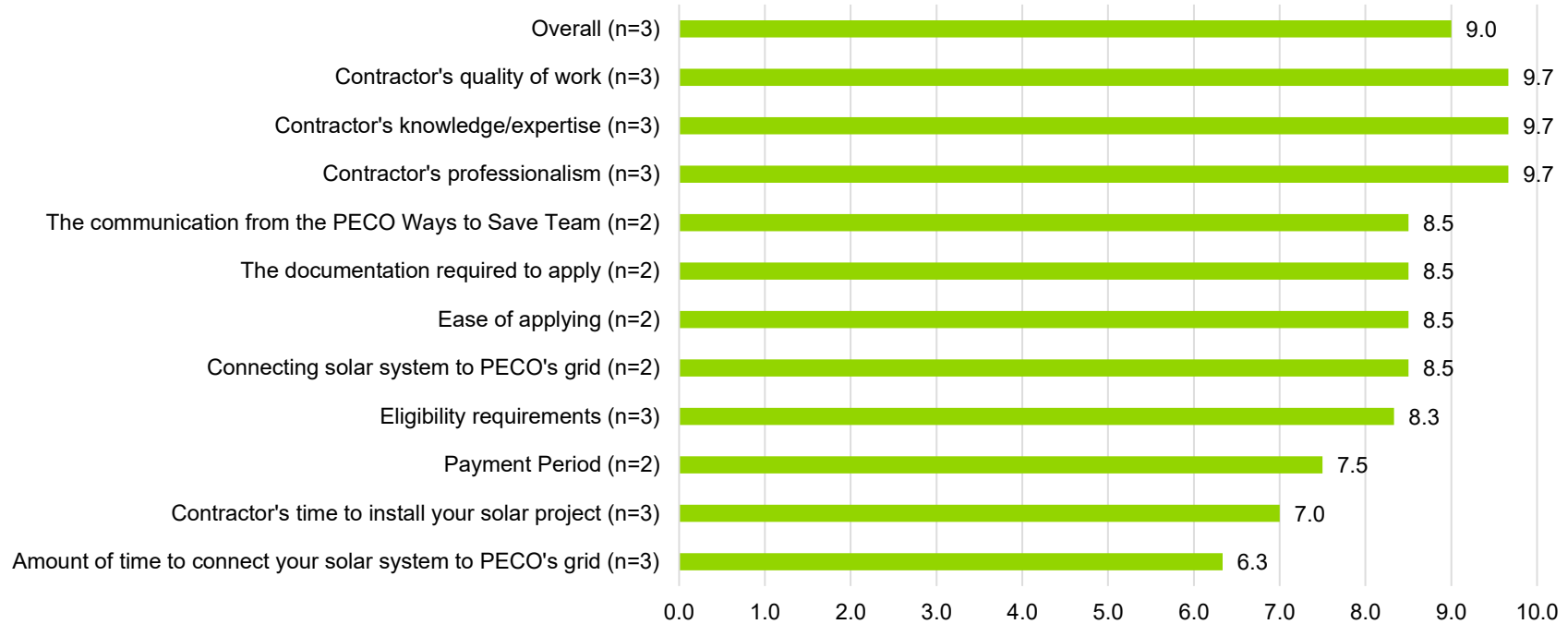


Respondents received the following question: “How would you rate your satisfaction with the PECO Ways to Save program overall?”

Source: Guidehouse analysis

The mean satisfaction score for the Non-Residential Downstream Rebates component reflects high levels of satisfaction, as Figure 3-9 shows. The mean satisfaction for the component overall is 9.0 out of 10, using a scale where 0 is “Extremely Dissatisfied” and 10 is “Extremely Satisfied.” Respondents reported the highest satisfaction with aspects related to their contractors: the quality of the work of the contractor who installed their solar equipment (9.7, n=3); the knowledge/expertise of the contractor who installed their solar equipment (9.7, n=3); and the professionalism of the contractor(s) that installed their solar equipment (9.7 out of 10, n=3). Respondents reported the lowest satisfaction aspects related to the process time: the amount of time to connect the solar system to PECO’s grid (6.3, n=3), the time it took to install the solar project (7.0, n=3), and the payment period (7.5, n=2).

Figure 3-9. Non-Residential Downstream Rebates Component Satisfaction (n=3)



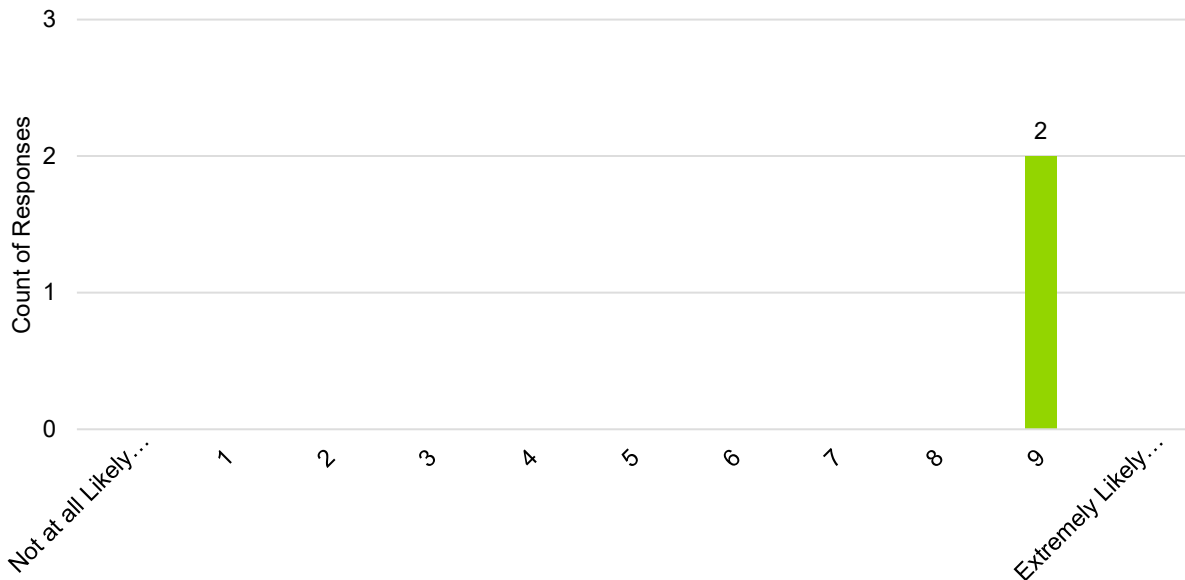
Respondents received the following question: "How would you rate your satisfaction with the following aspects of the PECO Ways to Save program?"

Guidehouse excluded "don't know" responses from analysis.

Source: Guidehouse analysis

The mean likelihood to recommend PECO's Non-Residential Downstream Rebates component is very high at 9.0 out of 10, as Figure 3-10 shows, with two out of two respondents selecting 9, using a scale where 0 is "Not at all Likely" and 10 is "Extremely Likely." When asked if they had recommended the program to others, both respondents indicated that they had.

Figure 3-10. Non-Residential Downstream Rebates Component Likelihood to Recommend (n=2)

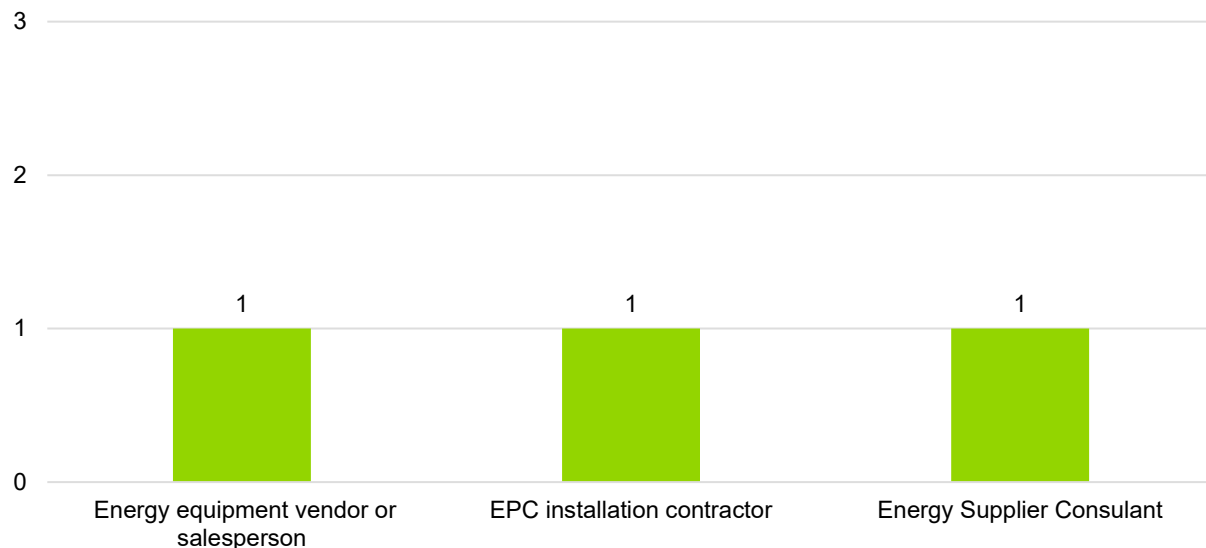


Respondents received the following question: "How likely are you to recommend the PECO Ways to Save Program to others?"

Source: Guidehouse analysis

Figure 3-11 indicates that there is not one single way that respondents learn about the Non-Residential Downstream Rebates component. The information sources included an energy supplier consultant (one respondent), an installation contractor (one respondent), and an energy equipment vendor/salesperson (one respondent).

Figure 3-11. Sources of Non-Residential Downstream Rebates Component Awareness (n=3)



Respondents received the following question: “How did you learn about PECO Ways to Save program?”

Source: Guidehouse analysis

Detailed findings are presented by component in 4.2Appendix G.

3.5.6 Program Finances and Cost-Effectiveness Reporting

Table 3-46 presents a detailed breakdown of program finances and cost-effectiveness. TRC benefits in Table 3-46 were calculated using gross verified impacts. NPV PY17 costs and benefits are expressed in 2025 dollars; Phase IV totals are in 2021 dollars.

Table 3-46. PY17 Summary of Program Finances – Gross Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$101,949		\$454,895	
2	Rebates to Participants and Trade Allies	\$20,048		\$69,224	
3	Upstream/Midstream Incentives	\$4,938		\$75,336	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$0		\$0	
5	Direct Installation Program Materials and Labor	\$89		\$19,084	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$76,874		\$291,252	
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$8,430	\$0	\$54,324	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$8,430		\$54,324	

Row	Cost Category*	PYTD (\$1,000)	P4TD (\$1,000)
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$110,378	\$509,220
15	Total NPV Lifetime Electric Energy Benefits	\$62,174	\$299,834
16	Total NPV Lifetime Electric Capacity Benefits	\$41,768	\$245,794
17	Total NPV Lifetime O&M Benefits	\$6,260	\$48,194
18	Total NPV Lifetime Fossil Fuel Impacts	-\$3,153	-\$35,227
19	Total NPV Lifetime Water Impacts	\$0	\$0
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$107,049	\$558,596
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	0.97	1.10

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars.

Source: Guidehouse analysis

Table 3-47 presents program financials and cost-effectiveness on a net savings basis. Guidehouse conducted primary NTGR data collection and analysis for the Non-Residential Downstream Rebates component in PY17. For the other program components, Guidehouse applied NTGRs from the most recent analysis year. Table 2-5 summarizes the NTGRs.

The 2021 TRC Test Final Order stated that the NTGR should be applied to all benefits in the net TRC test, including but not limited to avoided energy and capacity costs, O&M, interactive effects, and secondary fossil fuel impacts. In addition, the NTGRs are applied to the IMCs, therefore the IMCs are different on a net savings basis compared with the gross savings basis.

Table 3-47. PY17 Summary of Program Finances – Net Verified

Row	Cost Category*	PYTD (\$1,000)		P4TD (\$1,000)	
1	IMCs	\$71,030		\$311,913	
2	Rebates to Participants and Trade Allies	\$20,048		\$69,224	
3	Upstream/Midstream Incentives	\$4,938		\$75,336	
4	Material Cost for Self-Install Programs (EE&C Kits)	\$0		\$0	
5	Direct Installation Program Materials and Labor	\$89		\$19,084	
6	Participant Costs (row 1 minus the sum of rows 2 through 5)	\$45,956		\$148,269	
7	Program Design	\$0	\$0	\$0	\$0
8	Administration and Management	\$8,430	\$0	\$54,324	\$0
9	Marketing	\$0	\$0	\$0	\$0
10	Program Delivery	\$0	\$0	\$0	\$0
11	EDC Evaluation Costs	\$0		\$0	
12	SWE Audit Costs	\$0		\$0	
13	Program Overhead Costs (sum of rows 7 through 12)	\$8,430		\$54,324	
14	Total NPV TRC Costs (sum of rows 1 and 13)	\$79,460		\$366,237	
15	Total NPV Lifetime Electric Energy Benefits	\$43,318		\$205,594	
16	Total NPV Lifetime Electric Capacity Benefits	\$29,101		\$168,979	
17	Total NPV Lifetime O&M Benefits	\$4,361		\$33,258	
18	Total NPV Lifetime Fossil Fuel Impacts	-\$2,197		-\$23,879	
19	Total NPV Lifetime Water Impacts	\$0		\$0	

Row	Cost Category*	PYTD (\$1,000)	P4TD (\$1,000)
20	Total NPV TRC Benefits (sum of rows 15 through 19)	\$74,584	\$383,955
21	TRC Benefit-Cost Ratio (row 20 divided by row 14)	0.94	1.05

* Rows 1-13 are presented in nominal dollars (PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025); P4TD = 2021 nominal dollars.

Source: Guidehouse analysis

3.5.7 Status of Recommendations

The impact and process evaluation activities in PY17 led to the following findings and recommendations from Guidehouse to PECO, along with a summary of how PECO plans to address the recommendations in program delivery.

Table 3-48. Summary of Non-Residential EE Program PY17 Evaluation Recommendations

Component	Evaluation Activity	Finding	Recommendation	EDC Status
Downstream Rebates	Impact	In 13 of the 14 sampled solar PV projects, the ex-ante analysis used the ETDF method from the TRM to estimate demand savings. The TRM provided guidance to utilize the 8,760-hour simulation approach when possible, which is the approach used by the evaluation team.	Guidehouse recommends the CSP utilize the 8,760 method in PVWatts to estimate solar production during peak periods.	Under Consideration
Downstream Rebates	Impact	For High-Efficiency Evaporator Fan Motors for Walk-In or Reach-In Refrigerated Cases, the ex-ante horsepower and kW do not correspond to the same power. Also, it appears that the quantity field is inconsistently applied in the calculations.	Ensure consistent values are used across columns that report the same efficiency metric in different units. Remove values that are not used in calculations.	Under Consideration
Downstream Rebates	Impact	For the TRM measure Controls: Evaporator Fan Controllers (Section 3.5.3), the ex-ante estimates calculated the $kW = HP * 0.746$. The correct equation per the TRM is $kW = HP * (0.746/n) * LF$ where n is the efficiency of the fan and LF is the load factor.	Use TRM equations in Section 3.5.3 including the fan efficiency.	Under Consideration
Downstream Rebates	Impact	PRJ-45038-2025 is a 1 GWh RCx project initiated in 2022. Savings were claimed using an engineering base algorithm with no post data. The implementer assessed savings estimates based on a whole building regression analysis. The data collected for the post-period was whole building data rather than the end-use-specific data that was used to calculate the reported savings.	Projects above metering threshold (>250,000 kWh) should use site-specific data to quantify savings. Because this project was commissioned in 2022, post-install data should have been collected because savings could not be calculated at the whole building level.	Under Consideration
Downstream Rebates	Impact	PRJ-36837-2024 is a 3.1 GWh PV project that was oversized for the school and overestimated demand savings. Also, initial analysis did not normalize the final production profile to TMY3 data for Philadelphia. Four smaller projects also had capping adjustments made to the demand savings.	Ensure all PV projects compare production with baseline consumption, or energy models in the case of new construction. Use the weather files required by the active version TRM to normalize the savings for solar projects greater than 2 GWh of energy savings.	Under Consideration
Downstream Rebates	Impact	PRJ-03702-2022 is a 3.6 GWh HVAC project where a whole building regression analysis was done on a facility with increasing load through the post-period. The baseline period for the regression analysis features water-cooled chillers that were also at end of life.	Wait until post-period consumption stabilizes to conduct a regression analysis with a minimum of 1-year of post data. For custom projects, a defensible baseline needs to be selected. In this case, an end of life water-cooled chiller with a smaller load was used as the baseline comparison.	Under Consideration
Midstream Rebates	Impact	One midstream lighting measure line included fixtures that are ineligible for savings as of June 1, 2023. The savings associated with reflector lamps (R, ER, BR) $\geq 2.25"$ (57 mm)	The implementer should adopt the updated SWE codes and standards guidance when calculating reported savings around measure	In Process

Component	Evaluation Activity	Finding	Recommendation	EDC Status
		in diameter; all ER30, BR30, ER40, and BR40 lamps; all PAR, MR, and MRX lamps; ceiling-mounted fixtures that replace those lamps; and downlights were zeroed out for those projects.	3.1.7, which required compliance as of June 1, 2023.	
Midstream Rebates	Impact	All of the PTAC and PTHPs installed through the midstream program have overstated savings. The efficiency of the installed units are minimal or there are no improvements over the baseline from the 2021 Commercial HVAC IMP. It appears that savings claimed are using the nonstandard size values from Table 3-26 in the 2021 TRM rather than the IMP.	Ensure the latest IMPs are in use when implementing a new measure.	Under Consideration
New Construction	Impact	Five new construction projects were missing values for the baseline savings factor for lighting controls. Missing this adjustment caused the energy and demand savings to be slightly inflated.	Ensure baseline controls required by code are considered in New Construction lighting calculations.	Under Consideration
New Construction	Impact	HVAC units that serve in-unit (residential) spaces were getting EFLH and CF values from commercial lodging, which is more representative of Hotel/Motel use. Using Lodging as the space type inflates the energy and demand savings by nearly 200%. Lodging EFLH cooling = 1,732, EFLH heating = 2,017, CF = 0.83.	HVAC units that serve residential spaces should use EFLH and CF values from Appendix A of the 2021 TRM. Residential Heat Pump EFLH cooling = 781, EFLH heating = 1,084, CF = .424.	Under Consideration
New Construction	Impact	Two projects were using LPD values of 1.45 and one project was using 5.1 for baseline wattage calculations. Based on the building types for these projects, an LPD <1 should have been used. This inflated the energy and demand savings substantially for these three projects (realization rates of 33%, 37%, and negative savings for the last).	Use the correct LPD value from the applicable building code based on the permit date.	Under Consideration
Small Business Direct Install	Impact	The Lighting Controls Retrofit (3.1.3) measure does not include the interactive effect, or sometimes subtracts instead of adds it, for the demand savings.	Ensure proper mapping for interactive effects, if spaces are comfort cooled, demand is 0.192 per the 2021 TRM.	Under Consideration
Downstream Rebates	NTG	Guidehouse conducted NTG research for the C&I solar program again in PY17 to compare progress of the program on the C&I market. NTG in PY16 was 0.48, improving to 0.84 in PY17, showing the adjustments to the program had an impact on new solar installations.	Continue enhancing early-stage Non-Residential customer awareness and education efforts when program incentives may have greater potential to influence installation decisions.	In Process

Source: Guidehouse analysis

4. Portfolio Finances and Cost Recovery

This section provides an overview of the expenditures associated with PECO's portfolio and the recovery of those costs from ratepayers.

4.1 Program Financials

Table 4-1. shows program-specific and portfolio total finances for PY17. The columns in Table 4-1. are adapted from the Direct Program Cost categories in the Commission's EE&C Plan template⁴⁴ for Phase IV. Non-incentives include EDC Materials, Labor, and Administration costs (including costs associated with an EDC's own employees) as well as implementation conservation provider (ICSP) Materials, Labor, and Administration costs (including both the program implementation contractor and the costs of any other outside vendors and EDC employees to support program delivery). The dollar figures in Table 4-1. and Table 4-2. are based on EDC tracking of expenditures with no adjustments to account for inflation.⁴⁵

Table 4-1. PY17 Program and Portfolio Total Finances (\$1,000)

Program	Incentives	Non-Incentives	Total Cost
Residential	\$7,286	\$6,579	\$13,865
Income-Eligible	\$4,296	\$1,323	\$5,619
Residential HER	\$0	\$2,857	\$2,857
Income-Eligible HER	\$0	\$168	\$168
Non-Residential	\$25,075	\$8,430	\$33,505
Common Portfolio Costs¹			\$10,260
Portfolio Total	\$36,657	\$19,356	\$66,274
SWE Costs²	-	-	-
Portfolio Total	\$36,657	\$19,356	\$66,274

¹ Common Portfolio Costs include administrative, marketing, evaluation, and other shared expenses.

² SWE costs are outside of the 2% spending cap.

Source: PECO, CSP tracking data

Table 4-2. P4TD Program and Portfolio Total Finances (\$1,000)

Program	Incentives	Non-Incentives	Total Cost
Residential	\$36,417	\$31,016	\$67,434
Income-Eligible	\$29,136	\$8,573	\$37,709
Residential HER	\$0	\$10,859	\$10,859
Income-Eligible HER	\$0	\$452	\$452
Non-Residential	\$163,793	\$54,324	\$218,117
Common Portfolio Costs¹			\$52,606
Portfolio Total	\$229,346	\$105,224	\$387,176
SWE Costs²	-	-	-

⁴⁴ Pennsylvania Public Utility Commission, *State of Pennsylvania Act 129 Energy Efficiency Conservation Plan Template*, September 9, 2020, <https://www.puc.pa.gov/pcdocs/1676672.docx>.

⁴⁵ The cost recovery of program expenses through riders happens promptly so that costs are being recovered from ratepayers in the same dollars that they are incurred.

Program	Incentives	Non-Incentives	Total Cost
Portfolio Total	\$229,346	\$105,224	\$387,176

¹ Common Portfolio Costs include administrative, marketing, evaluation, and other shared expenses.

² SWE costs are outside of the 2% spending cap.

Source: PECO, CSP tracking data

4.2 Cost Recovery

Act 129 allows Pennsylvania EDCs to recover EE&C Plan costs through a cost-recovery mechanism. PECO's cost-recovery charges are organized separately by four customer sectors to verify that the electric rate classes that finance the programs are the rate classes that receive the direct energy conservation benefits. Cost recovery is governed by tariffed rate class, so it is necessarily tied to the way customers are metered and charged for electric service. Readers should be mindful of the differences between Table 4-3. and Section 2.3. For example, the IE customer segment is a subset of PECO's residential tariff(s) and therefore not listed in Table 4-3.

Table 4-3. PY17 and Phase IV EE&C Plan Expenditures by Cost-Recovery Category (\$1,000)

Cost-Recovery Sector	Rate Classes Included ¹	PY17 Spending	P4TD Spending
Residential	R, RH, and CAP	\$27,117	\$138,142
Small C&I	GS	\$14,459	\$136,132
Large C&I	PD, HT, and EP	\$24,598	\$108,975
Municipal	SLE, AL, and TLCL	\$99	\$3,927
Portfolio Total	All	\$66,274	\$387,176

¹ See current rate class definitions at

<https://www.peco.com/MyAccount/MyBillUsage/Pages/CurrentElectric.aspx>.

Source: PECO

For Phase IV of Act 129, PECO nominated a portion of peak demand reduction acquired via EE&C programs into the PJM FCM. Proceeds from resources that clear in the FCM flow back to the rate class that generated the savings to offset cost recovery. **Error! Reference source not found.** Table 4-4 shows the proceeds received in PY17 and P4TD net of CSP fees and other administrative costs.

Table 4-4. PY17 and Phase IV FCM Proceeds from Recognized Peak Demand Reductions (\$1,000)

Cost-Recovery Sector	Rate Classes Included ¹	PY17 Proceeds	P4TD PJM Proceeds
Residential	R, RH, and CAP	\$221	\$1,158
Small C&I	GS	\$2,708	\$3,555
Large C&I	PD, HT, and EP	\$1,741	\$2,460
Municipal	SLE, AL, and TLCL	\$1	\$4
Portfolio Total	All	\$4,670	\$7,176

¹ See current rate class definitions at

<https://www.peco.com/MyAccount/MyBillUsage/Pages/CurrentElectric.aspx>.

Source: PECO

Beginning in the 2026/2027 delivery year, peak demand reduction from energy efficiency is no longer an eligible resource, so Phase V cost recovery will be unaffected by proceeds from Phase IV peak demand reductions.

Appendix A. Site Inspection Summary

Guidehouse's impact evaluation team completed site inspections for **34** sites to collect and verify site-specific operation parameters and to verify equipment installation as reported. Due to some projects including multiple phases, this process encompassed site visits for **22** individual projects and the **12** municipal lighting drive-through confirmations. EcoMetric performed all onsite visits. Table A-1. shows the findings.

Table A-1. PY17 Non-Residential Site Visit Summary

Component	Update from Onsite	Type of Project	Onsite Tasks	Summary of Findings, Updates, and Impacts
Downstream	No	Exterior Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The site consists of six parking garages (A-F). One floor and the rooftop of each garage were inspected. Fixture operating hours were confirmed during the onsite. The space did not appear to be conditioned, and controls were limited to solar control on exterior fixtures, as expected.
Downstream	No	HVAC	Verify system characteristics, quantities, and operational specifics	During the onsite, the engineer was able to confirm control operation and data quality provided. The EM&V team attempted to get additional post-installation trend data with the expectation that estimated savings would increase due to low wet-bulb temperature operation. The participant did not send data despite multiple requests.
Downstream	No	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The site visit covered two projects and confirmed heating and cooling equipment, and the onsite engineer collected photos of schedule and lighting fixtures. Through this information, the team confirmed counts. The site did not provide trend data to update dimming factors.
Downstream	Yes	Solar	Confirm PV array configuration, capacity, operation, and converter specifications	The onsite evaluation identified differences in the tilt, azimuth, system losses, DC ratio, and inverter efficiency. The onsite visit confirmed that array 3 was fully installed despite having limited initial documentation for this array. Array 1 size and input was inconsistent with project documentation and was updated based on onsite findings.
Downstream	No	Solar	Confirm PV array connection	Customer was unavailable to provide the evaluation team access to confirm array configuration. The evaluation team went onsite to ensure array connectivity and confirmed other details based on provided documentation.
Downstream	Yes	CHP	Confirm equipment installation, auxiliary load, CHP impact on heating systems, and control operation	Micro-turbines (MTs) are designed to run at rated capacity continuously. These machines were installed on an electrical service with loads that frequently did not exceed the MT capacity. After several months of operation, PECO increased the minimum import requirement from the grid, further reducing the load on the MTs such that the average load was only 66% of rated. At this low load, the MT electric efficiency is only 19.5%. In addition, the thermal loads were only 40% of the capacity at this electric output; therefore, the overall system efficiency was 34% on average.

Component	Update from Onsite	Type of Project	Onsite Tasks	Summary of Findings, Updates, and Impacts
Downstream	Yes	CHP	Confirm equipment installation, auxiliary load, CHP impact on heating systems, and control operation	Collected onsite data showed that since last November, the system is consistently operating at higher output than in older trend data. The evaluation team also adjusted for hot weather which reduced the system's output.
Downstream	Yes	CHP	Confirm equipment installation, auxiliary load, CHP impact on heating systems, and control operation	The evaluation team acquired additional operating data with more winter hours, which increases savings due to better cold weather performance. Likewise, summer demand savings are reduced due to poorer hot weather performance.
Downstream	Yes	CHP	Confirm equipment installation, auxiliary load, CHP impact on heating systems, and control operation	The evaluation team verified all aspects of the project as reported by the implementer while onsite. The team made an adjustment to the normalization methodology and updated demand savings using PJM parameters.
Downstream	Yes	Compressed Air	Confirm compressor types, capacities, configuration, HOU, and dryer details	The evaluation team made corrections to the assumed voltage and power factor to align with actual operation. The team also made updates to the demand calculations to align with peak hours and days.
Downstream	No	Lighting	Verify fixture type(s), quantities, controls configuration, and HOU	Onsite staff confirmed quantity of fixtures, operating schedule, and HVAC conditioning.
Downstream	Yes	Solar	Confirm PV array configuration, capacity, operation, and converter specifications	The customer was not available for a walkthrough visit; photos of the solar installation and inverters were taken. Ex post analysis capped the kWh savings based on consumption data. And kW savings are calculated based on avg kW during summer peak hours.
Downstream-Municipal Lighting	Yes	Lighting	Verify fixture types(s), quantities, and operation for a sample of installed fixtures	The difference in dimming distribution and different types of fixtures resulted in a variation in the calculated installed connected load. In addition, for fixtures with statuses other than Controller Active, the ex-post methodology applies the full fixture wattage in the energy calculations, whereas the ex-ante assessment relies on assumed dimming profiles. The actual distribution of fixture status and dimming levels therefore differed from the original assumption.
Midstream	Yes	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	Based on the site visit, it was verified that the interior spaces were unconditioned with gas heating. As a result of this finding, the interactive effect for demand was updated to 0.
Midstream	Yes	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The evaluation team updated wattage of fixtures to correspond with the DLC certificate. The team also updated the heating type to Non-Electric, which resulted in an HVAC energy factor change.
Midstream	Yes	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The evaluation team updated wattage of fixtures to correspond with the DLC certificate. The hours for exterior lighting were adjusted to be in line with updated schedule information.
Midstream	No	Lighting	Verify fixture type(s), quantities	Customer was unavailable for visit. The evaluation team verified fixture quantities onsite.

Component	Update from Onsite	Type of Project	Onsite Tasks	Summary of Findings, Updates, and Impacts
Midstream	No	Lighting	Verify fixture type(s), quantities	The evaluation team verified quantities and space conditioning type.
Midstream	No	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	Field tech spoke with site contact over the phone while present on site to walk through the project. The evaluation team verified the installation of the fixtures during the onsite visit.
Midstream	Yes	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The site contact was not present on site; a drive-by visit was completed through visual verification. The evaluation team updated wattage of fixtures to correspond with the DLC certificate.
New Construction	No	Energy Model	Verify the building design, operation, and equipment as compared with the claimed whole-building energy model	A site visit was completed to verify the installation and operation of the major energy efficiency measures, including HVAC equipment, lighting systems, building controls, and other applicable building systems. Field observations were compared with the project documentation, and any discrepancies were evaluated for potential impacts on the project analysis. The engineering review included quality assurance checks of the supporting documentation, simulation inputs, and reported project information to ensure consistency and accuracy. No significant data quality issues affecting the verification were identified.
New Construction	No	Energy Model	Verify the building design, operation, and equipment as compared with the claimed whole-building energy model	A site visit was conducted to verify that the installed building systems were generally consistent with the proposed design documentation. Reported savings were reviewed for consistency with the submitted whole-building simulation results. All calculations and supporting documentation underwent internal quality assurance reviews to identify discrepancies, verify modeling assumptions, and ensure consistency between project documentation and reported savings.
New Construction	No	Lighting	Verify fixture type(s), quantities, model numbers, wattages, controls configuration, and HOU	The evaluation team was able to verify installation of HVAC, HOU, and controls while onsite with the customer.

Source: Guidehouse analysis

Appendix B. HER Impact Evaluation Detail

This appendix details the full HER programs' impact evaluation. All cohorts are included, regardless of residential or IE status. According to the Phase IV plan, the HER programs are planned to account for 8% of total portfolio energy savings and 9% of total portfolio demand savings. Oracle implements the HER programs.

B.1 Billing Data Management

Guidehouse used monthly billing data from Oracle to perform the energy savings analysis. Guidehouse applied the following preliminary data management steps to the billing data prior to conducting the energy regression analysis:

- Remove exact duplicate bills from the data as provided, by account.
- Drop all bills for accounts that went inactive prior to the latter of (a) the start of the current program year (June 1, 2025) and (b) the launch month of an account's wave.
- Normalize consecutive estimated reads by account, per Section 6.1.4 of the Phase IV Evaluation Framework.⁴⁶
- Convert usage billing data to monthly calendarized observations, per Section 6.1.4 of the Phase IV Evaluation Framework.
- Remove monthly observations outside of each wave's 12-month pre-period and current post-period.
- Remove outlier data, per Section 6.1.4.1 of the Phase IV Evaluation Framework,⁴⁷ defined as monthly observations outside median monthly usage by wave plus or minus 10 times that median usage.

B.2 Impact Regression Results

Guidehouse followed the impact evaluation methodology outlined in Section 6.1.5 of the Phase IV Evaluation Framework.⁴⁸ Guidehouse estimated energy savings using a monthly LDV model. For details on model selection, refer to Section 6.1.5 of the Phase IV Evaluation Framework.

Table B-1 summarizes the regression outputs and statistics by wave, including the absolute precision for percentage savings estimates. The Phase IV Evaluation Framework Section 6.1.1.1 requires that the solution-level verification achieve an absolute precision of $\pm 0.5\%$ at the 95% confidence level (two-tailed), but individual cohorts may have a wider margin of error.⁴⁹ The precision values in Note: ATE is average treatment effect as the change in kWh/day.

⁴⁶ Pennsylvania Statewide Evaluator, "Section 6.1.4 Data Management," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁴⁷ Pennsylvania Statewide Evaluator, "Section 6.1.4.1 Outlier Detection and Removal," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁴⁸ Pennsylvania Statewide Evaluator, "Section 6.1.5 Model Specification," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁴⁹ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

Source: Guidehouse analysis of monthly billing data

reflect the error of the individual regression analysis estimates using a two-tailed 95% confidence level.

Table B-1. HER Program PY17 Energy Regression Details (kWh/day)

HER Wave		Jun 2025	Jul 2025	Aug 2025	Sep 2025	Oct 2025	Nov 2025	Dec 2025	Jan 2026	Feb 2026	Mar 2026	Apr 2026	May 2026
Wave 1	ATE	-0.133	-0.253	-0.249	-0.193	-0.236	-0.565	-0.965	-1.400	-1.274	-0.444	-0.162	-0.136
	Std. Err.	0.175	0.195	0.179	0.156	0.144	0.203	0.291	0.347	0.334	0.208	0.164	0.164
Wave 2	ATE	-1.13	-1.17	-1.15	-0.91	-0.82	-0.96	-1.21	-1.29	-1.20	-0.87	-0.84	-0.62
	Std. Err.	0.279	0.317	0.282	0.244	0.210	0.264	0.364	0.417	0.408	0.272	0.233	0.253
Wave 3	ATE	-1.053	-1.144	-1.079	-0.982	-0.798	-0.920	-1.179	-1.398	-1.349	-0.927	-0.811	-0.910
	Std. Err.	0.183	0.214	0.187	0.160	0.135	0.165	0.225	0.253	0.244	0.168	0.147	0.158
Wave 4	ATE	-0.457	-0.650	-0.504	-0.340	-0.235	-0.189	-0.258	-0.376	-0.432	-0.322	-0.268	-0.325
	Std. Err.	0.137	0.165	0.139	0.116	0.097	0.124	0.169	0.189	0.182	0.124	0.106	0.113
Wave 5 Electric Only	ATE	-0.494	-0.470	-0.478	-0.428	-0.422	-0.238	-0.575	-0.692	-0.512	-0.338	-0.294	-0.441
	Std. Err.	0.247	0.288	0.253	0.212	0.187	0.256	0.345	0.397	0.392	0.257	0.208	0.212
Wave 6 Dual Fuel	ATE	-0.713	-1.105	-1.407	-1.394	-1.371	-1.605	-1.731	-1.713	-1.803	-0.883	-0.688	-0.783
	Std. Err.	0.453	0.546	0.488	0.431	0.360	0.398	0.498	0.543	0.541	0.411	0.390	0.420
Wave 6 Electric Only	ATE	-0.307	-0.271	-0.392	-0.441	-0.334	-0.725	-1.118	-1.219	-1.031	-0.674	-0.367	-0.215
	Std. Err.	0.252	0.303	0.271	0.235	0.216	0.301	0.417	0.480	0.473	0.304	0.237	0.239
Wave 7 Dual Fuel	ATE	-0.375	-0.385	-0.398	-0.307	-0.218	-0.154	-0.120	-0.078	-0.108	-0.173	-0.260	-0.344
	Std. Err.	0.086	0.101	0.088	0.076	0.063	0.069	0.085	0.093	0.091	0.070	0.068	0.074
Wave 7 Has Email	ATE	-0.466	-0.522	-0.408	-0.319	-0.232	-0.256	-0.256	-0.352	-0.475	-0.318	-0.269	-0.375
	Std. Err.	0.109	0.130	0.111	0.093	0.082	0.108	0.142	0.163	0.162	0.109	0.109	0.130
Wave 7 Income- Eligible	ATE	-0.282	-0.407	-0.356	-0.317	-0.417	-0.457	-0.519	-0.611	-0.682	-0.594	-0.409	-0.369
	Std. Err.	0.144	0.179	0.152	0.128	0.120	0.181	0.238	0.266	0.258	0.181	0.133	0.122
Wave 7 No Email	ATE	-0.271	-0.331	-0.282	-0.248	-0.175	-0.246	-0.206	-0.224	-0.230	-0.225	-0.164	-0.210
	Std. Err.	0.087	0.108	0.090	0.074	0.067	0.099	0.130	0.147	0.142	0.098	0.074	0.072
Wave 8 Low Income	ATE	-0.182	-0.076	-0.116	-0.032	-0.078	-0.054	0.097	-0.236	-0.156	-0.092	-0.099	-0.117
	Std. Err.	-0.182	-0.076	-0.116	-0.032	-0.078	-0.054	0.097	-0.236	-0.156	-0.092	-0.099	-0.117
Wave 9 Low Income	ATE	0.049	-0.041	-0.070	0.040	0.044	0.025	0.071	-0.026	-0.330	-0.376	-0.290	-0.193
	Std. Err.	0.097	0.115	0.102	0.089	0.090	0.140	0.180	0.198	0.196	0.137	0.102	0.095

Note: ATE is average treatment effect as the change in kWh/day.

Source: Guidehouse analysis of monthly billing data

Table B-2. HER Program PY17 Percentage Energy Savings

HER Wave		Jun 2025	Jul 2025	Aug 2025	Sep 2025	Oct 2025	Nov 2025	Dec 2025	Jan 2026	Feb 2026	Mar 2026	Apr 2026	May 2026
Wave 1	% Savings	0.40%	0.66%	0.77%	0.71%	0.80%	1.22%	1.44%	1.73%	1.67%	0.97%	0.50%	0.47%
	Abs. Prec.	0.52%	0.51%	0.55%	0.58%	0.49%	0.44%	0.43%	0.43%	0.44%	0.46%	0.51%	0.57%
Wave 2	% Savings	1.85%	1.62%	1.90%	1.89%	1.84%	1.65%	1.56%	1.46%	1.44%	1.54%	1.83%	1.29%
	Abs. Prec.	0.46%	0.44%	0.47%	0.51%	0.47%	0.45%	0.47%	0.47%	0.49%	0.48%	0.51%	0.53%
Wave 3	% Savings	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%	2.22%
	Abs. Prec.	0.39%	0.37%	0.39%	0.43%	0.42%	0.45%	0.50%	0.52%	0.53%	0.47%	0.46%	0.45%
Wave 4	% Savings	1.29%	1.46%	1.41%	1.26%	1.02%	0.74%	0.83%	1.13%	1.37%	1.30%	1.20%	1.28%
	Abs. Prec.	0.39%	0.37%	0.39%	0.43%	0.42%	0.48%	0.55%	0.57%	0.57%	0.50%	0.47%	0.45%
Wave 5 Electric Only	% Savings	1.36%	1.06%	1.31%	1.50%	1.62%	0.74%	1.37%	1.49%	1.15%	1.07%	1.13%	1.61%
	Abs. Prec.	0.68%	0.65%	0.70%	0.74%	0.72%	0.79%	0.83%	0.85%	0.88%	0.82%	0.80%	0.77%
Wave 6 Dual Fuel	% Savings	1.29%	1.63%	2.50%	3.16%	3.80%	4.25%	3.87%	3.66%	4.03%	2.45%	1.99%	1.90%
	Abs. Prec.	0.82%	0.81%	0.87%	0.98%	1.00%	1.05%	1.11%	1.16%	1.21%	1.14%	1.13%	1.02%
Wave 6 Electric Only	% Savings	0.70%	0.52%	0.89%	1.22%	0.96%	1.55%	1.78%	1.70%	1.49%	1.45%	1.01%	0.60%
	Abs. Prec.	0.57%	0.58%	0.61%	0.65%	0.62%	0.64%	0.66%	0.67%	0.68%	0.65%	0.66%	0.67%
Wave 7 Dual Fuel	% Savings	1.35%	1.09%	1.41%	1.45%	1.25%	0.85%	0.57%	0.36%	0.52%	0.99%	1.55%	1.73%
	Abs. Prec.	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%
Wave 7 Has Email	% Savings	1.93%	1.73%	1.67%	1.69%	1.41%	1.32%	1.07%	1.34%	1.87%	1.68%	1.65%	2.11%
	Abs. Prec.	0.45%	0.43%	0.45%	0.49%	0.50%	0.56%	0.59%	0.62%	0.64%	0.57%	0.56%	0.53%
Wave 7 Income-Eligible	% Savings	1.19%	1.36%	1.44%	1.68%	2.41%	2.22%	2.07%	2.25%	2.57%	2.92%	2.39%	2.05%
	Abs. Prec.	0.61%	0.60%	0.62%	0.68%	0.69%	0.88%	0.95%	0.98%	0.97%	0.89%	0.77%	0.68%
Wave 7 No Email	% Savings	1.29%	1.24%	1.32%	1.53%	1.19%	1.39%	0.95%	0.95%	1.01%	1.31%	1.14%	1.37%
	Abs. Prec.	0.41%	0.40%	0.42%	0.46%	0.46%	0.56%	0.60%	0.63%	0.62%	0.57%	0.51%	0.47%
Wave 8 Low Income	% Savings	0.72%	0.24%	0.44%	0.16%	0.41%	0.22%	-0.33%	0.71%	0.49%	0.39%	0.52%	0.60%
	Abs. Prec.	0.47%	0.47%	0.49%	0.54%	0.57%	0.68%	0.72%	0.75%	0.77%	0.69%	0.61%	0.57%
Wave 9 Low Income	% Savings	-0.19%	0.12%	0.25%	-0.18%	-0.22%	-0.10%	-0.22%	0.07%	0.94%	1.46%	1.39%	0.91%
	Abs. Prec.	0.37%	0.34%	0.37%	0.41%	0.45%	0.55%	0.56%	0.56%	0.56%	0.53%	0.49%	0.45%

Source: Guidehouse analysis of monthly billing data

B.3 Recipient Household Counts

Monthly impacts for the HER Program depend on the total number of active recipients with consumption data during each month. Recipients accrue savings for the full month, for each active month they have consumption data. Additionally, customers that opt out of receiving reports still accrue savings for as long as they remain active to retain the validity of the RCT design and savings.⁵⁰ Guidehouse multiplied the total number of active recipients by the number of days in the month, by the treatment estimates for each month, and by cohort. Table B-3. shows the number of active recipients that accrued savings in each month by cohort and across the entire program.

Table B-3. HER Program PY17 Active Recipient Households

Month	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5 Electric Only	Wave 6 Dual Fuel	Wave 6 Electric Only	Wave 7 Dual Fuel	Wave 7 Has Email	Wave 7 Income- Eligible	Wave 7 No Email	Wave 8 Low Income	Wave 9 Low Income	Total
Jun 2025	18,083	24,357	42,255	129,821	15,694	3,782	10,427	76,908	140,453	13,552	61,455	17,117	19,731	555,552
Jul 2025	17,983	24,246	42,095	129,307	15,611	3,762	10,362	76,394	139,157	13,413	60,981	16,894	19,345	551,567
Aug 2025	17,881	24,156	41,938	128,805	15,539	3,741	10,300	75,922	138,011	13,298	60,579	16,698	19,036	548,023
Sep 2025	17,803	24,042	41,771	128,322	15,458	3,721	10,239	75,514	137,062	13,164	60,196	16,537	18,732	544,758
Oct 2025	17,732	23,947	41,626	127,833	15,376	3,708	10,175	75,055	135,854	13,022	59,723	16,312	18,386	541,017
Nov 2025	17,677	23,870	41,502	127,439	15,305	3,691	10,115	74,669	134,906	12,909	59,303	16,105	18,087	537,901
Dec 2025	17,612	23,805	41,372	127,036	15,249	3,677	10,050	74,326	133,940	12,802	58,879	15,952	17,869	534,957
Jan 2026	17,553	23,742	41,265	126,667	15,194	3,667	10,001	74,030	133,055	12,714	58,486	15,802	17,635	532,258
Feb 2026	17,514	23,695	41,158	126,364	15,147	3,656	9,955	73,807	132,570	12,632	58,274	15,706	17,435	530,399
Mar 2026	17,480	23,649	41,085	126,109	15,103	3,652	9,924	73,617	132,272	12,578	58,138	15,642	17,278	529,047
Apr 2026	17,432	23,587	40,982	125,733	15,055	3,640	9,875	73,323	131,468	12,467	57,794	15,502	17,032	526,458
May 2026	17,362	23,506	40,842	125,282	14,977	3,623	9,797	72,992	130,525	12,348	57,351	15,310	16,722	523,275

Source: Guidehouse analysis of monthly billing data

⁵⁰ Pennsylvania Statewide Evaluator, "Section 6.1.1.2 Opt-Outs and Account Closures," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

B.4 Dual Participation Analysis

To the extent that the HER programs increase participation in other solutions, some savings from the regression analysis could be double-counted if appropriate adjustments are not made. Double-counting can be avoided for programs that track participation at the customer level by estimating the increase in program participation among HER recipients. This approach is also known as dual participation savings or uplift savings.

To generate estimates of dual participation, Guidehouse followed the Phase IV Evaluation Framework Section 6.1.8 for both downstream and upstream program accounting.⁵¹ The assumption is that exposure to the HER messaging motivates participants to take advantage of other programs' offerings promoted through HER materials. This exposure creates a situation where households in the treatment groups are likely to participate in other programs at a higher rate than households in the control groups. The methodology calls for program-specific uplift calculations. To that end, Guidehouse estimated aggregate uplift across the Residential EE Program components.

Guidehouse's dual participation analysis also accounts for upstream savings, which functions differently than for downstream programs. Because upstream participation is not tracked at the customer level, the approach for specific homes is not feasible. Therefore, Guidehouse used an assumed percentage reduction factor for each recipient cohort to account for upstream dual participation. The assumed percentage reduction factors increase over time from a low of 0.75% for the first year to a high of 3% for the fourth year and beyond. This factor determines total upstream reduction based on the estimate of energy savings less downstream double-counted savings. PECO stopped offering upstream lighting in June 2023, so adjustment factors are not applied to waves launched thereafter (e.g., for Wave 8, which was launched in June 2023). Table B-4. .

Table B-4. HER Program PY17 Default Upstream Reduction Factors

Year of Wave Activity	Default Upstream Reduction Factor	HER Waves Included
1	0.75%	-
2	1.50%	Wave 7D, Wave 7HE, Wave 7NE, Wave 7IE
3	2.25%	-
4 and beyond	3.00%	Wave 1, Wave 2, Wave 3, Wave 4, Wave 5E, Wave 6D, Wave 6E

Source: Phase IV Evaluation Framework Section 6.1.8.2

Table B-5. summarizes the dual participation savings associated with both downstream and upstream programs across each of the HER recipient cohorts.

Table B-5. HER Program PY17 Double-Counting Savings Adjustments

HER Wave	Downstream Adjustment (MWh)	Upstream Adjustment (MWh)	Total Adjustment (MWh)
Wave 1	575	79	653

⁵¹ Pennsylvania Statewide Evaluator, "Section 6.1.8 Dual Participation Analysis," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

HER Wave	Downstream Adjustment (MWh)	Upstream Adjustment (MWh)	Total Adjustment (MWh)
Wave 2	1,668	215	1,883
Wave 3	609	456	1,066
Wave 4	402	495	897
Wave 5 – Electric Only	77	73	150
Wave 6 – Dual Fuel	130	47	177
Wave 6 – Electric Only	11	65	76
Wave 7 – Dual Fuel	608	91	699
Wave 7 – Has Email	0	262	262
Wave 7 – IE	0	32	32
Wave 7 – No Email	367	71	438
Wave 8 – Low Income	0	0	0
Wave 9 – Low Income	0	0	0

Source: Guidehouse analysis of PECO program tracking data

B.5 Persistence and First-Year Savings

In compliance with Phase IV incremental annual accounting requirements and per Section 6.1.9 of the Phase IV Evaluation Framework,⁵² Guidehouse performed a persistence analysis to estimate first-year savings for all cohorts in their third or later year of activity.

The calculations for persistence reductions follow the algorithms in the 2021 Pennsylvania Technical Reference Manual (PA TRM), Volume 2, Section 2.7.3.⁵³ Guidehouse used the default decay rate of 31.3% to calculate monthly persistence based on ATE from prior program years and proportionate to estimated savings net of uplift from the current program year. Table B-6. contains the monthly persistence reductions for all active cohorts.

⁵² Pennsylvania Statewide Evaluator, "Section 6.1.9 Incremental Annual Accounting and Measure Life," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁵³ Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

Table B-6. HER Program PY17 Persistence (MWh)

Month	Wave 1	Wave 2	Wave 3	Wave 4	Wave 6 Dual Fuel	Wave 6 Electric Only	Wave 7 Dual Fuel	Wave 7 Has Email	Wave 7 IE	Wave 7 No Email	Wave 8 Low Income	Total
Jun 2025	17	404	98	1,109	26	64	390	1,311	34	221	48	3,725
Jul 2025	75	431	111	1,654	43	60	410	1,503	51	278	21	4,637
Aug 2025	73	431	104	1,274	55	86	421	1,167	44	232	31	3,917
Sep 2025	44	317	91	811	53	93	312	877	38	191	8	2,834
Oct 2025	69	285	75	570	53	72	220	653	50	131	20	2,199
Nov 2025	215	330	84	441	60	149	142	692	53	187	13	2,366
Dec 2025	402	449	113	626	66	238	103	710	62	157	-25	2,902
Jan 2026	601	478	135	916	65	260	57	969	72	172	59	3,785
Feb 2026	489	394	117	949	62	198	79	1,179	72	161	35	3,735
Mar 2026	165	290	88	777	32	143	156	871	69	171	23	2,784
Apr 2026	33	270	74	615	23	75	241	710	46	118	24	2,228
May 2026	21	181	86	780	27	44	335	1,015	42	160	28	2,720

Note: Wave 5 Electric Only was inactive from PY12-PY16, so though the persistence formula is applied, the savings from the past 3 years are 0, thus calculated persistence is 0. Wave 9 Low Income is in its first year and thus has no persistence.

Source: Guidehouse analysis of monthly billing data and ATE net-of-uplift from prior program years

To calculate first-year savings values, Guidehouse subtracted the persistence reductions from total savings net-of-uplift for the current program year. Table B-7. contains final first-year savings calculations by month for all active cohorts.

Table B-7. HER Program PY17 First-Year Savings (MWh)

Month	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5 Electric Only	Wave 6 Dual Fuel	Wave 6 Electric Only	Wave 7 Dual Fuel	Wave 7 Has Email	Wave 7 IE	Wave 7 No Email	Wave 8 Low Income	Wave 9 Low Income	Total
Jun 2025	3	256	1,135	578	212	44	26	424	622	79	251	45	-29	3,646
Jul 2025	11	273	1,280	863	208	73	25	446	713	116	316	19	24	4,366
Aug 2025	11	272	1,200	665	220	94	35	458	554	101	263	29	41	3,942
Sep 2025	7	201	1,052	423	188	90	38	339	416	86	216	8	-22	3,041
Oct 2025	11	180	863	297	186	91	29	239	310	115	148	19	-25	2,464
Nov 2025	33	208	970	230	96	102	61	154	328	121	212	13	-14	2,515
Dec 2025	61	284	1,304	326	254	114	97	112	337	141	178	-23	-40	3,146
Jan 2026	92	302	1,558	478	307	111	106	62	460	165	196	56	14	3,906
Feb 2026	75	249	1,351	495	209	106	81	86	559	165	183	33	161	3,752
Mar 2026	25	183	1,015	405	154	54	58	169	413	159	194	22	201	3,053
Apr 2026	5	171	860	321	129	39	31	262	337	105	134	22	148	2,562
May 2026	3	115	997	407	199	46	18	363	482	97	181	27	100	3,033

Source: Guidehouse analysis

B.6 Demand Savings

Guidehouse conducted an analysis to estimate average peak demand savings for the HER Program. To this end, Guidehouse developed a methodology in accordance with the Phase IV Evaluation Framework Section 6.1.6.⁵⁴ The methodology is bipartite, composed of a regression model that estimates hourly kW savings and a proportional conversion factor that accounts for uplift and persistence, by month.

Guidehouse used a simple difference regression model leveraging hourly interval data for peak hours to estimate gross average kW savings by month. Peak hours are defined as 2 p.m. to 6 p.m. on non-holiday weekdays during June through August of 2025. Guidehouse applied the following preliminary data management steps on the hourly metering data prior to carrying out the demand regression analysis:

- Limit the data to only observations within the definition of peak hours for PY17.
- Drop meter reads that occur after an account's inactive date.
- Remove customers with multiple service points if applicable.
- Remove exact duplicate meter reads by account.
- Remove estimated reads when an actual read is available for the same interval.
- Drop meter reads that occur after an account's inactive date.
- Remove outlier reads, defined as observations greater than or less than four standard deviations from the mean peak hourly usage (done separately for each cohort).
- Drop zero usage meter reads; missing reads are shown as zero usage and if kept can incorrectly reduce average hourly kW.
- Average the peak hourly reads to create a mean daily kW value by account and read date.
- Remove averaged account-date observations that incorporate less than three of the four possible peak hourly meter reads.

Table B-8. contains the resulting kW regression estimates with clustered standard errors by month for all cohorts.

Table B-8. HER Program PY17 Demand Regression Details (kW)

HER Wave		Jun 2025	Jul 2025	Aug 2025
Wave 1	Est.	-0.0279	-0.0210	-0.0206
	Std. Err.	0.0135	0.0161	0.0137
Wave 2	Est.	-0.0463	-0.0507	-0.0534
	Std. Err.	0.0228	0.0278	0.0235

⁵⁴ Pennsylvania Statewide Evaluator, "Section 6.1.6 Peak Demand Impacts," *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

HER Wave		Jun 2025	Jul 2025	Aug 2025
Wave 3	Est.	-0.0573	-0.0466	-0.0521
	Std. Err.	0.0140	0.0170	0.0145
Wave 4	Est.	-0.0381	-0.0487	-0.0387
	Std. Err.	0.0100	0.0127	0.0104
Wave 5 Electric Only	Est.	-0.0273	-0.0205	-0.0333
	Std. Err.	0.0184	0.0221	0.0190
Wave 6 Dual Fuel	Est.	-0.0426	-0.0503	-0.0483
	Std. Err.	0.0392	0.0474	0.0409
Wave 6 Electric Only	Est.	-0.0148	-0.0069	-0.0124
	Std. Err.	0.0218	0.0264	0.0224
Wave 7 Dual Fuel	Est.	-0.0223	-0.0218	-0.0210
	Std. Err.	0.0078	0.0098	0.0081
Wave 7 Has Email	Est.	-0.0283	-0.0388	-0.0314
	Std. Err.	0.0093	0.0118	0.0095
Wave 7 Income-Eligible	Est.	-0.0151	-0.0179	-0.0166
	Std. Err.	0.0104	0.0133	0.0107
Wave 7 No Email	Est.	-0.0118	-0.0142	-0.0139
	Std. Err.	0.0069	0.0091	0.0071
Wave 8 Low Income	Est.	0.0031	-0.0052	-0.0038
	Std. Err.	0.0099	0.0125	0.0101
Wave 9 Low Income	Est.	-0.0037	-0.0079	-0.0099
	Std. Err.	0.0096	0.0096	0.0096

Source: Guidehouse analysis of hourly metering data

To account for uplift and persistence, Guidehouse applied the ratio of the first-year savings ATE to the modeled ATE from the impact analysis for proportional parity in reductions for both the energy and demand savings. Each modified monthly kW value is multiplied by the total number of recipient households in that month (refer to Table B-3. for counts). The resulting monthly total demand savings are weighted together using total peak days for active households to create a single demand savings value by cohort.

B.7 Summary

Table B-9. contains the final values from the impact and demand analyses by cohort. Final MWh savings combine modeled energy savings, double-counted savings reductions, and persistence savings reductions. Final demand savings incorporate modeled demand savings and a ratio between gross and first-year energy savings, weighted by month.

Table B-9. HER Program PY17 Impacts Summary

Cohort	Modeled Savings (MWh)	Uplift Reduction (MWh)	Net-of-Uplift Savings (MWh)	Persistence Reduction (MWh)	First-Year Savings (MWh)	Demand Savings (MW)
Wave 1	3,195	653	2,541	2,205	336	0.026
Wave 2	8,837	1,883	6,954	4,260	2,694	0.380
Wave 3	15,823	1,066	14,757	1,175	13,582	1.867
Wave 4	16,906	897	16,009	10,522	5,487	1.785
Wave 5 – Electric Only	2,510	150	2,360	0	2,360	0.391
Wave 6 – Dual Fuel	1,704	177	1,527	563	963	0.100
Wave 6 – Electric Only	2,165	76	2,089	1,483	606	0.033
Wave 7 – Dual Fuel	6,684	699	5,984	2,868	3,116	0.812
Wave 7 – Has Email	17,449	262	17,187	11,656	5,531	1.451
Wave 7 – IE	2,115	32	2,083	633	1,450	0.152
Wave 7 – No Email	5,086	438	4,648	2,177	2,471	0.407
Wave 8 – Low Income	556	0	556	286	270	0.016
Wave 9 – Low Income	561	0	561	0	561	0.138

Source: Guidehouse analysis

Appendix C. PY17 and P4TD Summary by Customer Segment and IE Carveout

Table C-1. presents a summary of the programs, components, and customer segments that contribute to the IE carveout in PY17 and P4TD.

Table C-1. PY17 and P4TD Summary of Income-Eligible Carveout Energy Savings (MWh/Yr)

Component	Customer Segment	PYVTD Gross (MWh/yr)	VTD Gross (MWh/yr)
Multifamily Income-Eligible	Multifamily Income-Eligible	1,309	13,505
Residential Total		1,309	13,505
Income-Eligible Single-Family/Long-Term Savings	Income-Eligible	16,434	87,933
Income-Eligible Appliance Recycling	Income-Eligible	99	2,959
Income-Eligible Total		16,533	90,891
Income-Eligible HER	Income-Eligible	2,281	4,754
Portfolio Total		20,123	109,151

Source: Guidehouse analysis

Appendix D. Summary of Program-Level Impacts, Cost-Effectiveness, and HIM NTG

D.1 Program- and Component-Level Impacts Summary

Table D-1 presents a summary of energy impacts by program and component through PY17.

Table D-1. PY17 and P4TD Incremental Annual Energy Savings by Program and Component (MWh/Yr)

Program and Component	PYRTD (MWh/yr)	PYVTD Gross (MWh/yr)	PYVTD Net (MWh/yr)	RTD (MWh/yr)	VTD Gross (MWh/yr)	VTD Net (MWh/yr)
Rebates and Marketplace	38,343	38,237	20,066	168,317	152,033	87,140
Appliance Recycling	1,009	393	175	20,656	21,387	11,292
In-Home Assessment	6,792	6,085	4,971	30,072	27,804	24,229
New Construction	6,000	5,996	3,298	19,503	19,537	11,522
Multifamily	688	829	711	8,888	7,483	6,582
Multifamily Income-Eligible	1,454	1,309	1,309	15,462	13,505	13,505
Residential Total	54,285	52,849	30,531	262,898	241,750	154,270
Income-Eligible Single-Family	13,280	16,434	16,434	83,916	87,933	87,933
Income-Eligible Appliance Recycling	111	99	99	2,888	2,959	2,959
Income-Eligible Total	13,391	16,533	16,533	86,804	90,891	90,891
Residential HER	38,300	37,146	37,146	146,858	142,449	142,449
Income-Eligible HER	3,625	2,281	2,281	7,047	4,754	4,754
Downstream Rebates	132,771	113,453	84,230	498,619	466,674	327,862
Midstream Rebates	55,244	63,059	42,382	463,237	489,941	334,890
Small Business Direct Install	459	420	390	46,886	45,245	40,874
New Construction	10,778	9,422	2,837	44,505	44,433	14,444
Non-Residential Total	199,252	186,353	129,838	1,053,248	1,046,293	718,070
Portfolio Total	308,853	295,163	216,329	1,556,854	1,526,138	1,110,436

Note: For the Non-Residential Downstream Rebates component, 13,945 MWh of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Source: Guidehouse analysis

Table D-2. presents a summary of the peak demand impacts by energy efficiency program and component through the current reporting period.

Table D-2. PY17 and P4TD Peak Demand Savings by Energy Efficiency Program and Component (MW/Yr)

Program and Component	PYRTD (MW/yr)	PYVTD Gross (MW/yr)	PYVTD Net (MW/yr)	RTD (MW/yr)	VTD Gross (MW/yr)	VTD Net (MW/yr)
Rebates and Marketplace	9.07	10.55	5.70	27.00	29.38	16.90
Appliance Recycling	0.40	0.23	0.09	4.67	4.70	2.35

Program and Component	PYRTD (MW/yr)	PYVTD Gross (MW/yr)	PYVTD Net (MW/yr)	RTD (MW/yr)	VTD Gross (MW/yr)	VTD Net (MW/yr)
In-Home Assessment	0.62	0.83	0.68	2.72	2.98	2.59
New Construction	1.54	1.81	1.00	5.58	4.92	2.92
Multifamily	0.09	0.10	0.09	1.24	1.04	0.92
Multifamily Income-Eligible	0.18	0.17	0.17	1.85	1.61	1.61
Residential Total	11.89	13.69	7.72	43.05	44.62	27.29
Income-Eligible Single-Family	1.49	1.85	1.85	8.54	8.82	8.82
Income-Eligible Appliance Recycling	0.03	0.03	0.03	0.71	0.73	0.73
Income-Eligible Total	1.52	1.88	1.88	9.26	9.55	9.55
Residential HER	7.13	7.83	7.83	24.80	32.34	32.34
Income-Eligible HER	0.55	0.33	0.33	1.11	0.45	0.45
Downstream Rebates	16.10	15.84	12.18	79.54	75.00	53.26
Midstream Rebates	11.64	13.09	8.80	99.19	104.15	71.18
Small Business Direct Install	0.13	0.12	0.11	10.82	10.13	9.21
New Construction	1.67	1.59	0.48	7.33	7.62	2.48
Non-Residential Total	29.54	30.63	21.57	196.84	196.90	136.13
Portfolio Total	50.64	54.37	39.33	275.05	283.87	205.77

Note: For the Non-Residential Downstream Rebates component, 1.71 MW of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Source: Guidehouse analysis

D.2 Program-Level Cost-Effectiveness Summary

Table D-3. shows the TRC ratios by program and for the portfolio. The benefits in Table D-3. were calculated using gross verified impacts. Costs and benefits are expressed in 2025 dollars.

Table D-3. PY17 Gross TRC Ratios by Program (\$1,000)¹

Program	TRC NPV Benefits	TRC NPV Costs	TRC Ratio	TRC Net Benefits (Benefits – Costs)
Residential	\$56,633	\$39,723	1.43	\$16,911
Income-Eligible	\$18,678	\$5,905	3.16	\$12,773
HER	\$10,862	\$2,857	3.80	\$8,004
Income-Eligible HER	\$408	\$168	2.43	\$240
Residential Subtotal	\$86,581	\$48,653	1.78	\$37,928
Non-Residential Subtotal	\$107,049	\$110,378	0.97	-\$3,329
Common Portfolio Costs		\$10,260		
Portfolio Total	\$193,630	\$169,291	1.14	\$24,339

¹ Costs and benefits are expressed as follows: PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025

Source: PECO and CSP tracking data

Table D-4. presents PY17 cost-effectiveness using net verified savings to calculate benefits.

Table D-4. PY17 Net TRC Ratios by Program (\$1,000)¹

Program	TRC NPV Benefits	TRC NPV Costs	TRC Ratio	TRC Net Benefits (Benefits – Costs)
Residential	\$32,717	\$25,726	1.27	\$6,991
Income-Eligible	\$18,678	\$5,905	3.16	\$12,773
HER	\$10,862	\$2,857	3.80	\$8,004
Income-Eligible HER	\$408	\$168	2.43	\$240
Residential Subtotal	\$62,665	\$34,656	1.81	\$28,009
Non-Residential Subtotal	\$74,584	\$79,460	0.94	-\$4,876
Common Portfolio Costs		\$10,260		
Portfolio Total	\$137,249	\$124,376	1.10	\$12,873

¹ Costs and benefits are expressed as follows: PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025

Source: PECO and CSP tracking data

Table D-5. summarizes cost-effectiveness by program for Phase IV of Act 129. Cost and benefits are expressed in nominal dollars.

Table D-5. P4TD Gross TRC Ratios by Program (\$1,000)¹

Program	TRC NPV Benefits	TRC NPV Costs	TRC Ratio	TRC Net Benefits (Benefits – Costs)
Residential	\$222,805	\$186,812	1.19	\$35,993
Income-Eligible	\$119,099	\$32,721	3.64	\$86,378
HER	\$34,831	\$10,859	3.21	\$23,973
Income-Eligible HER	\$873	\$452	1.93	\$421
Residential Subtotal	\$377,608	\$230,844	1.64	\$146,765
Non-Residential Subtotal	\$558,595	\$509,220	1.10	\$49,375
Common Portfolio Costs		\$52,606		
Portfolio Total	\$936,203	\$792,669	1.18	\$143,534

¹ Costs and benefits are expressed as follows: PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025

Source: PECO and CSP tracking data

Table D-6. presents P4TD cost-effectiveness results using net verified savings to calculate benefits. Costs and benefits are expressed in nominal dollars.

Table D-6. P4TD Net TRC Ratios by Program (\$1,000)¹

Program	TRC NPV Benefits	TRC NPV Costs	TRC Ratio	TRC Net Benefits (Benefits – Costs)
Residential	\$142,686	\$129,972	1.10	\$12,714
Income-Eligible	\$119,099	\$32,721	3.64	\$86,378
HER	\$34,831	\$10,859	3.21	\$23,973
Income-Eligible HER	\$873	\$452	1.93	\$421
Residential Subtotal	\$297,489	\$174,003	1.71	\$123,485
Non-Residential Subtotal	\$383,955	\$366,236	1.05	\$17,719
Common Portfolio Costs		\$52,606		
Portfolio Total	\$681,444	\$592,845	1.15	\$88,598

¹ Costs and benefits are expressed as follows PY13 = 2021, PY14 = 2022, PY15 = 2023, PY16 = 2024, PY17 = 2025

Source: PECO and CSP tracking data

D.3 High Impact Measure Net-To-Gross Research

Guidehouse did not conduct NTG research for HIM in PY17.

D.4 Program-Level Comparison of Performance to the Approved EE&C Plan

Table D-7. presents PY17 expenditures, by program, compared with the budget estimates set forth in the EE&C Plan⁵⁵ for PY17. All the dollars in Table D-7. are presented in 2025 nominal dollars.

Table D-7. Comparison of PY17 Expenditures with Phase IV EE&C Plan (\$1,000)

Program	PY17 Budget from EE&C Plan	PY17 Actual Expenditures	Ratio (Actual/Plan)
Residential	\$16,580	\$13,865	0.84
Income-Eligible	\$8,570	\$5,619	0.66
Residential HER	\$1,850	\$2,857	1.54
Income-Eligible HER	\$90	\$168	1.87
Non-Residential	\$35,380	\$33,505	0.95
Portfolio Total	\$62,470	\$56,014	0.90

Sources: Guidehouse analysis, PECO EE&C Plan

Table D-8. presents P4TD expenditures, by program, compared with the budget estimates set forth in the EE&C Plan through PY17. Phase IV dollar totals in Table D-8. are presented in nominal dollars.

Table D-8. Comparison of P4TD Expenditures to Phase IV EE&C Plan (\$1,000)

Program	Phase IV Budget from EE&C Plan through PY17	P4TD Actual Expenditures	Ratio (Actual/Plan)
Residential	\$77,660	\$67,434	0.87
Income-Eligible	\$42,450	\$37,709	0.89
Residential HER	\$9,690	\$10,859	1.12
Income-Eligible HER	\$490	\$451	0.92
Non-Residential	\$247,070	\$218,118	0.88
Portfolio Total	\$377,360	\$334,571	0.89

Sources: Guidehouse analysis, PECO EE&C Plan

Table D-9. compares PY17 verified gross program savings with the energy savings projections set forth in the EE&C Plan.

Table D-9. Comparison of PY17 Actual Program Savings with EE&C Plan Projections

Program	EE&C Plan Projections for PY17 (MWh)	PY17 VTD Gross MWh Savings	Ratio (Actual/Plan)
Residential	51,106	52,849	1.03

⁵⁵ PECO, PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

Program	EE&C Plan Projections for PY17 (MWh)	PY17 VTD Gross MWh Savings	Ratio (Actual/Plan)
Income-Eligible	17,558	16,533	0.94
Residential HER	21,456	37,146	1.73
Income-Eligible HER	1,032	2,281	2.21
Non-Residential	156,348	186,353	1.19
Portfolio Total	247,500	295,163	1.19

Note: For the Non-Residential Downstream Rebates component, 13,915 MWh of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Sources: Guidehouse analysis, PECO EE&C Plan

Table D-10 compares P4TD verified gross program savings with the energy savings projections set forth in the EE&C Plan.

Table D-10. Comparison of P4TD Actual Program Savings with EE&C Plan Projections

Program	EE&C Plan Projections through PY17 (MWh)	VTD Gross MWh Savings	Ratio (Actual/Plan)
Residential	240,042	241,750	1.01
Income-Eligible	85,427	90,891	1.06
Residential HER	112,656	142,449	1.26
Income-Eligible HER	5,734	4,754	0.83
Non-Residential	1,101,919	1,046,293	0.95
Portfolio Total	1,545,778	1,526,138	0.99

Note: For the Non-Residential Downstream Rebates component, 13,915 MWh of reported savings are unverified in PY17. These unverified savings are included in reported savings values and excluded from verified savings values.

Sources: Guidehouse analysis, PECO EE&C Plan

Appendix E. Residential and Income-Eligible EE Programs

This appendix details the evaluation methods and activities Guidehouse deployed in PY17 for select residential and IE EE program components (listed below). Refer to Sections 3.1 and 3.2 for key evaluation findings, results, and conclusions for these components:

- Rebates and Marketplace (Market-Rate)
- Appliance Recycling (Market-Rate and IE)
- In-Home Assessment (Market-Rate)
- New Construction (Market-Rate)
- Multifamily (Market-Rate and IE)
- Single-Family (IE)
- Long-Term Savings (IE)

E.1 Rebates and Marketplace (Market-Rate)

The Rebates and Marketplace component includes customer rebates for lighting, HVAC, appliances, and energy-saving devices. There are multiple delivery pathways to receive product rebates: Downstream, Marketplace, and Point of Purchase. According to the Phase IV EE&C plan,⁵⁶ this component will account for 54% of Residential EE Program energy savings, 44% of Residential EE Program demand savings, 8% of total portfolio energy savings, and 6% of portfolio demand savings. CLEAResult implements the Phase IV Rebates and Marketplace component.

E.1.1 Gross Impact Evaluation

E.1.1.1 Methodology

Guidehouse conducted a tracking database analysis. As part of the tracking database analysis, Guidehouse verified algorithms used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM measures were passed through this process with no adjustment and adjusted database savings for these measures equaled the reported savings.

Table E-1 illustrates the factors that led to variation between the reported and adjusted database savings and impacted the observed realization rates reported in Section 3.1.2.

⁵⁶ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

Table E-1. Detailed Tracking Database Findings for Rebates and Marketplace

Measure	Percentage of Residential Energy Savings ¹	Tracking Database Energy Ratio	Tracking Database Demand Ratio	Reason for Adjustment
Ductless Heat Pumps	3.2%	0.84	0.97	Values provided in the tracking data and deemed TRM values result in tracking database adjusted savings that differ from reported savings.
Air Source Heat Pumps	3.0%	0.97	1.00	The Guidehouse team is unable to replicate the reported savings using the reported parameters.
ECM Circulation Fans	2.3%	1.05	1.06	Reported savings use an ECM _{kW} reduced power factor of 0.11 instead of the TRM-deemed 0.116
Heat Pump Water Heaters	0.9%	0.71	0.71	Reported units between 50 and 120 gallons use a UEF baseline calculation of 0.9307 - (0.0002*volume). TRM errata issued for PY15 provides updated equations to calculate UEF base for these larger measures.

¹ Percentage of Residential Energy Savings is the percentage of total Residential Program energy savings that each of these measures represents.

Source: Guidehouse analysis

E.1.2 Net Impact Evaluation

Guidehouse conducted NTG research for the Downstream and Online Marketplace delivery pathways of the Rebates and Marketplace component in PY17. Guidehouse sent online surveys to PECO customers who participated in the Downstream pathway by receiving a rebate for solar and non-solar projects and customers who received online discounts on energy efficient technologies purchased through PECO's Online Marketplace (referred to throughout Section E.1.2 as the Marketplace). Guidehouse received 494 valid NTG survey completes from Downstream participants, 68 from solar projects and 426 from non-solar projects, as well as 87 valid NTG survey completes from Marketplace participants.⁵⁷ See Section 3.1.3 for information on the PY17 surveying effort.

E.1.2.1 Estimating Free Ridership

The SWE's Phase IV Evaluation Framework⁵⁸ for Residential downstream-type programs includes two metrics for estimating free ridership: intention and influence. This direction comes directly from the Energy Trust of Oregon (ETO) Common Methods for conducting NTG research. The Rebates and Marketplace component offers equipment upgrades through downstream rebates, an online marketplace, and instant in-store discounts (point of purchase). Guidehouse asked intention and influence questions specific to both Downstream and Marketplace delivery pathways.

⁵⁷ NTG survey completes differ slightly from the Process survey complete counts below due to incomplete surveys where respondents answered the entire NTG battery of questions but dropped out of the survey prior to completing all process questions.

⁵⁸ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

Downstream Delivery Pathway

Intention

Intention is assessed through brief questions used to determine how the upgrade or equipment replacement likely would have differed if the respondent had not received the program assistance. The initial question asked the respondent to identify from a limited set of options that best describe what most likely would have occurred without the program.

The survey response options gathering feedback on intention in the PY17 Rebates and Marketplace component Downstream delivery pathway included:

- Without the program, would not have installed the project
- Without the program, would have postponed the installation of the project
- Without the program, would have installed the project without a rebate
- Without the program, would have reduced the size or scope of the project

The first and second outcomes (not installed the project or postponed installation) indicate zero free ridership and thus results in an intention score of 0.00. The other outcomes require follow-up questions and are scored according to the Downstream algorithm that Figure E-1 shows.

Scoring of Intention Assessment in Rebates and Marketplace - Downstream

Table E-2 summarizes the possible response combinations to the questions described above and the intention score assigned to each unique combination.

Table E-2. Intention Scoring for Rebates and Marketplace - Downstream

Measure	Question	Response	Intention Score
Solar and non-solar projects (including HVAC and appliances)	FR1. Please select the option below that best describes what you would have done if you had not participated in the program in the last year.	Without the program, would not have installed the project	0.00
		Without the program, would have postponed the installation of the project	0.00
		Without the program, would have installed the project without a rebate	See FR4
		Without the program, would have reduced the size or scope of the project	See FR3
	FR3. How much would you have reduced the size or scope of the project?	Small amount (1% - 33%)	0.375
		Moderate amount (34% - 66%)	0.25
		Large amount (67% - 99%)	0.125
		Don't know	0.25
	FR4. Does this mean you would have paid the entire cost of the project without the PECO rebate?	Yes	0.50
		Don't know	0.375
		No	0.25

Source: Guidehouse analysis

Influence

Program influence may be assessed by asking the respondent how much influence—from 0 (not at all influential) to 10 (extremely influential)—various program elements had on the decision to do the project the way it was done.

The number of elements included will vary depending on program design, with staff interviews typically informing the list. The more typical elements programs use to influence customer decision-making include information; incentives or rebates; interaction with program staff (technical assistance); interaction with program proxies, such as members of a trade ally network; building audits or assessments; and financing.

The program's influence score is equal to the maximum influence rating for any program element rather than, for example, the mean influence rating. The rationale is that if any given program element had a great influence on the respondent's decision, the program itself had a great influence, even if other elements had less influence.

Table E-3. Influence Ratings for Rebates and Marketplace - Downstream

Measure	Influence Element	Not at all Influential						Extremely Influential	Don't know
All solar and non-solar	PECO marketing and educational material	0	1-2	3-4	5-6	7-8	9-10	NA	
	PECO's rebate or incentive for the project	0	1-2	3-4	5-6	7-8	9-10	NA	
	An online or television advertisement from PECO	0	1-2	3-4	5-6	7-8	9-10	NA	
	Recommendation from PECO program staff	0	1-2	3-4	5-6	7-8	9-10	NA	
	Recommendation from an installation contractor	0	1-2	3-4	5-6	7-8	9-10	NA	

Source: SWE Framework

High program influence and free ridership have an inverse relationship—the greater the program influence, the lower the free ridership, as Table E-4 shows.

Table E-4. Influence Scoring for Rebates and Marketplace - Downstream

Program Influence Rating	Influence Score
0 – not at all influential	0.50
1-2	0.44
3-4	0.38
5-6	0.25
7-8	0.13
9-10 – extremely influential	0.00
Don't know	0.25

Note: Guidehouse received approval from the SWE to shift from a 1-5 scale in Phase III to a 0-10 scale in Phase IV to align with the process evaluation best practices.

Source: SWE Framework

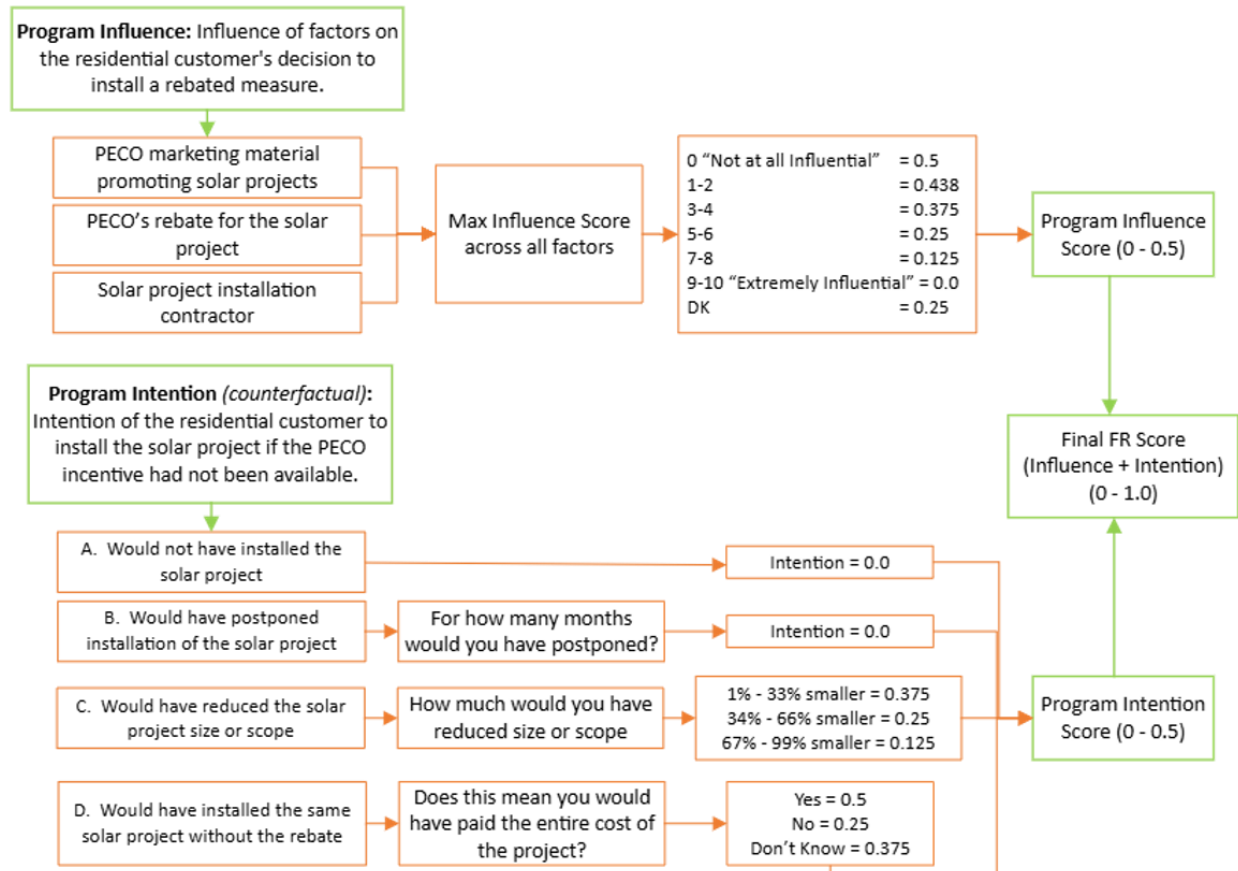
Total Free Ridership Score

Total free ridership is the sum of the intention and influence components, resulting in a score ranging from 0.00 to 1.00.

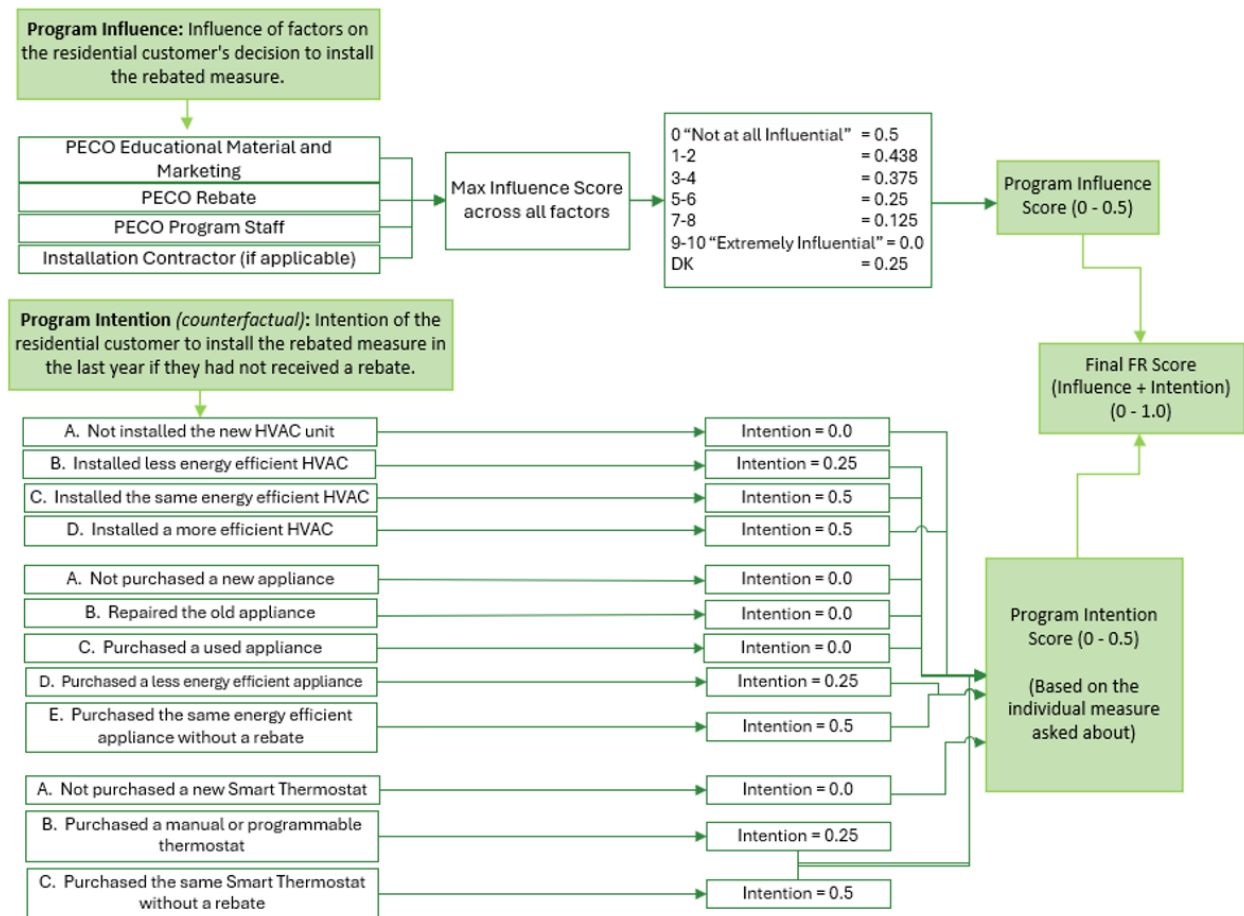
Free Ridership Algorithm

Figure E-1 and Figure E-2 detail the algorithms used to estimate free ridership using self-reported survey responses for the Downstream delivery pathway.

Figure E-1. Free Ridership Algorithm – Downstream Pathway – Solar



Source: Guidehouse analysis

Figure E-2. Free Ridership Algorithm – Downstream Pathway – Non-Solar


Source: Guidehouse analysis

Online Marketplace

Intention

Intention is assessed through a few brief questions used to determine if the purchase of the energy efficient equipment likely would have differed if the respondent had not received the program assistance through the online marketplace. Guidehouse adjusted the counterfactual intention questions for the Marketplace delivery channel to align with the program design. The question of "what you would have done without the program" refers to "what would you have done if the online marketplace was not available," so options could include purchasing the equipment through another retail outlet.

Measure-level intention questions in the PY17 research include:

Smart Thermostats

- Without the online marketplace, would not have purchased a smart thermostat
- Without the online marketplace, would have postponed purchasing a smart thermostat

- Without the online marketplace, would have purchased a manual or programmable thermostat elsewhere
- Without the online marketplace, would have purchased a smart thermostat elsewhere

Advanced Power Strips

- Without the online marketplace, would not have purchased a smart power strip
- Without the online marketplace, would have postponed purchasing a smart power strip
- Without the online marketplace, would have purchased a normal power strip elsewhere
- Without the online marketplace, would have purchased a smart power strip elsewhere

Air Purifiers and Dehumidifiers

- Without the online marketplace, would not have purchased an energy efficient appliance
- Without the online marketplace, would have postponed purchasing an energy efficient appliance
- Without the online marketplace, would have purchased an energy efficient appliance elsewhere

The first outcome (not purchased the equipment) indicates zero FR and thus results in an intention score of 0.00. The final outcome (would have purchased the same equipment elsewhere) indicates total FR, or an intention score of 0.50. The other options indicate partial FR and are scored according to the downstream algorithm. Furthermore, the intention battery probed customers about the plans they had that day for purchasing the energy efficient equipment, and whether they had the item in their digital shopping cart prior to learning about the PECO rebate.⁵⁹

Scoring of Intention Assessment in Rebates and Marketplace - Marketplace

Table E-5 summarizes the possible response combinations to the questions described above and the intention score assigned to each unique combination.

⁵⁹ Guidehouse used the responses to the plans reported by survey respondents to resolve inconsistent responses in free ridership scores between intention and influence and to determine the level of impact the program had on the online purchasing decision. Three respondents required this consistency step check to estimate free ridership.

Table E-5. Intention Scoring for Rebates and Marketplace - Marketplace

Measure	Question	Response	Intention Score
Smart Thermostat	FR3. Which of the following statements most closely describes what you would have done if you had not purchased the Smart Thermostat on PECO Marketplace?	Would not have purchased a smart thermostat	0.0
		Would have postponed purchasing a smart thermostat	0.0
		Would have purchased a manual or programmable thermostat elsewhere	0.25
		Would have purchased a smart thermostat elsewhere	0.5
Smart Power Strip	FR3. Which of the following statements most closely describes what you would have done if you had not purchased the Smart Power Strip on PECO Marketplace?	Not installed the measure	0.0
		Installed a less energy efficient measure	0.25
		Installed a measure with the same energy efficiency	0.5
		Installed a more energy efficient measure	0.5
Air Purifier / Dehumidifier	FR3. Which of the following statements most closely describes what you would have done if you had not purchased the Air Purifier or Dehumidifier on PECO Marketplace?	Not installed the measure	0.0
		Installed a less energy efficient measure	0.25
		Installed a measure with the same energy efficiency	0.5
		Installed a more energy efficient measure	0.5

Source: Guidehouse analysis

Influence

Program influence may be assessed by asking the respondent how much influence—from 0 (not at all influential) to 10 (extremely influential)—various program elements had on the decision to do the project the way it was done. The number of elements included will vary depending on program design. Logic models, program theory, and staff interviews typically inform the list. The more typical elements programs use to influence customer decision-making include information; incentives or rebates; interaction with program staff (technical assistance); interaction with program proxies, such as members of a trade ally network; building audits or assessments; and financing. Factors listed in Table E-6 apply to the Marketplace pathway.

The program's influence score is equal to the maximum influence rating for any program element rather than, say, the mean influence rating. The rationale is that if any given program element had a great influence on the respondent's decision, then the program itself had a great influence, even if other elements had less influence.

Table E-6. Influence Ratings for Rebates and Marketplace - Marketplace

Measure	Influence Element	Not at all Influential					Extremely Influential	Don't know
Marketplace equipment	Rebate or discount being offered from PECO	0	1-2	3-4	5-6	7-8	9-10	NA
	PECO marketing email or bill insert	0	1-2	3-4	5-6	7-8	9-10	NA
	Google search directing you to the PECO Marketplace	0	1-2	3-4	5-6	7-8	9-10	NA
	PECO website	0	1-2	3-4	5-6	7-8	9-10	NA
	PECO advertising (online or television)	0	1-2	3-4	5-6	7-8	9-10	NA

Measure	Influence Element	Not at all Influential					Extremely Influential	Don't know
	Rebate or discount being offered from PECO	0	1-2	3-4	5-6	7-8	9-10	NA

Source: SWE Framework

High program influence and free ridership have an inverse relationship—the greater the program influence, the lower the free ridership, as Table E-7 shows.

Table E-7. Influence Scoring for Rebates and Marketplace - Marketplace

Program Influence Rating	Influence Score
0 – not at all influential	0.50
1-2	0.44
3-4	0.38
5-6	0.25
7-8	0.13
9-10 – extremely influential	0.00
Don't know	0.25

Note: Guidehouse received approval from the SWE to shift from a 1-5 scale in Phase III to a 0-10 scale in Phase IV to align with the process evaluation best practices.

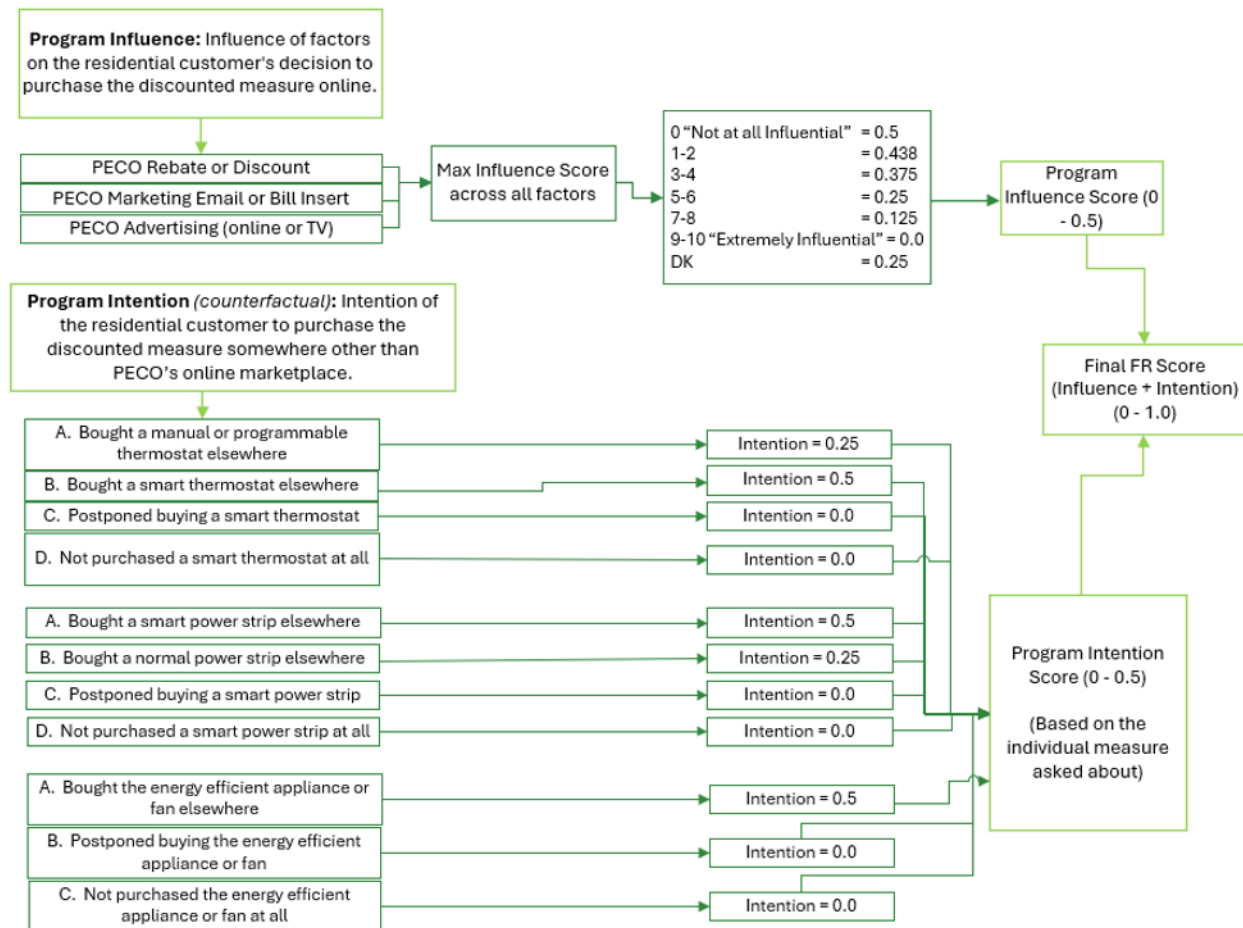
Source: SWE Framework

Total Free Ridership Score

Total free ridership is the sum of the intention and influence components, resulting in a score ranging from 0 to 1.00.

Free Ridership Algorithm

Figure E-3 details the algorithms used to estimate free ridership using self-reported survey responses for the Marketplace delivery pathway.

Figure E-3. Free Ridership Algorithm – Rebates and Marketplace – Marketplace


Source: Guidehouse analysis

Free Ridership Consistency Check

Guidehouse also added consistency checks to confirm that the reported intention did not conflict with additional information that the respondent provided. Consistency check questions included:

- Please think about the day you made your purchase on the PECO Marketplace. Before you visited the PECO Marketplace, did you already have specific plans to buy the product that day?⁶⁰
- Which of the following statements most closely describes your plans to buy the product that day?
 - I already had the item in an online shopping cart with another retailer before learning of the PECO rebate
 - I had compared the price on the PECO Marketplace, including the rebate, with another online site (Amazon, etc.)

⁶⁰ The survey piped in the specific product purchased by the respondent through the Marketplace.

- I had compared the price on the PECO Marketplace, including the rebate, with a retail store (Lowes, Home Depot, Lowes.com, etc.)
- I knew I was going to purchase the product(s) that day, I just wasn't sure where
- Other, please describe

E.1.2.2 Estimating Participant Spillover

The participant spillover battery of questions assesses, for each participant, the number and description of non-incentivized energy efficient equipment installed since program participation, and the program's influence on the participants' decision to install those technologies. This section summarizes the spillover approach for the Residential Rebates and Marketplace component in PY17.

Assessment of Program Influence on Residential Measures

Participants in the Downstream and Marketplace pathways of the Rebates and Marketplace component received spillover questions asking about the level of influence the program component had on their decision to install additional, non-incentivized equipment. Guidehouse only asked the influence question once to cover all the additional energy efficient equipment installed, and assigned a value that determines what proportion of the measure's savings are attributed to the program:

- A rating of 8, 9, or 10 = 1.0 (full savings attributed to the program)
- A rating of 3, 4, 5, 6, or 7 = 0.5 (half of the savings attributed to the program)
- A rating of 0, 1, or 2 = 0 (no savings attributed to the program)

Solar survey respondents reported air sealing windows and doors and purchasing an energy efficient washer and dryer. Other downstream pathway participants reported purchasing efficient appliances such as washers, dryers, dishwashers, and refrigerators; efficient hot water heaters and other water saving devices; and higher efficient heating, ventilation, and air conditioning (HVAC) equipment. They also reported upgrading their building envelope by sealing air leaks and installing additional insulation. Marketplace participants reported purchasing efficient refrigerators, new windows, and tuning up their HVAC systems.

Assessment of Energy Savings for Residential Spillover

Where applicable, the savings for each additional measure installed were calculated per the TRM for a rebated measure installed through the program. For partially deemed measures, the SWE and Guidehouse developed conservative working assumptions for any required inputs (e.g., square footage of home or R-value improvement) or identified average verified savings for such measures.

Guidehouse first calculated spillover savings for each spillover measure reported as the product of the measure savings, number of units, and influence score:

$$\text{Measure SO} = \text{Measure Savings} * \text{Number of Units} * \text{Program Influence}$$

For each of the above categories, Guidehouse completed the following tasks:

- Totaled the savings associated with each program participant, to give the overall participant spillover savings.

$$\text{Participant SO} = \sum \text{Measure SO}$$

- Multiplied the mean participant spillover savings for the participant sample by the total number of participants to yield an estimated total participant spillover savings for the program.

$$\sum \text{Participant SO (population)} = ((\sum \text{Participant SO (sample)}) / (\text{Sample } n)) \times \text{Population } N$$

- Divided that total savings by the total program savings to yield a participant spillover percentage:

$$\% \text{ Participant SO} = ((\sum \text{Participant SO (population)}) / (\text{Program Savings})) \times 100$$

E.1.2.3 Estimating the NTGR

Guidehouse estimated the final NTGR score using Equation E-1.

Equation E-1. NTG Equation

$$NTG = 1 - \text{Free Ridership} + \text{Spillover}$$

Where:

<i>Free Ridership</i>	The estimated savings that would have occurred even if the program did not exist
<i>Spillover</i>	The estimated savings occurring outside of the program but directly influenced by the program

E.1.3 Process Evaluation

Residential Rebates and Marketplace process evaluation activities and findings are discussed in Section 3.1.5.

E.2 Appliance Recycling (Market-Rate and IE)

The Appliance Recycling component focuses on recycling low-capacity refrigerators (“mini-fridges”) and freezers, dehumidifiers, and window or RAC units responsibly. The component serves both market-rate and IE customers. According to the Phase IV EE&C plan,⁶¹ this component is planned to account for 16% of Residential EE Program energy savings, 16% of Residential EE Program demand savings, 13% of Income-Eligible EE Program energy savings, 14% of Income-Eligible EE Program demand savings, 3% of total portfolio energy savings, and 3% of total portfolio demand savings. ARCA implemented the Appliance Recycling component at the beginning of Phase IV. The program has switched partners and now works with eForce. eForce holds local drop-off events and PECO incentivizes customers to recycle their low-

⁶¹ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

capacity refrigerators (“mini-fridges”) and freezers, dehumidifiers, and window AC units by paying for their drop-off fee.

The same CSP runs a separate program known as LIURP, similar to the Single-Family Income-Eligible program component, which is not funded through Act 129. Customers from LIURP may have received certain measures through the Single-Family Income-Eligible component. When LIURP participants receive measures funded through Act 129, they are included in the evaluation activities, and the measure savings are fed into the Single-Family Income-Eligible results. LIURP Refrigerator replacements with recycling funded through Act 129 are also included in evaluation activities and the measure savings fed into the Appliance Recycling Income-Eligible results.

E.2.1 Gross Impact Evaluation

E.2.1.1 Methodology

Guidehouse conducted two activities to verify savings for this component: a tracking database analysis for all measures outlined in the PA TRM⁶² and latest IMPs using a combination of TRM default values and EDC-provided data, and online surveys to verify characteristics of recycled equipment.

Table E-8 illustrates the factors that led to variation between the reported and adjusted database savings and impacted the observed realization rates reported in Section 3.1.2.

Table E-8. Detailed Tracking Database Findings for Appliance Recycling

Measure	Percentage of Residential ¹ Energy Savings	Percentage of Income-Eligible ² Energy Savings	Tracking Database Energy Ratio	Tracking Database Demand Ratio	Reason for Adjustment
Low-Capacity Refrigerators and Freezers	0.1%	<0.1%	0.79	0.79	Reported savings use a custom PART _{USE} factor from a research study that targeted full-size refrigerators and a replacement/pick-up program delivery design different from the current component’s low-capacity units and drop-off design.
Refrigerator Recycling	NA	0.6%	0.89	0.89	Values provided in the tracking data and deemed TRM values result in tracking database adjusted savings that differ from reported savings.

¹ Percentage of Residential Energy Savings is the percentage of total Residential Program energy savings that each of these measures represents.

² Percentage of Income-Eligible Energy Savings is the percentage of total Income-Eligible Program energy savings that each of these measures represents.

Source: Guidehouse analysis

⁶² Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

The online survey revealed one primary finding that was applicable to all measure types: A significant portion of survey respondents indicated that the equipment being recycled was not functioning when it was recycled. Additionally, and specific to low-capacity refrigerators and freezers, the survey found a variety of types of equipment being recycled. For speed and simplicity during drop-off events and reporting, the CSP had reported all low-capacity refrigeration equipment to be the same type. Table E-9 discusses these findings and verification ratios by measure type that affected the observed realization rates reported in Section 3.1.2.

Table E-9. Detailed Survey Findings for Appliance Recycling

Measure	Energy Verification Ratio	Demand Verification Ratio	Reason for Adjustment
Dehumidifier Retirement	0.34	0.34	35% of respondents that knew whether their equipment was functioning reported that their equipment was working. 65% reported that their equipment was not functioning when it was recycled.
Low-Capacity Refrigerator and Freezer Retirement	0.46	0.46	54% of respondents that knew whether their equipment was functioning reported that their equipment was working. 46% reported that their equipment was not functioning when it was recycled. Additionally, most survey respondents reported that their Low-Capacity Refrigerator was of a slightly different type than the reported type, resulting in slight changes to deemed UEC values.
Room AC Retirement	0.78	0.78	70% of respondents that knew whether their equipment was functioning reported that their equipment (79% of equipment) was working. 30% reported that their equipment (21% of equipment) was not functioning when it was recycled.

Source: Guidehouse analysis

E.2.1.2 Sampling

As Table E-10 presents, Guidehouse stratified based on measure type, as described in the Sample Design Memo.⁶³ The drop-off events are open to all, and all PECO customers are eligible for the incentive covering the fee. There is no distinction in treatment, advertising, or incentives between market-rate and income-eligible customers, so the market-rate and income-eligible populations were combined for sampling and evaluation. Overall, Guidehouse exceeded the sample response rate as a result of higher than expected survey participation across all strata.

⁶³ PECO, PY17 Residential and IE Impact Sample Design Memo FINAL, dated January 21, 2026.

Table E-10. Appliance Recycling Sample Measure Count

Stratum	Target Count	Achieved Count
Dehumidifier Retirement	15	69
Mini-Fridge Retirement	13	14
Room AC Retirement	14	38
Total Sampled Projects¹	42	121

Source: Guidehouse analysis

E.2.2 Net Impact Evaluation

Guidehouse estimated NTG for the Residential Appliance Recycling program component in PY17 by conducting online surveys with residential customers who dropped off functioning small appliances recycling drop-off events. The team deviated from the SWE guidance defined in the Phase IV Evaluation Framework⁶⁴ due to the changes in delivery of the Appliance Recycling program in PY17 and the measures eligible for recycling. Guidehouse worked with the SWE to develop an updated evaluation approach for the Appliance Recycling program component based on how it was being delivered. This section describes Guidehouse's approach to estimating free ridership and where deviations from the Evaluation Framework occur.

E.2.2.1 Estimating Free Ridership

Appliance recycling programs typically offer some mix of incentives and free pick-up for the removal of old-but-operable refrigerators, freezers, or RACs.⁶⁵ These programs are designed to encourage the consumer to:

- Discontinue the use of secondary or inefficient appliances
- Relinquish appliances previously used as primary units when they are replaced (rather than keeping the old appliance as a secondary unit)
- Prevent the continued use of old appliances in another household through a direct transfer (giving it away or selling it)

The nature of the Appliance Recycling program requires a unique approach to estimating free ridership, and ultimately, net savings. Free ridership is based on the participants' anticipated plans had the program not been available—a free rider is classified as one who would have removed the unit from service irrespective of the program. Net savings for the Appliance Recycling program is therefore based on participants' anticipated continued operation of the appliance within their home or transferred to another home (either directly or indirectly).

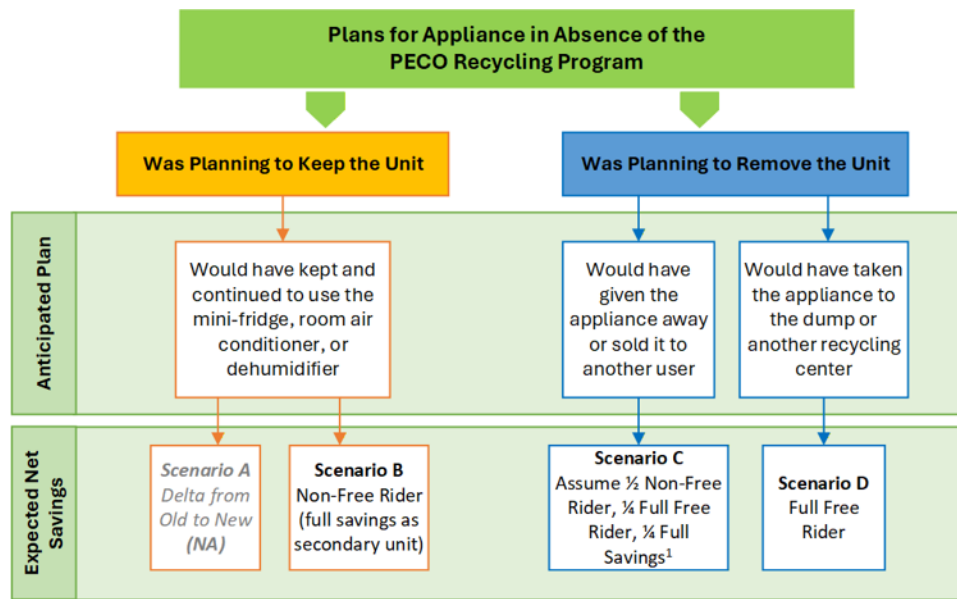
The general approach to estimating net savings for the Appliance Recycling program is a several-step process to segment the participants into different groups, each with unique savings attributable to them. Participants should first be classified as either keepers or removers. The keeper segment, defined as those who were planning on keeping the unit, should be further segmented into groups based on whether they replaced the unit. The remover segment, defined

⁶⁴ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁶⁵ PECO's Appliance Recycling program shifted the eligible appliance mix to include operable small capacity mini-refrigerators, RACs, dehumidifiers, and air purifiers.

as those who were planning on removing the unit, should be further segmented into groups based on whether the unit would have continued operating or been permanently removed from service. Each respondent is then assigned a net savings value, and overall program net savings is calculated in aggregate across the sample population. Figure E-4 shows a simple flow chart of how the net savings are derived for the Appliance Recycling program.

Figure E-4. Diagram for Determining Net Savings



¹ Guidehouse is not comparing the incremental savings between the recycled and replacement units and therefore the ¼ participant group in Scenario C receiving this delta in the original Appliance Recycling NTG algorithm will get full savings and be considered non-free riders in the new algorithm.

Source: Guidehouse analysis

Primary versus Secondary Appliances

The guidance in the Evaluation Framework⁶⁶ first attempts to classify the recycled appliance as either the primary or secondary unit in the home, to better estimate the deemed energy savings attributable to the program. However, due to the nature of the eligible measures in PECO's current Appliance Recycling program—mini-refrigerators, RACs, and dehumidifiers—Guidehouse does not see a clear distinction between primary and secondary units and treats all recycled appliances as secondary.

Classifying the Participant as Keeper or Remover

The second step in the Evaluation Framework,⁶⁷ and followed here in the PY17 methodology, is to classify the recycled appliance as either a keeper or remover using a counterfactual free

⁶⁶ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁶⁷ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

ridership battery of questions. Question 1 shows the counterfactual used in the PY17 methodology, which deviates slightly from the guidance in the Evaluation Framework.⁶⁸

1. If PECO had not covered the drop-off fee for your recycled unit at the recycling center that day, would you still have gotten rid of it that day, gotten rid of it within the next year, or kept it for at least another year?
 - a. Would have gotten rid of it that day and paid the recycling fee myself [Scenario D – Full Free Rider]
 - b. Would have gotten rid of it at some point within the next year [Remover – additional context needed]
 - c. Would have kept it for at least another year [Keeper - additional context needed]

Classifying the Status of the Keeper

The keeper segment, as discussed previously, would be assigned to those who answered question 1 above as “c. would have kept it for at least another year”. The keeper segment is not qualified as free riders, assuming in absence of the program their appliances would have continued operating normally. The Evaluation Framework requires the keeper group to be further segmented into groups based on whether they replaced their unit to help define the deemed savings value assigned. Again, Guidehouse assumes the load, use, or purpose performed by the types of measures eligible for PECO’s program continue to be addressed by other equipment. Therefore, the team will not probe further into the keeper group and classify them all as non-free riders.

Classifying the Status of the Remover

The remover segment, as discussed previously, would be assigned to those who answered question 1 above as option a or b. The remover segment is potentially qualified as free riders, assuming in absence of the program their appliance would still have been removed from service. Those who answer question 1 with option a will skip any further free ridership questions and be included in scenario D. Respondents answering question 1 with option b will be further segmented into groups based on whether the unit would have continued operating or been permanently removed from service, allowing for a more accurate estimate of savings attributable to the program. The PY17 methodology will ask the following questions:

2. How would you have gotten rid of the unit?
 - a. Sell it
 - b. Given it away for free
 - c. Take it to a dump
 - d. Take it to a different recycling center for drop-off
 - e. Other
 - f. Don’t know

With follow up questions for option a:

3. When would you have sold it?
 - a. Within a month
 - b. 1-6 months later

⁶⁸ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

- c. 6-12 months later
- d. More than a year from when I recycled it
- e. Other
- f. Don't know

As well as:

- 4. Who would you have sold it to?
 - a. Commercial appliance dealer
 - b. Friend, family or someone responding to an ad
 - c. Other
 - d. Don't know

In the original guidance in the Evaluation Framework,⁶⁹ selling the unit to a dealer requires it to be less than 10 years old. This requirement is not applicable to the types of measures offered through PECO's current appliance recycling program and therefore the evaluation team did not probe into the age of the recycled units.

Follow up questions for question 2 option b will include:

- 5. Would you have given the unit to:
 - a. Charitable organization
 - b. A private party (like a friend, relative or by running an ad)
 - c. Other
 - d. Don't know
- 6. When were you planning on giving away your appliance?
 - a. Within a month from when it was recycled
 - b. 1-6 months later
 - c. 6-12 months later
 - d. More than a year from when I recycled it
 - e. Other
 - f. Don't know

If the respondent was planning on transferring the unit by selling or giving it away, then the evaluation team can assume the unit would likely continue operating somewhere on the grid and therefore the respondents are not classified as free riders. The savings attributable to these participants are the most difficult to estimate, because this scenario (Scenario C) is attempting to estimate what the prospective buyer of the used appliance did in absence of finding the program-recycled-unit in the marketplace (i.e., the program took the unit off the grid, so the prospective purchaser faced, in theory, a smaller market of used appliances). The Evaluation Framework⁷⁰ recommends, and Guidehouse also follows, using a composite value for this scenario, assuming half of the respondents will receive full savings (assuming unit would have served as secondary unit for a different household), and a quarter of the respondents receive zero savings (assuming different household was able to find alternative similar old unit). The

⁶⁹ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁷⁰ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

remaining quarter of the respondents in the original guidance from the Evaluation Framework⁷¹ would receive the delta between a new and old unit (non-ENERGY STAR). In other words, the remaining quarter assumes that the would-be second-hand buyer will buy a new unit instead of the old program-recycled unit. However, as the nature of the measures offered through PECO's program do not have clear incremental savings between the new and old units, and these measure types would be considered secondary units, the team assumes this last quarter to also be non-free riders and receive full savings.

If the respondent was planning on removing the unit from service, either by recycling it or hauling it to the dump, they are classified as full free riders and not allocated any savings (scenario D, net savings = 0).

Estimating Net Savings

Guidehouse assigned net savings individually to each respondent using the deemed savings values established by the impact team and adjust the savings based on their assigned Scenario B – D.

E.2.3 Process Evaluation

As described in the Phase IV Evaluation Plan⁷² approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

E.3 In-Home Assessment (Market-Rate)

The In-Home Assessment component provides in-home or virtual assessments and comprehensive audits to educate customers; install energy efficient measures; identify additional, potentially larger, energy efficiency opportunities (such as insulation and air sealing); and encourage greater participation in other Residential EE Program components. There are two program pathways: direct install (DI) and rebated measures (REB). According to the Phase IV EE&C Plan,⁷³ this component is planned to account for 13% of Residential EE Program energy savings, 9% of Residential EE Program demand savings, 2% of total portfolio energy savings, and 1% of portfolio demand savings. CLEAResult implements the In-Home Assessment component.

E.3.1 Gross Impact Evaluation

E.3.1.1 Methodology

Guidehouse conducted a tracking database analysis. As part of the tracking database analysis, Guidehouse verified algorithms used to estimate reported gross savings at the measure level

⁷¹ Pennsylvania Statewide Evaluator, *Evaluation Framework for Pennsylvania*, https://www.puc.pa.gov/media/1584/swe-phaseiv_evaluation_framework071621.pdf.

⁷² Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁷³ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM measures were passed through this process with no adjustment and adjusted database savings for these measures equaled the reported savings.

Table E-11 illustrates the factors that led to variation between the reported and adjusted database savings and impacted the observed realization rates reported in Section 3.1.2.

Table E-11. Detailed Tracking Database Findings for In-Home Assessment

Measure	Percentage of Residential Energy Savings ¹	Tracking Database Energy Ratio	Tracking Database Demand Ratio	Reason for Adjustment
Water Heater Pipe Insulation	1.0%	2.65	2.80	A number of measures report a deemed energy savings value of 3.087 kWh/ft and a varying demand savings value, most often 0.0002333 kW/ft, instead of the TRM-deemed values of 8.82 kWh/ft and 0.00071 kW/ft, respectively.
Ceiling/Attic, Wall, Floor, and Rim Joist Insulation	0.5%	1.02	1.02	Within these measure types, the Guidehouse team is unable to replicate reported savings for some ceiling, wall, basement wall, and crawl space wall insulation measures using the reported parameters. While the tracking data reports R_{base} and R_{ee} values, the reported savings appear to use the TRM-deemed R_{base} and R_{ee} values for ceiling and wall insulation measures, respectively.
Basement or Crawl Space Wall Insulation	<0.1%	1.23	3.61	
Residential Air Sealing	0.3%	1.12	1.00	The Guidehouse team is unable to replicate the reported savings using the reported parameters.
Air Source Heat Pumps	<0.1%	0.93	1.00	The Guidehouse team is unable to replicate the reported savings using the reported parameters.
ECM Circulation Fans	<0.1%	1.05	1.06	Reported savings use an ECM_{kW} reduced power factor of 0.11 instead of the TRM-deemed 0.116

¹ Percentage of Residential Savings is the percentage of total Residential Program energy savings that each of these measures represent.

Source: Guidehouse analysis

Guidehouse did not conduct additional component-specific impact verification activities in PY17 and instead applied the energy and demand verification ratios based on evaluation activities in PY16 to the result of the tracking database analysis to arrive at final PY17 gross impact results.

E.3.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁷⁴ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

E.3.3 Process Evaluation

Guidehouse did not conduct an in-depth process evaluation for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

E.4 New Construction (Market-Rate)

The Residential New Construction component supports the construction of more comfortable, durable, and energy efficient homes compared with those simply built to code. This component works with Home Energy Rating System (HERS) raters and builders to create more energy efficient homes during the design and construction phases. According to the Phase IV EE&C Plan,⁷⁵ this component is planned to account for 6% of Residential EE Program energy savings, 22% of Residential EE Program demand savings, 1% of total portfolio energy savings, and 3% of total portfolio demand savings. PSD implements the New Construction component.

E.4.1 Gross Impact Evaluation

E.4.1.1 Methodology

In PY17, Guidehouse conducted a tracking database analysis for all measures outlined in the PA TRM and latest IMPs using a combination of TRM default values and EDC-provided data. As part of the tracking database analysis, Guidehouse verified algorithms used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. While the TRM and more recent IMP updates include algorithms, all calculations require custom software-calculated input values. This makes automated review using systematic deemed parameters impossible. All Residential New Construction measures were passed through the Tracking Data Analysis process with no adjustment and adjusted savings for these measures equaled the reported savings.

Guidehouse did not conduct additional component-specific impact verification activities in PY17 and instead applied the energy and demand verification ratios based on evaluation activities in PY15 to the result of the tracking database analysis to arrive at final PY17 gross impact results.

⁷⁴ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁷⁵ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 20, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

E.4.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁷⁶ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

E.4.4 Process Evaluation

As described in the Phase IV Evaluation Plan⁷⁷ approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

E.5 Multifamily (Market-Rate and IE)

The Multifamily component provides analysis, direct install measures, and larger, investment-level upgrades to improve the energy efficiency of multifamily buildings, both in units and common areas. The component serves buildings with market-rate customers, IE customers, and a mix of residential and commercial customer types. According to the Phase IV EE&C Plan,⁷⁸ this component is planned to account for 11% of Residential EE Program energy savings, 9% of Residential EE Program demand savings, 21% of Income-Eligible EE Program energy savings, 16% of Income-Eligible EE Program demand savings, 3% of total portfolio energy savings, and 2% of total portfolio demand savings. CMC implements the Multifamily component for both the residential and IE customers.

E.5.1 Gross Impact Evaluation

E.5.1.1 Methodology

In PY17, Guidehouse conducted a tracking database analysis for all measures outlined in the PA TRM and latest IMPs using a combination of TRM default values and EDC-provided data. As part of the tracking database analysis, Guidehouse verified algorithms used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM measures were passed through this process with no adjustment and adjusted savings for these measures equaled the reported savings. The tracking data analysis found no notable findings, with all TDR near 1.00.

Guidehouse did not conduct additional component-specific impact verification activities in PY17 and instead applied the energy and demand verification ratios based on evaluation activities in PY16 to the result of the tracking database analysis to arrive at final PY17 gross impact results.

⁷⁶ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁷⁷ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁷⁸ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

E.5.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁷⁹ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

E.5.3 Process Evaluation

As described in the Phase IV Evaluation Plan⁸⁰ approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

E.6 Single-Family and Long-Term Savings (IE)

The Single-Family Income-Eligible component improves the energy efficiency of single-family homes for IE customers to help reduce their electric bills and make their homes more comfortable. This program, which is known to customers as the Free Energy Checkup, features an in-depth inspection of the home, energy usage analysis and recommendations, direct install measures, and an energy education session. The home visit is followed by a custom report and education materials.

The same CSP runs a similar program known as LIURP, which is not funded through Act 129. Customers from LIURP may have received certain measures through the Single-Family Income-Eligible component. When LIURP participants receive measures funded through Act 129, they are included in the evaluation activities, and the measure savings are fed into the Single-Family Income-Eligible results. LIURP Refrigerator replacements with recycling funded through Act 129 are also included in evaluation activities and the measure savings fed into the Appliance Recycling Income-Eligible results.

According to the Phase IV EE&C Plan,⁸¹ the Single-Family Income-Eligible component is planned to account for 58% of Income-Eligible EE Program energy savings, 65% of Income-Eligible EE Program demand savings, 3% of total portfolio energy savings, and 3% of portfolio demand savings. CMC implements the Single-Family component.

The Long-Term Savings component is implemented as an overlay service through the Single-Family component to encourage the installation of long-term, comprehensive measures. The Long-Term Savings component measures include insulation, air sealing, duct sealing, heat pumps, ACs, thermostats, window repairs, and residential heat pump water heaters and solar water heaters. According to the Phase IV Plan, this component is planned to account for 7% of Income-Eligible EE Program energy savings, 5% of Income-Eligible EE Program demand savings, 0.4% of total portfolio energy savings, and 0.3% of total portfolio demand savings. CMC implements the Long-Term Savings component.

⁷⁹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁸⁰ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁸¹ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

E.6.1 Gross Impact Evaluation

E.6.1.1 Methodology

Guidehouse conducted a tracking database analysis for this component for all measures outlined in the PA TRM and the latest IMPs using a combination of TRM default values and EDC-provided data. Table E-12. illustrates the factors that led to variation between the reported and adjusted database savings and affected the observed realization rates reported in Section 3.2.2.

Table E-12. Detailed Tracking Database Findings for Single-Family

Measure	Percentage of Income-Eligible Energy Savings ¹	Tracking Database Energy Ratio	Tracking Database Demand Ratio	Reason for Adjustment
Low Flow Faucet Aerators	8.5%	0.82	0.82	Reported savings for some low flow faucet aerators distributed via mailed kits report a specific Kitchen space type where the aerators are assumed to be installed and use that space type to inform inputs for kit delivery rows. Guidehouse and SWE use inputs that align with the space type Unknown for all kit delivery measures.
Ductless Heat Pumps	2.9%	1.05	0.82	Values provided in the tracking data and deemed TRM values result in tracking database adjusted savings that differ from reported savings.
Ceiling/Attic, Wall, Floor and Rim Joist Insulation	0.9%	0.99	0.90	Within these measure types, the Guidehouse team is unable to replicate reported savings for some ceiling and wall insulation measures using the reported parameters. While the tracking data reports R _{base} and R _{ee} values, the reported savings appear to use the TRM-deemed R _{base} and R _{ee} values for ceiling and wall insulation measures, respectively.
Residential Air Sealing	0.3%	1.60	1.00	The Guidehouse team is unable to replicate the reported savings using the reported parameters.

¹ Percentage of Income-Eligible Energy Savings is the percentage of total Income-Eligible Program energy savings that each of these measures represents.

Source: Guidehouse analysis

Guidehouse did not conduct additional component-specific impact verification activities in PY17 and instead applied the energy and demand verification ratios based on evaluation activities in PY16 to the result of the tracking database analysis to arrive at final PY17 gross impact results.

E.6.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁸² approved by the SWE, Guidehouse does not conduct NTG research for IE components.

E.6.3 Process Evaluation

As described in the Phase IV Evaluation Plan⁸³ approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

⁸² Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁸³ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Appendix F. Residential and Income-Eligible HER Programs

This appendix details the evaluation methods and activities Guidehouse deployed in PY17 for the Residential and Income-Eligible HER Programs. According to the Phase IV EE&C Plan,⁸⁴ these programs are planned to account for 8% of total portfolio energy savings and 9% of total portfolio demand savings. Refer to Sections 3.3 and 0 and Appendix B for key evaluation findings, results, and conclusions for these components.

F.1 Gross Impact Evaluation

The HER Gross Impact Evaluation details are discussed in Sections 3.3 and 0 and 1.1.1.1 Appendix A.

F.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan⁸⁵ approved by the SWE, Guidehouse does not conduct NTG research for IE components.

F.3 Process Evaluation

As described in the Phase IV Evaluation Plan⁸⁶ approved by the SWE, Guidehouse did not conduct in-depth process activities for this program in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

⁸⁴ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

⁸⁵ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁸⁶ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Appendix G. Non-Residential EE Program

This appendix details the evaluation sample design, methods, and activities deployed in PY17 for select Non-Residential EE Program components. Refer to Section 0 for evaluation findings, results, and conclusions for these components.

G.1 Downstream Rebates

The Downstream Rebates component includes incentives for existing building retrofit projects with either deemed, partially deemed, or custom measures. Typical measures include lighting, VFDs, HVAC systems, motors, refrigeration, and controls. According to the Phase IV EE&C Plan,⁸⁷ this component is planned to account for 45% of Non-Residential EE Program energy savings, 48% of Non-Residential EE Program demand savings, 32% of total portfolio energy savings, and 36% of total portfolio demand savings. DNV implements the Downstream Rebates component.

G.1.1 Gross Impact Evaluation

G.1.1.1 Methodology

In the first step of the gross impact evaluation, Guidehouse conducted a tracking database analysis for all 952 projects from all 760 participants in the component.⁸⁸ This analysis used a combination of TRM default values and EDC-provided data for open variables. Guidehouse verified approaches, algorithms, and assumptions used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM based measures passed through this step with no adjustments, and the adjusted database savings for these measures equaled the reported savings.

In the second step, Guidehouse sampled projects for further data collection and analysis. Guidehouse conducted engineering desk reviews for all projects in the evaluation sample. The engineering desk reviews used project applications, project-specific analysis files and associated calculation sheets, measure invoices, measure specification sheets, construction plans, and other construction documents provided by PECO. Documentation included scanned files of hard copy forms as well as electronic files of CSP inspection reports, photos of installed measures, important emails, and memoranda. In the engineering desk review, Guidehouse reviewed all available project documentation to verify whether all assumptions used in measure savings calculations were supported by the project documentation and that the calculation methodology was correct.

Guidehouse supplemented engineering desk reviews with phone verifications, which Guidehouse assigned to projects per the Sample Design Memo⁸⁹ that was submitted to and approved by the SWE. Phone verifications consisted of interviews with customers about their

⁸⁷ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

⁸⁸ Participants are defined as the count of unique bill accounts.

⁸⁹ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

projects. Common discussion points included the quantities and type of each measure installed, the operating status of the measures, equipment nameplate data, operating schedules, a careful description of site conditions, and overall verification of the information contained in the project files. Guidehouse updated the measure savings calculations based on customer responses during the phone verifications as warranted.

Guidehouse conducted onsite verification for sampled projects per the Sample Design Memo.⁹⁰ Projects assigned an onsite visit first received an engineering desk review to create the Site-Specific Measurement and Verification Plan (SSMVP). The primary objective of site visits was to collect the data required by the TRM and the Phase IV Evaluation Framework. This data included verifying the quantities and type of each measure, equipment nameplate data, and operating schedules, and carefully describing the site conditions. Guidehouse verified this information through visual inspection of the measures and by interviewing the customers, and updated measure savings calculations as warranted based on verified information obtained onsite.

Guidehouse made every attempt to complete its verification efforts. Guidehouse made repeated attempts via email and phone calls to schedule site visits or complete phone interviews. For projects that were assigned a phone verification, Guidehouse converted the project to an engineering desk review only after making at least five attempts to call or email the customer in alignment with the Evaluation Plan.⁹¹ Twenty projects were converted to engineering desk review after Guidehouse exhausted all customer contact attempts.

Table G-1 shows the number of Downstream Rebates projects by evaluation method. Of the 952 completed projects, Guidehouse originally sampled 52 projects for additional data collection and analysis. An additional six census projects and large projects were added to the sample throughout the evaluation period resulting in a total of 58 sampled projects.

Table G-1. Downstream Rebates PY17 Project Count by Evaluation Method

Verification Level	Evaluation Target	Number of Projects Evaluated
Tracking Database Analysis	952	952
Engineering Desk Review Only	12	20
Phone Verification	12	13
Onsite Verification	28	25
Total Sampled Projects	52	58

Source: Guidehouse analysis

Twenty-eight projects surpassed the energy (kWh) savings thresholds set in Table 1-2 of the TRM,⁹² which requires site-specific data collection for enhanced evaluation rigor. Guidehouse and the SWE jointly considered four of these 28 projects as unverified for this PY17 report. For the remaining 24 projects, Guidehouse used site-specific information to verify the project savings, including metering data, end-use trend data, and trend data from building management systems. Guidehouse conducted site visits for 15 of the 24 projects that surpassed the savings

⁹⁰ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

⁹¹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

⁹² Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

threshold to gather site-specific information. Guidehouse remotely gathered site-specific information, such as trend data, for the other nine projects.

G.1.1.2 Sampling

Using tracking data from PY17, Guidehouse obtained the total number of projects and the total amount of energy savings in the population. With this project data, Guidehouse sampled at the project level for the impact evaluation activities in PY17 to bin projects into eight strata, as outlined in the PY17 Sample Design Memo.⁹³

Guidehouse first separated CHP projects into their own stratum. Then the sampling team separated solar projects into their own stratum. Next the sampling team separated municipal lighting projects into their own strata. Guidehouse then created a census stratum (Stratum 1 – Very High Impact Projects) for projects reporting more than 1,000 MWh of energy savings. Next, Guidehouse sorted all remaining projects by size and excluded all the smallest projects, which combine to make up the lowest 1.2% of total energy savings. Finally, Guidehouse divided the remaining population into three additional strata: those projects make up the top, middle, and lowest third of the total remaining energy savings.

Of the 58 Downstream Rebates projects evaluated:

- Fourteen were solar PV projects
- Thirteen included lighting or lighting control retrofits (four are unverified for PY17)
- Twelve were municipal lighting projects
- Ten included custom HVAC improvements, HVAC controls, or RCx
- Four were CHP projects
- Three were refrigeration projects
- Two were compressed air projects

The SWE sampled 15 total projects for its review. The SWE conducted an engineering desk review for all 15 projects.

G.1.2 Net Impact Evaluation

Guidehouse estimated NTG in PY17 by conducting online surveys with non-residential customers participating in the Non-Residential Downstream Rebates component installing solar projects. The team followed the guidance from the SWE for creating the NTG survey guide and conducting NTG research as defined in the Phase IV Evaluation Framework. This section summarizes the SWE guidance and how Guidehouse applied it to the Program.

G.1.2.1 Estimating Free Ridership

Guidehouse followed the SWE's recommendation of gathering feedback from participating customers on their intention to complete the solar projects if they did not receive PECO program assistance, and the influence the component had on their decision to complete the solar project

⁹³ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

this program year. The evaluation team asked specific survey questions to inform these two metrics as follows.

Intention

Intention, also known as the counterfactual, is assessed through a few brief questions used to determine how the upgrade or equipment replacement likely would have differed if the program had not been available. The initial question asks the respondent to identify with a limited set of options that best describe what most likely would have occurred without the program assistance.

The survey response options gathering feedback on intention in the PY17 Downstream Rebates component for solar projects include:

- Without the program, would not have installed any solar equipment
- Without the program, would have postponed installation of solar equipment
- Without the program, would have reduced the solar project size or scope
- Without the program, would have installed exactly the same solar equipment

The first (not installed any solar equipment) and second (would have postponed installation of solar equipment) outcomes indicate zero free ridership and thus result in an intention score of 0.00. The third (would have reduced the solar project size or scope) and fourth (would have installed exactly the same solar equipment) indicate partial free ridership and are scored according to the Downstream algorithm detailed in Figure G-2.

Scoring of Intention Assessment for Downstream Rebates

Table G-2 **Error! Reference source not found.** summarizes the possible response combinations to the questions described earlier and the intention score assigned to each unique combination.

Table G-2. Intention Scoring for Downstream Rebates - Solar

Measure	Question	Response	Intention Score
Solar	FRS1. What would your organization have done without the PECO solar incentive?	Would not have installed any solar equipment	0.0
		Without the program, would have postponed the installation of the solar project	0.0
		Would have reduced the solar project size or scope	Based on response to FRS3
		Would have installed exactly the same solar equipment	Based on response to FRS4
	FRS2. For how many months would your organization have postponed the project?	[Number of months]	[not scored]
	FRS3. How much would your organization have reduced the size, scope, or efficiency of the project?	Small reduction in size, scope, or efficiency (1% to 33% reduction)	0.375
		Moderate reduction in size, scope, or efficiency (34% to 66% reduction)	0.25

Measure	Question	Response	Intention Score
		Large reduction in size, scope, or efficiency (67%+ reduction)	0.125
		Don't know	0.25*
	FRS4. Does this mean your organization would have paid the entire cost of the solar installation without the PECO incentive?	Yes	0.50
		Don't know	0.375*
		No	0.25

* Represents the midpoint of possible values for this question.

Source: Guidehouse analysis

Influence

Program influence was assessed by asking the respondent how much influence—from 0 (not at all influential) to 10 (extremely influential)—various program elements had on the decision to conduct the solar project the way it was done.

The program's influence score is equal to the maximum influence rating for any program element rather than, for example, the mean influence rating. The rationale is that if any given program element had a great influence on the respondent's decision, the program itself had a great influence, even if other elements had less influence.

Table G-3. Influence Ratings for Downstream Rebates - Solar

Influence Element	Not at all Influential					Extremely Influential	Don't know
PECO's incentive for the solar project	0	1-2	3-4	5-6	7-8	9-10	NA
Recommendation from PECO program staff	0	1-2	3-4	5-6	7-8	9-10	NA
PECO Marketing materials promoting solar projects	0	1-2	3-4	5-6	7-8	9-10	NA
Solar project installation contractor	[factor not used in the free ridership influence score]						
The ability to receive credits for excess solar generation (i.e., net metering)	[factor not used in the free ridership influence score]						

Source: SWE Framework

High program influence and free ridership have an inverse relationship - the greater the program influence, the lower the free ridership, as Table G-4 shows.

Table G-4. Influence Scoring for Downstream Rebates - Solar

Program Influence Rating	Influence Score
0 – not at all influential	0.50
1-2	0.44
3-4	0.38
5-6	0.25
7-8	0.13
9-10 – extremely influential	0.00
Don't know	0.25

Note: Guidehouse received approval from the SWE to shift from a 1-5 scale in Phase III to a 0-10 scale in Phase IV to align with the process evaluation best practices.

Source: SWE Framework

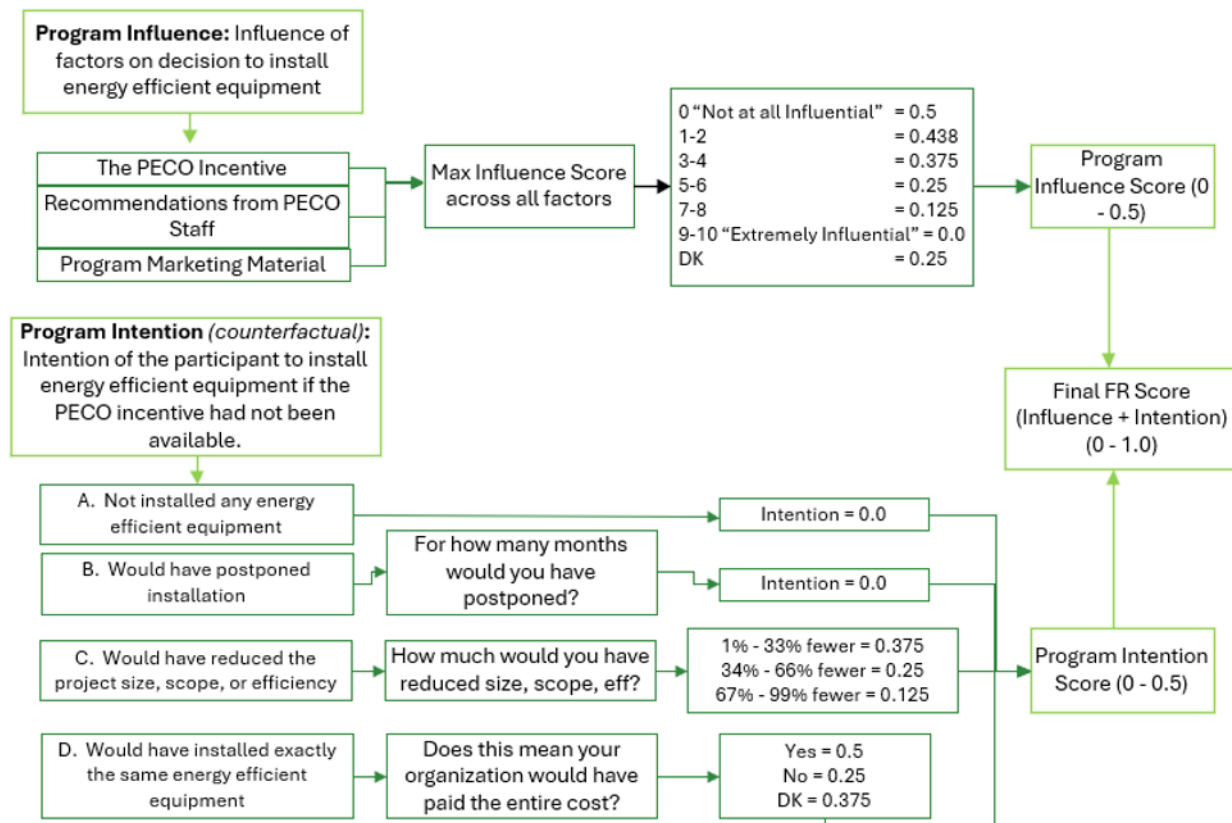
Total Free Ridership Score

Total free ridership is the sum of the intention and influence components, resulting in a score ranging from 0 to 1.00.

Free Ridership Algorithm

Figure G-1 details the algorithm used to estimate free ridership using self-reported survey responses for the Downstream Rebates solar component.

Figure G-1. Free Ridership Algorithm – Downstream Rebates – Solar



Source: Guidehouse analysis

G.1.2.2 Estimating Participant Spillover

The participant spillover battery of questions assessed, for each participant, the number and description of non-incented energy efficient equipment installed since program participation; and the program's influence on the participant's decision to install those technologies. This section summarizes the spillover approach for the Downstream Rebates component in PY17.

Identification of Non-Rebated Downstream Rebates Equipment

The survey assessed the purchase and installation of any energy efficient technologies, using the following questions:

- Since your organization participated in the PECO program, did you install any additional energy efficient equipment at your facility that did not receive incentives through a PECO program?⁹⁴
- [IF YES:] Please describe the energy-efficiency equipment. [Follow up questions will gather detail on equipment type, size, and quantity]

Guidehouse asked about and documented all additional, non-rebated equipment installed since program participation, whether eligible for program rebates, in the TRM but not eligible, or not in the TRM.

Assessment of Program Influence on Non-Rebated Equipment

The survey asked respondents about the level of influence the prior program participation had on their decision to install the additional equipment. The survey asks:

- On a 0 to 10 scale, with 0 meaning “not at all influential” and 10 meaning “extremely influential,” how influential was your experience in the PECO Ways to Save program on your decision to install this additional equipment at this facility?

Guidehouse asked the influence question only once to cover all the additional energy efficient equipment installed. The influence rating is assigned a value that determines what proportion of the equipment’s savings are attributed to the program:

- A rating of 8, 9, or 10 = 1.0 (full savings attributed to the program)
- A rating of 3, 4, 5, 6, or 7 = 0.5 (half of the savings attributed to the program)
- A rating of 0, 1, or 2 = 0.0 (no savings attributed to the program)

Assessment of Energy Savings for Non-Residential Spillover

Where applicable, the savings for each additional piece of equipment installed were calculated per the TRM. For partially deemed equipment, Guidehouse developed conservative working assumptions for any required inputs or identified average verified savings for such equipment.

For equipment not in the TRM, Guidehouse conducted a brief engineering analysis to assess savings or, if applicable, identified an alternative source and methodology for assessing savings.

Evaluators first calculated spillover savings for each piece of spillover equipment reported as the product of the equipment savings, number of units, and influence score:

$$\text{Equipment SO} = \text{Savings} * \text{Number of Units} * \text{Program Influence}$$

Guidehouse then:

- Totaled the savings associated with each program participant, to give the overall participant SO savings.

⁹⁴ Guidehouse asked about the facility drawn in the random sample of projects, as well as a follow up question to the participant regarding additional, un-incented equipment at any other facilities they operate.

Participant SO = Σ Equipment SO

- Multiplied the mean participant SO savings for the participant sample by the total number of participants to yield an estimated total participant SO savings for the program.

$$\Sigma \text{ Participant SO (population)} = (\Sigma \text{ Participant SO (sample)}) / (\text{Sample } n)$$

- Divided that total savings by the total program savings to yield a participant spillover percentage.

$$\% \text{ Participant SO} = (\Sigma \text{ Participant SO (population)}) / (\text{Program Savings})$$

G.1.2.3 Estimating the NTGR

Guidehouse calculated the final NTGR score using Equation G-1.

Equation G-1. NTGR Score Equation

$$NTG = 1 - \text{Free Ridership} + \text{Spillover}$$

Where:

<i>Free Ridership</i>	The estimated amount of savings that would have occurred even if the program did not exist
<i>Spillover</i>	The estimated amount of savings occurring outside of the program, but directly influenced by the program

G.1.3 Process Evaluation

Non-Residential EE Program process evaluation activities and findings are discussed in Section 3.5.5. This section describes additional insights from process evaluation activities conducted for the Downstream Rebates component specifically.

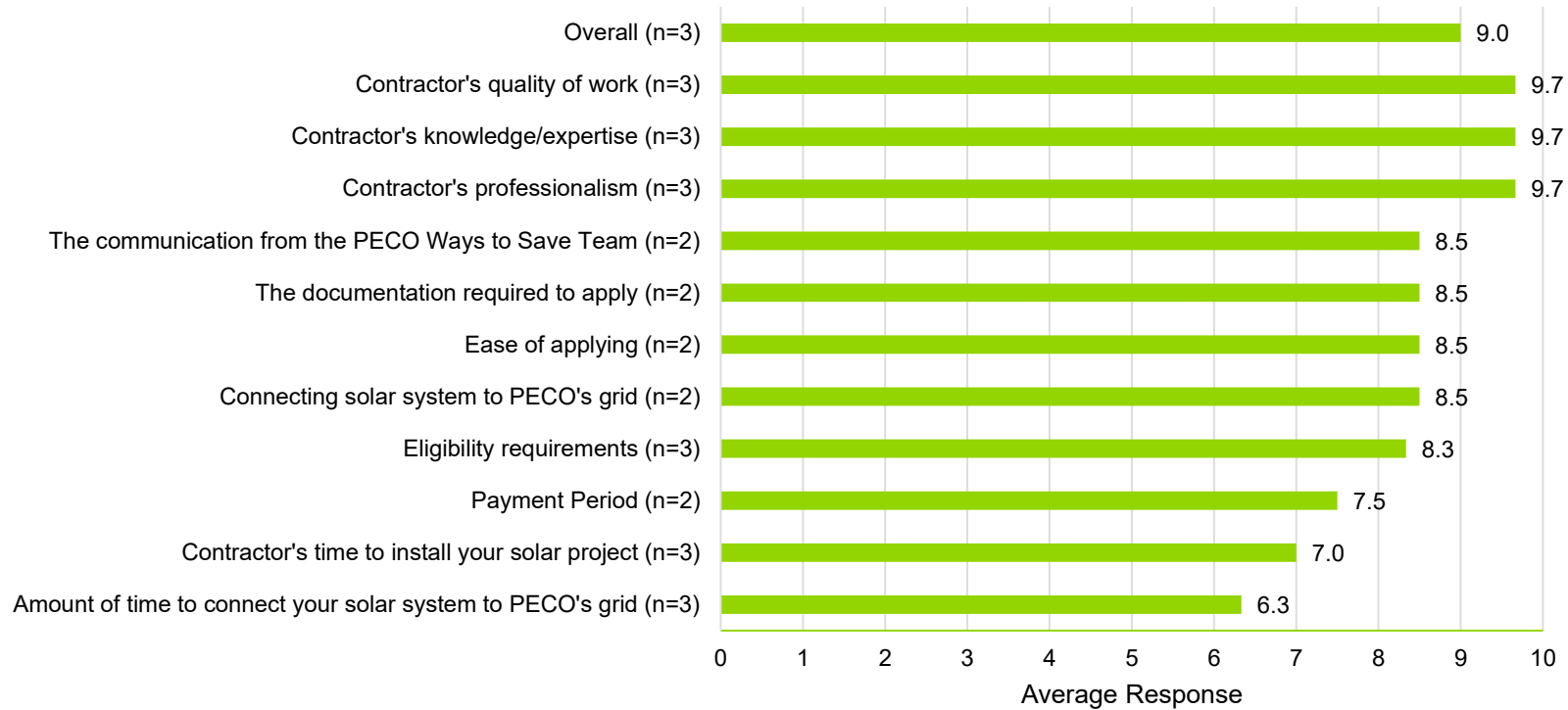
Guidehouse contacted 30 customers who received an incentive for a solar energy system through PECO's Downstream Rebates component to conduct the process evaluation for this program. Three customers replied to the online survey resulting in a 10% response rate. Given the low number of completes, Guidehouse suggests survey findings are directional rather than conclusive. Guidehouse removed "don't know" responses from analysis for most questions. Therefore, n values may vary between questions.

Respondents reported satisfaction levels for the component overall, using a scale of 0 to 10 with 0 representing "Extremely Dissatisfied" and 10 representing "Extremely Satisfied." The mean satisfaction for the Ways to Save component overall is 9.0 out of 10 (n=2).

Respondents also provided satisfaction scores for aspects of the component. Respondents provided the highest satisfaction scores for the quality of work of the contractor (9.7 out of 10), the knowledge/expertise of the contractor (9.7), and the professionalism of the contractor who installed the solar project (9.7), as Figure G-2 shows. PY17 findings were generally consistent with PY16, with respondents reporting high overall satisfaction and particularly strong satisfaction with contractor-related aspects of participation. In both years, comparatively lower satisfaction was associated with administrative or process-related steps, suggesting that

elements such as documentation, webpage navigation, or interconnection may continue to present some challenges for participants. Please note the PY16 findings were based on a small sample size, so this comparison is not conclusive.

Figure G-2. Downstream Rebates Satisfaction



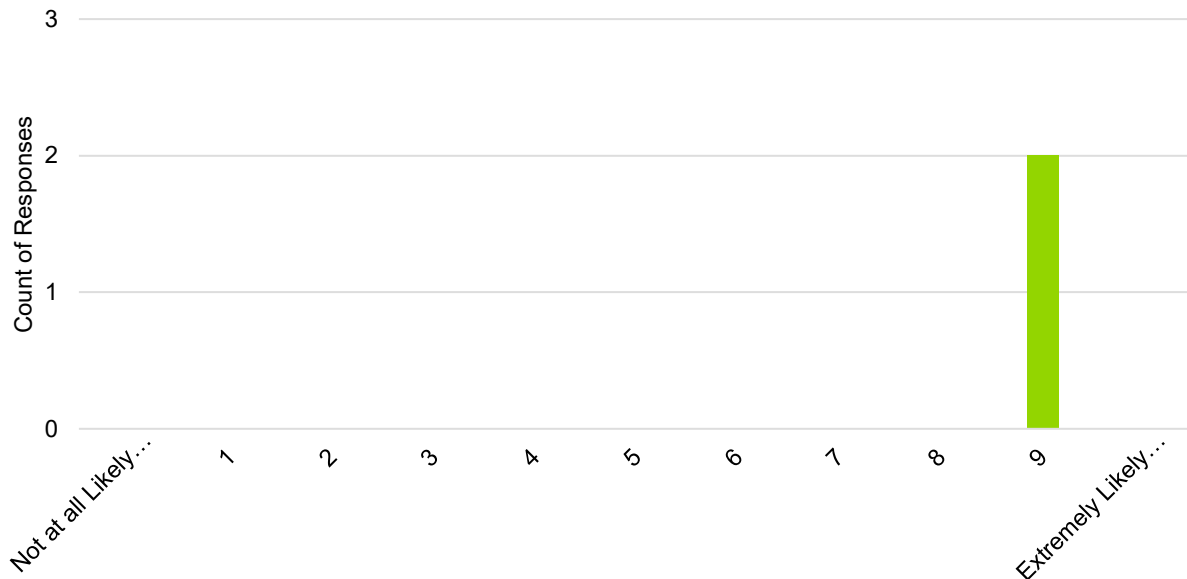
Respondents received the following questions: “How would you rate your satisfaction with the PECO Ways to Save program overall?” and “How would you rate your satisfaction with the following aspects of the PECO Ways to Save program?”

Note: The pathway is referred to as “Ways to Save” as this is a more familiar name for customers.

Source: Guidehouse analysis

As Figure G-3 shows, two respondents rated their likelihood to recommend the PECO Ways to Save component to others as 9 out of 10. Respondents were asked to use a scale of 0 to 10 where 0 is “Not at all Likely” and 10 is “Extremely Likely” (n= 2).

Figure G-3. Likelihood of Recommending PECO’s Downstream Rebates Component (n=2)

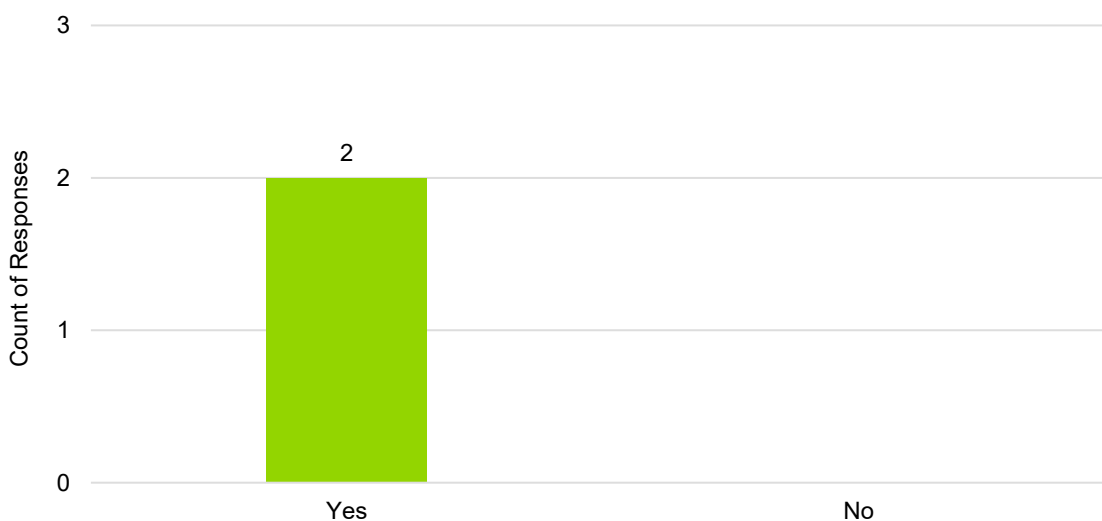


Respondents received the following question: “How likely are you to recommend the PECO Ways to Save program to others?”

Source: Guidehouse analysis

Respondents who rated their likeliness to recommend the component to others were asked if they had recommended it to others; both respondents indicated they had (Figure G-4).

Figure G-4. Recommendation of Ways to Save (n=2)

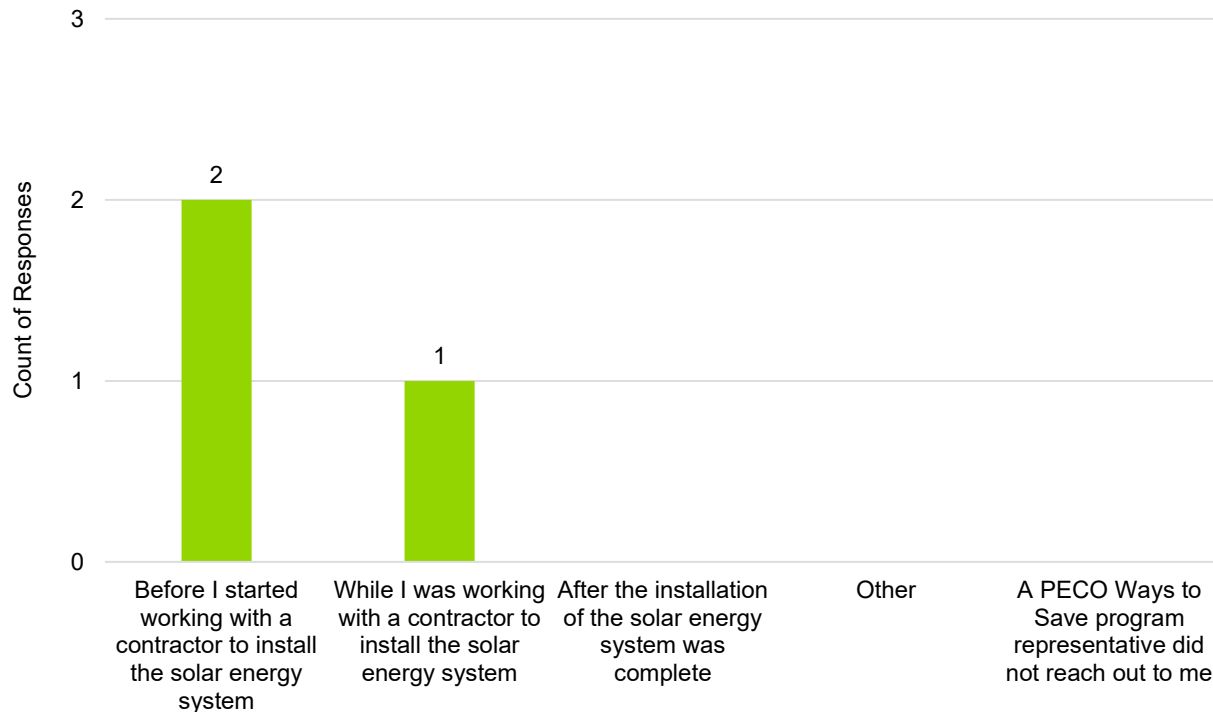


Respondents received the following question: “Have you recommended the PECO Ways to Save program to others?”

Source: Guidehouse analysis

Respondents were also asked at what point in the process of installing their solar system they received outreach from a PECO Ways to Save representative. Two respondents were contacted before they started working with a contractor to install their solar system, and another was contacted while they were working with a contractor to install their solar system.

Figure G-5. Contact from Ways to Save Representative (n=3)

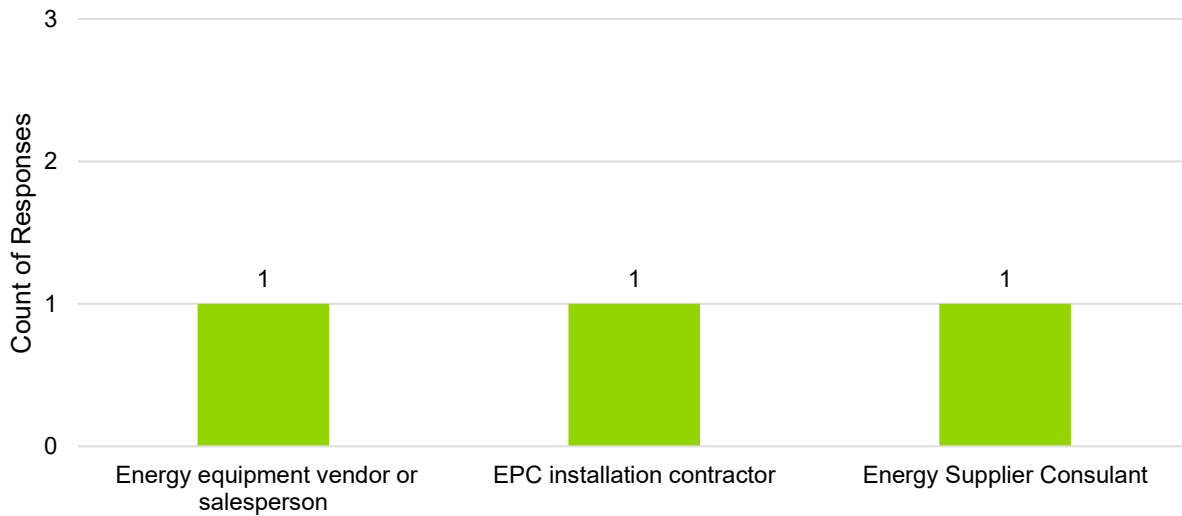


Respondents received the following question: “At what point in the process of adding a solar system to your business did a PECO Ways to Save program representative initially reach out to you?”

Source: Guidehouse analysis

Respondents were also asked how they learned about the component, and indicated they did so through an energy equipment vendor or salesperson (1), an energy supplier consultant (1), or an EPC installation contractor (1) (Figure G-6).

Figure G-6. Awareness of PECO's Downstream Rebates Component (n=3)



Respondents received the following question: "How did you learn about the PECO Ways to Save program?"

Source: Guidehouse analysis

G.2 Midstream Rebates

The Midstream Rebates component includes incentives at the distributor and manufacturer levels to encourage the purchase and installation of high-efficiency lighting, HVAC, refrigeration and food service, compressed air, and other measures. PECO has several pathways to receive midstream rebates, including the POS for all measures, and LED Aggregation pathway (for lighting measures).

The LED aggregation pathway captures savings from manufacturer and national distributor direct-to-consumer transactions that did not go through the POS pathway. Manufacturer and national distributor (channel partner) sales and transaction data is collected and processed by Encentiv Energy, which identifies program-qualifying LED sales. The program then disperses incentive funds to the channel partners and Encentiv Energy to accelerate market transformation through product pricing buy-downs, sales promotions, and other mechanisms.

According to the Phase IV EE&C Plan,⁹⁵ this component is expected to account for 33% of Non-Residential EE Program energy savings, 29% of Non-Residential EE Program demand savings, 24% of total portfolio energy savings, and 22% of total portfolio demand savings. DNV implements the Midstream Rebates component.

G.2.1 Gross Impact Evaluation

G.2.1.1 Methodology

In the first step of the gross impact evaluation, Guidehouse conducted a tracking database analysis for all 5,857 projects from all 3,179 participants in the Midstream Rebates component. This analysis used a combination of TRM default values and EDC-provided data for open

⁹⁵ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

variables. Guidehouse verified approaches, algorithms, and assumptions used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM-based measures passed through this step with no adjustments, and the adjusted database savings for these measures equaled the reported savings.

In the second step, Guidehouse sampled projects for further data collection and analysis. Guidehouse conducted engineering desk reviews for all projects in the evaluation sample. The engineering desk reviews used project measure invoices and documents provided by PECO, as well as customized TRM Appendix C calculation sheets, specification sheets and DLC reports based on model numbers, and other information as it was available. PECO-provided documentation often included only invoices from the distributors. In the engineering desk review, Guidehouse reviewed all available project documentation to verify whether all assumptions used in measure savings calculations were supported by the project documentation and that the calculation methodology was correct.

Guidehouse supplemented engineering desk reviews with phone verifications, which Guidehouse assigned to projects per the Sample Design Memo⁹⁶ that was submitted to and approved by the SWE. Phone verifications consisted of interviews with customers about their projects. Common discussion points included the quantities and type of each measure installed, the operating status of the measures, equipment model numbers, operating schedules, a careful description of site conditions, and overall verification of the information contained in the project files. Guidehouse made updates to the measure savings calculations based on customer responses during the phone verifications as warranted.

Guidehouse conducted onsite verification for sampled projects per the Sample Design Memo. Projects assigned an onsite visit first received an engineering desk review to create the SSMVP. The primary objective of site visits was to collect the data required by the TRM and the Phase IV Evaluation Framework. This data included verifying the quantities and type of each measure, equipment nameplate data, and operating schedules, and carefully describing the site conditions. Guidehouse verified this information through visual inspection of the measures and by interviewing the customers, and updated measure savings calculations as warranted based on verified information obtained onsite.

Guidehouse made every attempt to complete its verification efforts. Guidehouse made repeated attempts via email and phone calls to schedule site visits or complete phone interviews. For projects that were assigned a phone verification, Guidehouse converted the project to an engineering desk review only after making at least five attempts to call or email the customer in alignment with the Evaluation Plan.⁹⁷ Twenty projects were converted to a file review after Guidehouse exhausted all customer contact attempts.

Table G-5 shows the number of Midstream Rebates projects by evaluation method. Of the 5,827 completed projects through 3,179 participants, Guidehouse originally sampled 34 projects for increased evaluation rigor.

⁹⁶ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

⁹⁷ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Table G-5. Midstream Rebates Project Count by Evaluation Method

Verification Level	Evaluation Target	Final Evaluation Total
Tracking Database Analysis	5,857	5,857
Engineering Desk Review Only	18	20
Phone Verification	15	7
Onsite Verification	1	7
Total Sampled Projects	34	34

Source: Guidehouse analysis

No projects surpassed the energy (kWh) savings thresholds set in Table 1-2 of the TRM,⁹⁸ which requires site-specific data collection for enhanced evaluation rigor.

G.2.1.2 Sampling

Using tracking data from PY17, Guidehouse obtained the total number of projects and the total amount of energy savings in the population. With this project data, Guidehouse sampled at the project level for the impact evaluation activities in PY17 to bin projects within five strata, as outlined in the PY17 Sample Design Memo.⁹⁹

Guidehouse first created a census stratum (Stratum 1 – Very High Impact Projects) for projects exceeding 1,000 MWh of energy savings. Next, Guidehouse sorted the remaining projects by size and excluded all projects making up the lowest 1% of total Midstream Rebates energy savings. Finally, Guidehouse divided the population into three additional strata: those projects making up the top, middle, and lowest third of the total remaining Midstream Rebates energy savings.

For Midstream Rebates projects, all 34 sampled projects included lighting or lighting control retrofits and one included heat pump installations. The SWE sampled five total projects for its review and conducted engineering desk reviews for all five sites.

G.2.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan¹⁰⁰ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

G.2.3 Process Evaluation

As described in the Phase IV Evaluation Plan¹⁰¹ approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

⁹⁸ Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

⁹⁹ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

¹⁰⁰ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

¹⁰¹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

G.3 Small Business Direct Install

The Small Business Direct Install component offered rebates to small businesses for the direct installation of energy efficiency measures to improve overall energy performance. Typical measure offerings included efficient lighting and lighting controls, refrigeration lighting, door gaskets, and efficient motors on refrigerators and freezers. According to the Phase IV EE&C Plan,¹⁰² this component is predicted to account for 18% of Non-Residential EE Program energy savings, 19% of Non-Residential Program demand savings, 13% of total portfolio energy savings, and 14% of total portfolio demand savings. DNV implemented the Small Business Direct Install component using an open contractor network.

The Small Business Direct Install component was shut down partly through PY17 due to exhaustion of funds.

G.3.1 Gross Impact Evaluation

G.3.1.1 Methodology

Guidehouse conducted a tracking database analysis for all 11 projects across all 9 participants¹⁰³ in the component. This analysis used a combination of TRM default values and EDC-provided data for open variables. Guidehouse verified approaches, algorithms, and assumptions used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM-based measures passed through this step with no adjustments, and the adjusted database savings for these measures equaled the reported savings. Guidehouse applied the verification ratios from the PY16 evaluation of the Small Business Direct Install component to the PY17 adjusted database savings for energy and demand to arrive at PY17 gross impact results.

G.3.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan¹⁰⁴ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

G.3.3 Process Evaluation

As described in the Phase IV Evaluation Plan¹⁰⁵ approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

¹⁰² PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

¹⁰³ Participants are defined as the count of unique bill accounts.

¹⁰⁴ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

¹⁰⁵ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

G.4 New Construction

The New Construction component is designed to accelerate adoption of energy efficient design and construction practices in new and retrofit facilities. The program covers both new construction and buildings undergoing major renovation; major renovation is defined as construction projects that involve the complete removal, redesign, and replacement of two or more major building systems. The program provides facility designers and builders with training, design assistance, and financial incentives to incorporate energy efficient systems into their building designs. Many of the projects within the Non-Residential New Construction component involve efficient lighting, heating and cooling technologies, controls, and other measures. According to the Phase IV EE&C Plan,¹⁰⁶ this component is expected to account for 4% of Non-Residential EE Program energy savings, 3% of Non-Residential EE Program demand savings, 3% of total portfolio energy savings, and 2% of total portfolio demand savings. DNV implements the New Construction component.

G.4.1 Gross Impact Evaluation

G.4.1.1 Methodology

In the first step of the gross impact evaluation, Guidehouse conducted a tracking database analysis for all 83 projects from all 73 participants in the component.¹⁰⁷ This analysis used a combination of TRM default values and EDC-provided data for open variables. Guidehouse verified approaches, algorithms, and assumptions used to estimate reported gross savings at the measure level and recalculated gross energy and demand savings estimates to confirm whether the tracking database was accurate as reported. Guidehouse used a programmatic approach in this step based solely on inputs provided in the tracking database and the relevant TRM and IMP sections. Non-TRM-based measures passed through this step with no adjustments, and the adjusted database savings for these measures equaled the reported savings.

In the second step, Guidehouse sampled projects for further data collection and analysis. Guidehouse conducted engineering desk reviews for all projects in the evaluation sample. The engineering desk reviews used project applications, project-specific analysis files and associated calculation sheets, measure invoices, measure specification sheets, construction plans, and other construction documents provided by PECO. Documentation included scanned files of hard copy forms as well as electronic files of CSP inspection reports, photos of installed measures, important emails, and memoranda. In the engineering desk review, Guidehouse reviewed all available project documentation to verify whether all assumptions used in measure savings calculations were supported by the project documentation and that the calculation methodology was correct.

Guidehouse supplemented engineering desk reviews with phone verifications, which Guidehouse assigned to projects per the Sample Design Memo¹⁰⁸ that was submitted to and approved by the SWE. Phone verifications consisted of interviews with customers about their projects. Common discussion points included the quantities and type of each measure installed,

¹⁰⁶ PECO, *PECO Program Years 13 to 17 Act 129 – Phase IV Energy Efficiency and Conservation Plan*, filed June 19, 2024, <https://www.puc.pa.gov/pcdocs/1834379.pdf>.

¹⁰⁷ Participants are defined as the count of unique bill accounts.

¹⁰⁸ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

the operating status of the measures, equipment nameplate data, operating schedules, a careful description of site conditions, and overall verification of the information contained in the project files. Guidehouse updated the measure savings calculations based on customer responses during the phone verifications as warranted.

Guidehouse conducted onsite verification for sampled projects per the Sample Design Memo. Projects assigned an onsite visit first received an engineering desk review to create the SSMVP. The primary objective of site visits was to collect the data required by the TRM and the Phase IV Evaluation Framework. This data included verifying the quantities and type of each measure, equipment nameplate data, and operating schedules, and carefully describing the site conditions. Guidehouse verified this information through visual inspection of the measures and by interviewing the customers, and updated measure savings calculations as warranted based on verified information obtained onsite.

Guidehouse made every attempt to complete its verification efforts. Guidehouse made repeated attempts via email and phone calls to schedule site visits or complete phone interviews. For projects that were assigned a phone verification, Guidehouse converted the project to an engineering desk review only after making at least five attempts to call or email the customer in alignment with the Evaluation Plan. Fourteen projects were converted to engineering desk review after Guidehouse exhausted all customer contact attempts.

Table G-6 shows the number of New Construction projects by evaluation method. Of the 83 completed projects, Guidehouse originally sampled 14 projects for additional data collection and analysis. An additional five census projects and large projects were added to the sample throughout the evaluation period resulting in a total of 19 sampled projects.

Table G-6. New Construction Project Count by Evaluation Method

Verification Level	Evaluation Target	Number of Projects Evaluated
Tracking Database Analysis	74	83
Engineering Desk Review Only	3	14
Phone Verification	10	2
Onsite Verification	1	3
Total Sampled Projects	14	19

Source: Guidehouse analysis

Seven projects surpassed the energy (kWh) savings thresholds set in Table 1-2 of the TRM,¹⁰⁹ which requires site-specific data collection for enhanced evaluation rigor. Guidehouse reran energy model simulations for four of these sites and conducted additional site visits for two of these projects that surpassed the savings threshold to gather site-specific information. Guidehouse was not able to gather site-specific information for the other three projects.

G.1.1.2 Sampling

Using tracking data from PY17, Guidehouse obtained the total number of projects and the total amount of energy savings in the population. With this project data, Guidehouse sampled at the

¹⁰⁹ Pennsylvania Public Utility Commission, *Technical Reference Manual*, <https://www.puc.pa.gov/filing-resources/issues-laws-regulations/act-129/technical-reference-manual/>.

project level for the impact evaluation activities in PY17 to bin projects into four strata, as outlined in the PY17 Sample Design Memo.¹¹⁰

Guidehouse created a census stratum (Stratum 1 – Very High Impact Projects) for projects reporting more than 700 MWh of energy savings. Next, Guidehouse sorted all remaining projects by size and excluded all the smallest projects with less than 10 MWh of energy savings. Finally, Guidehouse divided the remaining population into two additional strata; those projects make up the top and bottom halves of the total remaining energy savings.

Most of the 19 New Construction projects evaluated had multiple measures included in the savings calculations:

- Nine included lighting or lighting control retrofits
- Four were energy modeling projects
- Four included HVAC systems
- Three included motor measures
- Three included refrigeration projects

The SWE sampled four total projects for its review. The SWE conducted an engineering desk review for all four projects.

G.4.2 Net Impact Evaluation

As described in the Phase IV Evaluation Plan¹¹¹ approved by the SWE, Guidehouse did not conduct NTG research for this component in PY17.

G.4.3 Process Evaluation

As described in the Phase IV Evaluation Plan¹¹² approved by the SWE, Guidehouse did not conduct in-depth process activities for this component in PY17. Instead, Guidehouse interviewed the PECO program managers and CSP staff to understand the goals of the program, identify significant implementation changes, and identify areas of strength and areas of improvement. Guidehouse will use findings from these interviews to inform evaluation research in future years.

¹¹⁰ Guidehouse, *PECO PY17 Non-Residential Sample Design Memo FINAL*, dated February 3, 2026.

¹¹¹ Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

¹¹² Guidehouse, *Phase IV Evaluation Plan, Energy Efficiency and Conservation Portfolio*, revised November 6, 2025.

Appendix H. PY17 Unverified Projects

This appendix details projects that were completed close to the end of PY17, but the project application was not submitted in time for inclusion in Guidehouse's verified savings analysis and this PY17 Annual Report. Per SWE guidance,¹¹³ Guidehouse intends to provide verified savings estimates for these projects in an addendum to the PY18 Semi-Annual Report due January 15, 2027. This addendum will provide the final verified gross savings for Phase IV and include an updated and final estimate of carryover savings from Phase IV into Phase V. Table H-1 quantifies these projects that will be evaluated for the PY18 Semi-Annual Report.

Table H-1. PY17 Estimate of Unverified Reported Energy and Peak Demand Savings for PY18 Evaluation

Program and Component	Energy Savings Estimate (MWh/yr)	Demand Savings Estimate (MW/yr)
Rebates and Marketplace	1,175	0.29
Appliance Recycling	-	-
In-Home Assessment	-	-
New Construction	-	-
Multifamily	-	-
Multifamily Income-Eligible	-	-
Residential Total	1,175	0.29
Income-Eligible Single-Family	7	-
Income-Eligible Appliance Recycling	-	-
Income-Eligible Total	7	-
Residential HER	-	-
Income-Eligible HER	-	-
Downstream	13,915	1.71
Midstream	-	-
Small Business Direct Install	-	-
New Construction	-	-
Non-Residential Total	13,915	1.71
Portfolio Total	15,097	2.00

Note: Residential and IE unverified projects were not submitted in time for inclusion in Guidehouse's evaluation and thus are not included in PYRTD numbers throughout this report. Non-Residential unverified projects were reported ahead of the deadline but were not verified in time due to data collection issues with the short timeframe; these are included in the PYRTD numbers throughout the report.

Source: Guidehouse analysis

H.1 Residential Program Projected Carryover Projects

The Residential Program continued to process eligible Phase IV applications for projects completed before June 1, 2026, through August 1, 2026. Due to timing constraints, Guidehouse was unable to include these savings as verified in this PY17 Annual Report. Guidehouse reports approximately 1,175 MWh of energy savings and 0.29 MW of system-level peak demand

¹¹³ Guidance Memo for Verifying End of Phase IV Rebate Applications, PA SWE Memo_End of Ph IV rebates & verified savings timeline_06.29.26.docx

savings as unverified. Verified savings for these projects will be included in the PY18 Semi-Annual Report.

H.2 Income-Eligible Program Projected Carryover Projects

The Income-Eligible Program continued to process eligible Phase IV applications for projects completed before June 1, 2026, through August 1, 2026. Due to timing constraints, Guidehouse was unable to include these savings as verified in this PY17 Annual Report. Guidehouse reports approximately 7 MWh of energy savings and 0.0003 MW of system-level peak demand savings as unverified. Verified savings for these projects will be included in the PY18 Semi-Annual Report.

H.3 Non-Residential Program Carryover Projects

The Non-Residential Program continued to process eligible Phase IV applications for projects completed before June 1, 2026, through June 15, 2026, for all Non-Residential Program components. This process included eight above-threshold projects that required verification to meet statistical targets set forth in Guidehouse's PY17 Sample Design Memo. Due to timing constraints driven by a short window for customer engagement and onsite data collection, Guidehouse and the SWE jointly decided to classify four Downstream Rebates component projects as unverified in this PY17 Annual Report. Guidehouse reports 13,915 MWh and 1.71 MW of savings for these four projects. Verified savings for these projects will be included in the PY18 Semi-Annual Report.

Appendix I. PY14-PY16 Duplicate Projects

During the Phase IV final reconciliation review, DNV and PECO discovered and validated 37 Non-Residential projects throughout Phase IV that were invoiced and reported twice, resulting in duplicated savings reported in the tracking database and previously claimed in PY14-PY16 annual reports. The issue was tied to DNV's accounting process related to reissued incentive checks, which resulted in projects entering the tracking database twice. Guidehouse confirmed that savings associated with these projects were in fact reported twice in the tracking database and developed a process to back out duplicate savings to ensure that the VTD savings accurately represent program activity. Table I-1 shows savings associated with these projects.

Table I-1. Savings Adjustments from Duplicate Projects

Program Year	Non-Residential Program Component	Project Count	Reported Energy (MWh)	Reported Demand (MW)	Verified Energy (MWh)	Verified Demand (MW)
PY14	Midstream	1	18	-	23	-
PY15	Downstream	32	2,745	0.42	2,595	0.44
PY15	Small Business	1	9	-	9	-
PY16	Midstream	3	293	0.04	308	0.04
Total		37	3,065	0.47	2,935	0.49

Source: Guidehouse analysis

Guidehouse's process to estimate verified savings impacts from these projects was as follows:

1. Independently confirmed and verified the 37 affected projects with the PECO team
2. Mapped each project to the appropriate program year, program component, stratum, and verification ratio across PY14-PY16
3. Multiplied reported savings by each appropriate verification ratio to determine verified savings

Savings were associated with projects from PY14 through PY16, so Guidehouse did not adjust PYVTD savings because of these findings. The verified savings associated with these projects were subtracted from VTD savings shown throughout this report, while RTD savings remain unadjusted for consistency with prior Phase IV annual reports.