

# Statewide Evaluation Team: Impact of Act 129 Income- Eligible Programs on Arrearages and Collections

Phase IV of Act 129

Final

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For Pennsylvania Act 129 of 2008

Energy-Efficiency and Conservation Plan

SUBMITTED TO:  
Pennsylvania Public Utility Commission

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## Acronyms

CAP	Customer Assistance Program
EDC	Electric Distribution Company
FE	FirstEnergy Pennsylvania Electric Company
IE	Income Eligible
kWh	Kilowatt-Hour
LI	Low-Income
LIHEAP	Low Income Home Energy Assistance Program
LIURP	Low Income Usage Reduction Program
PUC	Public Utility Commission
PY	Program Year: e.g., PY13, from June 1, 2021, to May 31, 2022
SWE	Statewide Evaluator
TRC	Total Resource Cost



## Executive Summary

In the Phase IV Implementation Order, stakeholders pointed out that arrearages and uncollected debt were a cost of supplying electricity and suggested the Public Utility Commission (PUC) quantify potential reductions of these costs as benefits in the TRC Test for income-eligible programs. In its disposition, the PUC stated:

*Therefore, we determined that PA-EEFA’s comments regarding reduced arrearages and uncollected debt merit further investigation, particularly for programs offered to the low-income sector, and will direct the Phase IV SWE to study the impacts of EDC low-income programs on collections. We will make, at a later time, recommendations regarding the appropriateness and magnitude of such a benefit for consideration in future TRC Test Orders.*

Energy-efficient technologies and associated energy-efficiency programs often result in reduced energy bills for participants, which can decrease the likelihood that customers experience difficulties paying their utility bills.

Noting this, the Act 129 SWE sought to quantify and monetize EDC financial savings, which, in turn, benefit all ratepayers. The SWE was able to identify, quantify, and monetize the following five types of financial savings from EDC low-income programs:

- Reduced arrearage carrying cost
- Reduced bad debt write-offs
- Fewer shutoffs and reconnects
- Fewer notices
- Fewer collections calls

Table 1 provides the total annual monetized value per participant of all five impacts quantified in the study. The total annual monetized impact per participant is \$15.80 for PECO, \$16.16 for PPL, \$9.78 for Duquesne Light, \$0 for the FirstEnergy Pennsylvania Electric Company (FE) rate districts, and \$5.82 statewide. These monetized values for Pennsylvania EDCs were generally within the range of the values found in similar studies in other jurisdictions for these impacts. A notable exception is the reduced bad debt write-off for which the monetized value in Pennsylvania was higher than the high end of the range. This suggests that a higher percentage of arrearages must be written off in Pennsylvania, on average, than those in jurisdictions examined in similar studies.

**Table 1: Total Annual Monetized Impact Per Participant**

Annual Impact (\$ per Participant)	EDC/ Rate District							Statewide
	PECO	PPL	Duquesne Light	FE: Met-Ed	FE: Penelec	FE: Penn Power	FE: West Penn Power	
Reduced arrearage carrying cost	\$1.59	\$3.06	\$1.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.77
Reduced bad debt write-off	\$12.62	\$10.60	\$7.47	\$0.00	\$0.00	\$0.00	\$0.00	\$4.77
Reduced notice cost	\$0.49	\$0.67	\$0.18	\$0.00	\$0.00	\$0.00	\$0.00	\$0.26
Reduced collection call cost	\$0.05	\$0.98	\$0.07	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02
Reduced service termination cost	\$1.05	\$0.84	\$0.86	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>TOTAL</b>	<b>\$15.80</b>	<b>\$16.16</b>	<b>\$9.78</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$5.82</b>

The study converted the monetized impacts per participant into monetized impacts per kWh of savings by dividing the impact per participant by the average kWh savings per participant in PY13 from Act 129 IE programs for each EDC.

Table 2 presents the average kWh savings per participant in PY13 and the resulting monetized impacts per kWh. The total annual monetized impact is 5.9 cents/kWh for PECO, 4.6 cents/kWh for PPL, 1.9 cents/kWh for Duquesne Light, 0 cents/kWh for the FE rate districts, and 1.9 cents/kWh statewide.

**Table 2: Total Annual Monetized Impact Per kWh**

Annual Impact (\$ per kWh)	EDC/Rate District							Statewide
	PECO	PPL	Duquesne Light	FE: Met-Ed	FE: Penelec	FE: Penn Power	FE: West Penn Power	
Average kWh savings per participant	267	351	517	320	297	327	340	314
Reduced arrearage carrying cost	\$0.006	\$0.009	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.002
Reduced bad debt write-off	\$0.047	\$0.030	\$0.014	\$0.000	\$0.000	\$0.000	\$0.000	\$0.015
Reduced notice cost	\$0.002	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.001
Reduced collection call cost	\$0.000	\$0.003	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Reduced service termination cost	\$0.004	\$0.002	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
<b>TOTAL</b>	<b>\$0.059</b>	<b>\$0.046</b>	<b>\$0.019</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.019</b>

The SWE recommends that the Commission propose to incorporate into the TRC Test Order and the Avoided Cost Calculator (ACC) the benefits of EDC financial savings from their Act 129 IE energy-efficiency programs quantified in this study. As this study has demonstrated, the energy-efficient technologies installed by the EDCs Act 129 energy-efficiency programs have resulted in reduced EDC costs through reduced arrearage carrying cost, reduced bad debt write-offs, fewer collection notices, fewer collection calls, and fewer shutoffs.

The SWE recommends adopting EDC-specific results for PECO, PPL, and Duquesne Light but statewide average values for the FE rate districts. The benefits apply for the Effective Useful Life

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(EUL) of the installed measures. The benefit values presented in [Table 1](#) and [Table 2](#) are in 2023 dollars and the SWE recommends applying the inflation rate and escalation rate as defined in the TRC Test Order and assumed throughout the TRC model. In addition, the SWE recommends applying transmission and distribution losses (or line losses) to reflect the energy savings at the system level, as detailed in Volume 1 of the 2021 TRM.

[Table 3](#) presents the per MWh values in 2026 dollars, adjusted for line losses and inflation, the SWE recommends for each EDC.

The SWE recommends considering an updated study in the future for the FE rate districts. It is unclear why the study did not find reductions in arrears, collection notices, collections calls and shutoffs for the FE rate districts, but it may have been due to differences between the treatment and comparison groups not found for the other EDCs. If a follow-up study is conducted, the SWE recommends replacing the statewide average with the results of the follow-up study for the FE rate districts.

**Table 3: Recommended Total Annual Monetized Impact for Use in the 2026 TRC Test Order**

EDC/Rate District	Average kWh savings per participant (System Level) <sup>1</sup>	Total Annual Impact Per MWh, 2026 dollars
PECO	288	\$58.14
PPL	382	\$44.87
Duquesne Light	556	\$18.67
FE: Met-Ed	350	\$18.10
FE: Penelec	325	\$18.10
FE: Penn Power	358	\$18.10
FE: West Penn Power	372	\$18.10
<b>Statewide</b>	<b>341</b>	<b>\$18.10</b>

<sup>1</sup> Per participating kWh were adjusted for transmission and distribution losses (or line losses) to reflect the energy savings at the system level as detailed in Volume 1 of the 2021 TRM.



## Section 1 Background: Impact of Act 129 Income-Eligible Programs on Arrearages, Collections and Other EDC Costs

In the Phase IV Implementation Order, stakeholders pointed out that arrearages and uncollected debt were a cost of supplying electricity and suggested the Public Utility Commission (PUC) quantify potential reductions of these costs as benefits in the TRC Test for income-eligible programs. In its disposition, the PUC stated:

*Therefore, we determined that PA-EEFA's comments regarding reduced arrearages and uncollected debt merit further investigation, particularly for programs offered to the low-income sector, and will direct the Phase IV SWE to study the impacts of EDC low-income programs on collections. We will make, at a later time, recommendations regarding the appropriateness and magnitude of such a benefit for consideration in future TRC Test Orders.*

Energy-efficient technologies and associated energy-efficiency programs often result in reduced energy bills for participants, which can decrease the likelihood that customers experience difficulties paying their utility bills. In turn, utilities may realize reduced costs associated with arrearages and late payments, uncollectible bills and bad debt write-offs, service terminations and reconnections, bill-related customer calls, and the bill collections process.

The study sought to quantify and monetize EDC financial savings, which, in turn, benefit all ratepayers. This was done through an analysis of EDC data on customer arrearages, shutoffs, and collections actions for Act 129 income-eligible (IE) program participants. The goal of the study was, to the extent that data were available from the EDC, to estimate and monetize the following five types of financial savings:

- Reduced arrearage carrying cost
- Reduced bad debt write-offs
- Fewer shutoffs and reconnects
- Fewer notices
- Fewer collections calls

### 1.1 DATA REQUEST

To quantify and monetize EDC financial savings and to control for external factors, the SWE requested the following types of customer data pertaining to financial and collections-related transaction histories from June 2020 through May 2023 for all customers who participated in the EDCs Act 129 IE programs in PY13 and PY14<sup>1</sup>:

- Arrearages
- Bad debt write-offs

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<sup>1</sup> This was to ensure that at least one year of pre-program and one year of post-program data for PY13 participants and two years of pre-program data for PY14 participants would be available for analysis.

- Collections calls
- Terminations
- Reconnections
- Notices (related to late payments and collections)

To determine the monetary value of the pertinent financial impacts, the SWE also requested the following information from the EDCs:

- EDC annual interest rate on short-term debt in PY14
- Percentage of total arrears written off in 2020, 2021, and 2022
- EDC cost per shutoff and reconnect
- EDC cost per notice
- EDC cost per collection call

### 1.2 DATA ASSESSMENT

Upon receipt of the arrearage- and collections-related data and the additional information requested for monetization from the EDCs, the SWE inspected the data for completeness and identified any data elements that were missing, incomplete, or potentially incorrect. The study team informed each EDC data team of any data issues identified and worked with the EDCs to resolve these issues.

After all data issues were addressed, the SWE cleaned the data, merged different files by unique customer IDs provided to create full customer histories, removed any duplicate records or records not associated with requested program participants, and prepared them for the analysis.

### 1.3 DATA ANALYSIS

For the analysis, the treatment group consisted of customers who participated in the EDCs Act 129 IE programs in PY13. The SWE compared the indicators for these customers in the 12 months prior to their program participation to those in the 12 months after their program participation. This represented the actual change in arrearages, shutoffs, reconnections, etc. for those customers who were served by the Act 129 IE programs during the analysis period. Some of these changes may be due to the participation in the Act 129 IE programs, and some of these changes may be due to other exogenous factors, such as participation in the Low Income Usage Reduction Program (LIURP), the Low Income Home Energy Assistance Program (LIHEAP), or the Customer Assistance Program (CAP), which is an arrearage forgiveness program. To control for exogenous factors, the SWE used PY14 program participants as the comparison group and assessed the changes in their indicators during the analysis period for the treatment group. Later program participants – also referred to as “future” participants – are particularly effective for comparison with prior participants, because they represent other customers that have made the same decision to opt into the same IE programs. Relative to a non-participant comparison group,

future participants are expected to be more aligned with prior participants regarding unobservable characteristics than the general public.

To assess the comparability of the treatment group (PY13 participants) and comparison group (PY14 participants), the SWE checked the participation rates in other programs, including LIHEAP, LIURP, and CAP programs, which may impact arrearages and bill affordability, and found that the two groups of participants had similar participation rates in these other programs during the analysis period for all EDCs. This means that the comparison group in this analysis was ideal to control for the confounding effects of these other programs on arrearages and bill affordability.

The analysis in customer arrearage- and collections-related data quantified the following indicators for PY13 participants compared to the PY14 participants during the same period in time:

- Change in arrearages
- Change in collection notices
- Change in collection calls
- Change in shutoffs and reconnects

# 2

## Section 2 Results

This section presents the results of our analysis of changes in arrearages, collection notices, collection calls, shutoffs and reconnects. All monetary values presented in this report are in 2023 dollars.

### 2.1 CHANGE IN ARREARAGES

Arrearages are customer balances that are past due. For the treatment group (PY13) participants, the study defined arrears in the 12 months prior to participation as “Pre” and arrears in the 12 months after participation as “Post.” For the comparison group (PY14) participants, the study defined arrears in the 12 to 24 months prior to participation as “Quasi Pre” and arrears in the 12 months prior to participation as “Quasi Post.” This allowed for the assessment of the changes for both groups during the same period in time (“Analysis Period”). The net change, or difference in differences, is the change in arrears for the treatment group minus the change for the comparison group during the analysis period. To illustrate the difference-in-differences design, [Figure 1](#) shows pre- and post-periods for a treatment group participant who participated in June 2021 and quasi-pre- and quasi-post-periods for a comparison group participant who participated in June 2022.

**Figure 1: Illustration of Difference-in-Differences Design**

	June 2020	June 2021	June 2022
Treatment Group (A June 2021 participant)		Pre	Post
Comparison Group (A June 2022 participant)		Quasi Pre	Quasi Post

Net Change = (Post - Pre) - (Quasi Post - Quasi Pre)

A statewide average for the net change in arrearages, collection notices, collection calls, and shutoffs was calculated as a weighted average. We used each EDCs share of low-income households in Pennsylvania, shown in [Table 4](#), as the weights for this analysis.<sup>2</sup>

<sup>2</sup> Estimates of the EDC share of statewide number of low-income households are derived from the 2021 American Community Survey (ACS) 5-Year (2017-2021) Public Use Microdata Sample (PUMS) data. <https://www.census.gov/programs-surveys/acs/microdata/access.html>  
Low-income customers are defined as households at or below 150% of the federal poverty income guidelines.

**Table 4: EDC’s Share of Low-Income Households in Pennsylvania**

EDC/Rate District	Percent of Low-Income Households*
PECO	24%
PPL	27%
Duquesne Light	12%
FE: Met-Ed	9%
FE: Penelec	12%
FE: Penn Power	3%
FE: West Penn Power	14%
<b>Total</b>	<b>100%</b>

\*Due to rounding, the percentages shown in the table may not sum to 100%.

Table 5 presents the results for the change in arrears. The net reduction in monthly average arrears per participant was found to be \$51.15 for PECO, \$98.76 for PPL, \$38.70 for Duquesne Light, and \$24.74 statewide.

The study did not find a reduction in net monthly average arrears for FE rate districts (Met-Ed, Penelec, Penn Power, and West Penn Power). For these FE rate districts, the arrearages rose from the pre to post period for both treatment and comparison group participants. The increase for the comparison group participants was not large enough to offset the increase for the treatment group participants, resulting in a positive net change in arrears. It is important to note that the pre mean arrears were significantly lower for the comparison group participants than the treatment group participants for the FE rate districts. This suggests that a greater share of PY13 participants may have had bill payment issues than PY14 participants prior to their program participation. Therefore, PY14 participants may not have served as an appropriate comparison group for PY13 participants.

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**Table 5: Change in Arrears**

EDC/Rate District	Study Group	n	Pre Mean Arrears per Participant	Post Mean Arrears per Participant	Gross Change (\$)¹	Significant at 90% confidence level?	Net Change (\$)²	Significant at 90% confidence level?
<b>PECO</b>	Treatment	50,224	\$216.19	\$188.50	(\$27.69)	Yes	(\$51.15)	Yes
	Comparison	44,269	\$190.24	\$213.70	\$23.46	Yes		
<b>PPL</b>	Treatment	23,838	\$230.57	\$230.31	(\$0.26)	No	(\$98.76)	Yes
	Comparison	23,017	\$108.46	\$206.96	\$98.50	Yes		
<b>Duquesne Light</b>	Treatment	4,167	\$162.11	\$106.05	(\$56.06)	Yes	(\$38.70)	Yes
	Comparison	6,919	\$180.30	\$162.94	(\$17.36)	Yes		
<b>FE: Met-Ed</b>	Treatment	9,004	\$124.12	\$230.24	\$106.12	Yes	\$56.57	Yes
	Comparison	8,405	\$36.35	\$85.90	\$49.55	Yes		
<b>FE: Penelec</b>	Treatment	12,382	\$121.16	\$189.89	\$68.73	Yes	\$36.32	Yes
	Comparison	6,860	\$54.62	\$87.03	\$32.41	Yes		
<b>FE: Penn Power</b>	Treatment	2,501	\$137.81	\$222.30	\$84.49	Yes	\$58.50	Yes
	Comparison	1,061	\$111.90	\$137.89	\$25.99	Yes		
<b>FE: West Penn Power</b>	Treatment	9,201	\$105.94	\$201.75	\$95.81	Yes	\$56.08	Yes
	Comparison	9,100	\$42.02	\$81.75	\$39.73	Yes		
<b>Statewide</b>	Treatment	111,317	\$176.77	\$196.16	\$19.39	Yes	(\$24.74)	Yes
	Comparison	99,631	\$115.18	\$159.30	\$44.12	Yes		

¹ Gross Change may not equal the “post” minus “pre” columns due to rounding.

² Net Change may not equal “gross change” for treatment group minus the “gross change” for the comparison group due to rounding.

## 2.2 CHANGE IN COLLECTION NOTICES

Collection notices are letters EDCs send to customers regarding collection actions. Similar to arrearages, for the treatment group (PY13) participants, the study defined notices sent in the 12 months prior to participation as “Pre” and notices sent in the 12 months after participation as “Post.” For the comparison group (PY14) participants, the study defined notices sent between 12 and 24 months prior to participation as “Quasi Pre” and notices sent in the 12 months prior to participation as “Quasi Post.”

Table 6 presents the results for the change in collection notices. The net reduction in the average number of collection notices per participant was found to be 0.68 for PECO, 0.99 for PPL, 0.27 for Duquesne Light, and 0.36 statewide.

The study did not find a reduction in the net average number of collection notices sent for the FE rate districts. Specifically, the number of collection notices rose from the pre to post period for both treatment and comparison group participants, but the increase for the comparison group participants was not large enough to offset the increase for the treatment group participants. As noted previously, this could be due to a greater share of PY13 participants having bill payment issues than PY14 program participants prior to their program participation.

Table 6: Change in Collection Notices

EDC/Rate District	Study Group	n	Pre Mean Notices per Participant	Post Mean Notices per Participant	Gross Change (#) <sup>1</sup>	Significant at 90% confidence level?	Net Change (#) <sup>2</sup>	Significant at 90% confidence level?
PECO	Treatment	50,224	2.84	2.80	(0.04)	No	(0.68)	Yes
	Comparison	44,269	2.09	2.72	0.63	Yes		
PPL	Treatment	23,838	0.98	0.80	(0.18)	Yes	(0.99)	Yes
	Comparison	23,017	0.43	1.23	0.81	Yes		
Duquesne Light	Treatment	4,167	1.47	1.69	0.22	Yes	(0.27)	Yes
	Comparison	6,919	1.32	1.81	0.49	Yes		
FE: Met-Ed	Treatment	9,004	0.69	1.36	0.67	Yes	0.43	Yes
	Comparison	8,405	0.22	0.45	0.24	Yes		
FE: Penelec	Treatment	12,382	0.74	1.12	0.39	Yes	0.11	No
	Comparison	6,860	0.30	0.58	0.28	Yes		
FE: Penn Power	Treatment	2,501	0.73	1.30	0.56	Yes	0.22	Yes
	Comparison	1,061	0.61	0.95	0.34	Yes		
FE: West Penn Power	Treatment	9,201	0.58	1.11	0.53	Yes	0.31	Yes
	Comparison	9,100	0.23	0.45	0.22	Yes		
Statewide	Treatment	111,317	1.37	1.53	0.16	Yes	(0.36)	Yes
	Comparison	99,631	0.88	1.40	0.52	Yes		

<sup>1</sup> Gross Change may not equal the “post” minus “pre” columns due to rounding.

<sup>2</sup> Net Change may not equal “gross change” for treatment group minus the “gross change” for the comparison group due to rounding.

### 2.3 CHANGE IN COLLECTION CALLS

Collection calls are calls EDCs made to customers regarding collection actions. Similar to notices, for the treatment group (PY13) participants, the study defined calls made in the 12 months prior to participation as “Pre” and calls made in the 12 months after to participation as “Post.” For the comparison group (PY14) participants, the study defined calls made between 12 and 24 months prior to participation as “Quasi Pre” and calls made in the 12 months prior to participation as “Quasi Post.”

Table 7 presents the results for the change in collection calls. The net reduction in the average number of collection calls per participant was found to be 0.90 for PECO, 1.49 for PPL, 0.19 for Duquesne Light, and 0.07 statewide.

The study did not find a reduction in the net average number of collection calls for the FE rate districts. Specifically, the number of collection calls rose from the pre to post period for both

treatment and comparison group participants, but the increase for the comparison group participants was not large enough to offset the increase for the treatment group participants.

**Table 7: Change in Collection Calls**

EDC/Rate District	Study Group	n	Pre Mean Calls per Participant	Post Mean Calls per Participant	Gross Change (#) <sup>1</sup>	Significant at 90% confidence level?	Net Change (#) <sup>2</sup>	Significant at 90% confidence level?
PECO	Treatment	50,224	3.93	5.04	1.11	Yes	(0.90)	Yes
	Comparison	44,269	3.16	5.17	2.01	Yes		
PPL	Treatment	23,838	1.18	1.00	(0.18)	Yes	(1.49)	Yes
	Comparison	23,017	0.48	1.78	1.30	Yes		
Duquesne Light	Treatment	4,167	0.58	0.45	(0.12)	Yes	(0.19)	Yes
	Comparison	6,919	0.63	0.69	0.06	Yes		
FE: Met-Ed	Treatment	9,004	1.36	3.72	2.36	Yes	1.84	Yes
	Comparison	8,405	0.50	1.02	0.52	Yes		
FE: Penelec	Treatment	12,382	1.47	3.28	1.80	Yes	1.25	No
	Comparison	6,860	0.70	1.25	0.56	Yes		
FE: Penn Power	Treatment	2,501	1.38	3.32	1.94	Yes	1.53	Yes
	Comparison	1,061	1.42	1.84	0.42	Yes		
FE: West Penn Power	Treatment	9,201	1.22	3.33	2.12	Yes	1.55	Yes
	Comparison	9,100	0.55	1.12	0.56	Yes		
Statewide	Treatment	111,317	1.83	2.79	0.97	Yes	(0.07)	Yes
	Comparison	99,631	1.20	2.24	1.04	Yes		

<sup>1</sup> Gross Change may not equal the “post” minus “pre” columns due to rounding.

<sup>2</sup> Net Change may not equal “gross change” for treatment group minus the “gross change” for the comparison group due to rounding

## 2.4 CHANGE IN SERVICE TERMINATIONS AND RECONNECTIONS

For the treatment group (PY13) participants, the study defined service terminations due to non-payment that occurred in the 12 months prior to participation as “Pre” and service terminations due to non-payment that occurred in the 12 months after participation as “Post.” For the comparison group (PY14) participants, the study defined terminations that occurred between 12 and 24 months prior to participation as “Quasi Pre” and terminations that occurred in the 12 months after participation as “Quasi Post.”

Table 8 presents the results for the change in service terminations. The net reduction in the average number of service terminations per participant was found to be 0.05 for PECO, 0.07 for PPL, and 0.05 for Duquesne Light.

The study did not find a reduction in the net average number of service terminations for the FE rate districts. Specifically, the number of service terminations increased from the pre to post period for both treatment and comparison group participants, but the increase for the comparison group

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participants was not large enough to offset the increase in the treatment group participants. The statewide average net change in service terminations was zero.

**Table 8: Change in Service Terminations**

EDC/Rate District	Study Group	n	Pre Mean Shutoffs per Participant	Post Mean Shutoffs per Participant	Gross Change (#) <sup>1</sup>	Significant at 90% confidence level?	Net Change (#) <sup>2</sup>	Significant at 90% confidence level?
<b>PECO</b>	Treatment	50,224	0.13	0.13	0.00	No	(0.05)	Yes
	Comparison	44,269	0.07	0.12	0.05	Yes		
<b>PPL</b>	Treatment	23,838	0.06	0.05	(0.02)	Yes	(0.07)	Yes
	Comparison	23,017	0.02	0.08	0.05	Yes		
<b>Duquesne Light</b>	Treatment	4,167	0.08	0.11	0.03	Yes	(0.05)	Yes
	Comparison	6,919	0.10	0.18	0.08	Yes		
<b>FE: Met-Ed</b>	Treatment	9,004	0.04	0.24	0.19	Yes	0.16	Yes
	Comparison	8,405	0.02	0.05	0.03	Yes		
<b>FE: Penelec</b>	Treatment	12,382	0.03	0.16	0.13	Yes	0.11	Yes
	Comparison	6,860	0.02	0.04	0.02	Yes		
<b>FE: Penn Power</b>	Treatment	2,501	0.02	0.11	0.09	Yes	0.07	Yes
	Comparison	1,061	0.02	0.04	0.02	Yes		
<b>FE: West Penn Power</b>	Treatment	9,201	0.02	0.16	0.14	Yes	0.11	Yes
	Comparison	9,100	0.01	0.04	0.03	Yes		
<b>Statewide</b>	Treatment	111,317	0.07	0.12	0.05	Yes	0.00	No
	Comparison	99,631	0.04	0.09	0.05	Yes		

<sup>1</sup> Gross Change may not equal the “post” minus “pre” columns due to rounding.

<sup>2</sup> Net Change may not equal “gross change” for treatment group minus the “gross change” for the comparison group due to rounding

The information that EDCs provided to the SWE indicated that the reconnection fees charged to customers are structured to fully cover the EDCs cost of reconnection. Therefore, the SWE did not analyze the change in the number of reconnections because the EDCs would not realize any financial savings from reduced reconnections. These savings would accrue solely to participants avoiding reconnection fees.

# 3

## Section 3 Monetization

This section presents the monetization algorithms and monetized values of annual impacts of changes in arrearages, collection notices, collection calls, and shutoffs. All monetized values are in 2023 dollars.

### 3.1 MONETIZED IMPACTS PER PARTICIPANT

The study monetized the following five types of financial savings.

- Reduced arrearage carrying costs
- Reduced bad debt write-offs
- Fewer collection notices
- Fewer collection calls
- Fewer shutoffs

Table 9 shows the calculation of the annual monetary values of the above EDC financial savings.

**Table 9: Monetized Annual Impact Calculations**

Impact	Calculation
Reduced arrearage carrying cost	Reduction in net arrears per participant (\$) × EDC annual interest rate on short-term debt
Reduced bad debt write-off	Reduction in net arrears per participant (\$) × EDCs' % arrears written off (2020-2022 annual average)
Fewer collection notices	Reduction in the number of collection notices per participant × EDC cost per notice (\$)
Fewer collection calls	Reduction in the number of collection calls per participant × EDC cost per call (\$)
Fewer shutoffs	Reduction in the number of shutoffs due to non-payment per participant × EDC cost per shutoff (\$)

The Act 129 IE programs can reduce arrearages for participants and the associated carrying cost of that debt for the EDCs. Table 10 shows the calculations and the resulting monetized annual value for the reduced arrearage carrying cost. For the EDC annual interest rate, instead of using the interest rates reported by the EDCs, which varied significantly across years, the SWE chose to use the Federal Funds rate projection for 2025, which would better reflect the typical interest rates in future years.<sup>3</sup> The annual monetized impact per participant from reduced arrearage carrying cost is \$1.59 for PECO, \$3.06 for PPL, \$1.20 for Duquesne Light, \$0 for FE rate districts, and \$0.77 statewide.

<sup>3</sup> <https://fred.stlouisfed.org/series/FEDTARMD>

**Table 10: Reduced Arrearage Carrying Cost**

EDC/Rate District	Average \$ reduction in arrearage per participant (A)	EDC annual interest rate on short-term debt* (B)	Annual monetized value per participant (A*B)
PECO	\$51.15	3.10%	\$1.59
PPL	\$98.76	3.10%	\$3.06
Duquesne Light	\$38.70	3.10%	\$1.20
FE: Met-Ed	\$0.00	3.10%	\$0.00
FE: Penelec	\$0.00	3.10%	\$0.00
FE: Penn Power	\$0.00	3.10%	\$0.00
FE: West Penn Power	\$0.00	3.10%	\$0.00
<b>Statewide</b>	<b>\$24.74</b>	<b>3.10%</b>	<b>\$0.77</b>

\*Median Federal funds rate projection for 2025

The Act 129 IE programs can reduce arrearages for participants, which in turn can reduce the bad debt write offs for the EDCs. Table 11 shows the calculations and the resulting monetized annual value for the reduced bad debt write-offs. The annual monetized impact per participant from reduced bad debt write-offs is \$12.62 for PECO, \$10.60 for PPL, \$7.47 for Duquesne Light, \$0 for FE rate districts, and \$4.77 statewide.

**Table 11: Reduced Bad Debt Write-off**

EDC/Rate District	Average \$ reduction in arrearage per participant (A)	EDC % of Arrears written off (Annual Average, 2020-2022) (B)	Annual monetized value per participant (A*B)
PECO	\$51.15	24.67%	\$12.62
PPL	\$98.76	10.74%	\$10.60
Duquesne Light	\$38.70	19.30%*	\$7.47
FE: Met-Ed	\$0.00	17.33%	\$0.00
FE: Penelec	\$0.00	17.33%	\$0.00
FE: Penn Power	\$0.00	17.33%	\$0.00
FE: West Penn Power	\$0.00	17.33%	\$0.00
<b>Statewide</b>	<b>\$24.74</b>	<b>19.30%</b>	<b>\$4.77</b>

\*EDC was not able to provide this information. An average write-off % across all other EDCs is used.

The Act 129 IE programs can improve affordability and reduce arrearages for participants, which in turn can reduce the collections actions for the EDCs. Table 12 shows the calculations and the resulting monetized annual value for reduced collection notice cost per participant. The annual monetized impact per participant from fewer notices is \$0.49 for PECO, \$0.67 for PPL, \$0.18 for Duquesne Light, \$0 for FE rate districts, and \$0.26 statewide.

**Table 12: Reduced Collection Notice Cost**

EDC/Rate District	Reduction in number of notices per participant (A)	EDC cost per notice (B)	Annual monetized value per participant (A*B)
PECO	0.68	\$0.73	\$0.49
PPL	0.99	\$0.68	\$0.67
Duquesne Light	0.27	\$0.66	\$0.18
FE: Met-Ed	0.00	N/A*	\$0.00
FE: Penelec	0.00	N/A*	\$0.00
FE: Penn Power	0.00	N/A*	\$0.00
FE: West Penn Power	0.00	N/A*	\$0.00
<b>Statewide</b>	<b>0.36</b>	<b>\$0.71</b>	<b>\$0.26</b>

\* EDC was not able to provide this cost information.

Table 13 shows the calculations and the resulting monetized annual value for reduced collection call cost per participant. The annual monetized impact per participant from fewer calls is \$0.05 for PECO, \$0.98 for PPL, \$0.07 for Duquesne Light, \$0 for FE rate districts, and \$0.02 statewide.

**Table 13: Reduced Collection Call Cost**

EDC/Rate District	Reduction in number of calls per participant (A)	EDC cost per call (B)	Annual monetized value per participant (A*B)
PECO	0.90	\$0.06	\$0.05
PPL	1.49	\$0.66	\$0.98
Duquesne Light	0.19	\$0.38	\$0.07
FE: Met-Ed	0.00	\$0.32	\$0.00
FE: Penelec	0.00	\$0.32	\$0.00
FE: Penn Power	0.00	\$0.32	\$0.00
FE: West Penn Power	0.00	\$0.32	\$0.00
<b>Statewide</b>	<b>0.07</b>	<b>\$0.28</b>	<b>\$0.02</b>

The Act 129 IE programs can reduce arrearages for participants, which in turn can reduce the service terminations due to non-payment. Table 14 shows the calculations and the resulting monetized annual value for the reduced service shutoff cost per participant. The annual monetized impact per participant from fewer shutoffs is \$1.05 for PECO, \$0.84 for PPL, \$0.86 for Duquesne Light, \$0 for FE rate districts, and \$0 statewide.

**Table 14: Reduced Shutoff Cost**

EDC/Rate District	Reduction in number of shutoffs per participant (A)	EDC cost per shutoff (B)	Annual monetized value per participant (A*B)
PECO	0.05	\$21.12	\$1.05
PPL	0.07	\$12.00	\$0.84
Duquesne Light	0.05	\$16.56*	\$0.86
FE: Met-Ed	0.00	N/A**	\$0.00
FE: Penelec	0.00	N/A**	\$0.00
FE: Penn Power	0.00	N/A**	\$0.00
FE: West Penn Power	0.00	N/A**	\$0.00
<b>Statewide</b>	<b>0.00</b>	<b>\$18.10</b>	<b>\$0.00</b>

\*EDC was not able to provide this information. An average cost across all other EDCs is used.

\*\* EDC was not able to provide this cost information.

Table 15 provides the total annual monetized value per participant of all five impacts quantified in the study. The total annual monetized impact per participant is \$15.80 for PECO, \$16.16 for PPL, \$9.78 for Duquesne Light, \$0 for the FE rate districts, and \$5.82 statewide.

**Table 15: Total Annual Monetized Impact Per Participant**

Annual Impact (\$ per Participant)	EDC/Rate District							Statewide
	PECO	PPL	Duquesne Light	FE: Met-Ed	FE: Penelec	FE: Penn Power	FE: West Penn Power	
Reduced arrearage carrying cost	\$1.59	\$3.06	\$1.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.77
Reduced bad debt write-off	\$12.62	\$10.60	\$7.47	\$0.00	\$0.00	\$0.00	\$0.00	\$4.77
Reduced notice cost	\$0.49	\$0.67	\$0.18	\$0.00	\$0.00	\$0.00	\$0.00	\$0.26
Reduced collection call cost	\$0.05	\$0.98	\$0.07	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02
Reduced service termination cost	\$1.05	\$0.84	\$0.86	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>TOTAL</b>	<b>\$15.80</b>	<b>\$16.16</b>	<b>\$9.78</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$5.82</b>

### 3.2 MONETIZED IMPACTS PER KWH OF SAVINGS

The study converted the monetized impacts presented in Table 15 per participant into monetized impacts per kWh of savings by dividing the impact per participant by the average kWh savings per participant in PY13 from Act 129 IE programs for each EDC.

Table 16 presents the average kWh savings per participant in PY13 and the resulting monetized impacts per kWh. The total annual monetized impact is 5.9 cents/kWh for PECO, 4.6 cents/kWh for PPL, 1.9 cents/kWh for Duquesne Light, 0 cents/kWh for the FE rate districts, and 1.9 cents/kWh statewide.

**Table 16: Total Annual Monetized Impact Per kWh**

Annual Impact (\$ per kWh)	EDC/Rate District							Statewide
	PECO	PPL	Duquesne Light	FE: Met-Ed	FE: Penelec	FE: Penn Power	FE: West Penn Power	
Average kWh savings per participant	267	351	517	320	297	327	340	314
Reduced arrearage carrying cost	\$0.006	\$0.009	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.002
Reduced bad debt write-off	\$0.047	\$0.030	\$0.014	\$0.000	\$0.000	\$0.000	\$0.000	\$0.015
Reduced notice cost	\$0.002	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.001
Reduced collection call cost	\$0.000	\$0.003	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Reduced service termination cost	\$0.004	\$0.002	\$0.002	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
<b>TOTAL</b>	<b>\$0.059</b>	<b>\$0.046</b>	<b>\$0.019</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.019</b>

### 3.3 BENCHMARKING

The SWE compared the monetized values of the arrearage- and collections-related impacts per participant in this study, which were presented in Table 15, to the range of per-participant impact values found in similar studies of low-income energy conservation and weatherization programs in other jurisdictions. Table 17 provides a comparison of this study’s estimates to those found in the literature. The monetized values for Pennsylvania EDCs were generally within the range of the values found in the literature. A notable exception is the reduced bad debt write-off for which the monetized value in Pennsylvania was higher than the high end of the range. This suggests that a higher percentage of arrearages must be written off in Pennsylvania, on average, than those in jurisdictions examined in similar studies.

**Table 17: A Comparison of Annual Monetized Impacts per Participant**

Impact	PECO	PPL	Duquesne Light	Pennsylvania Statewide	The Literature*		
					Low	High	Typical
Reduced Arrearage Carrying Cost	\$1.59	\$3.06	\$1.20	\$0.77	\$1.50	\$4.00	\$2.50
Reduced Bad Debt Write-off	\$12.62	\$10.60	\$7.47	\$4.77	\$0.50	\$3.75	\$1.75
Reduced Collection Notice Cost	\$0.49	\$0.67	\$0.18	\$0.26	\$0.05	\$1.50	\$0.60
Reduced Collection Call Cost	\$0.05	\$0.98	\$0.07	\$0.02	\$0.40	\$1.50	\$0.90
Reduced Shutoff Cost	\$1.05	\$0.84	\$0.86	\$0.00	\$0.10	\$3.65	\$0.65
<b>TOTAL</b>	<b>\$15.80</b>	<b>\$16.16</b>	<b>\$9.78</b>	<b>\$5.82</b>	<b>\$2.55</b>	<b>\$14.40</b>	<b>\$6.40</b>

\*Source: Northeast Energy Efficiency Partnerships. (2017). [Non-Energy Impacts Approaches and Values: An Examination of the Northeast, Mid-Atlantic, and Beyond](#). Table 20: Weatherization Non-Energy Impact Value Ranges.

## Section 4 SWE Recommendations for 2026 TRC Test Order

### 4

This section presents the SWE's recommendations for the Tentative 2026 TRC Test Order.

The SWE recommends that the Commission propose to incorporate into the TRC Test Order and the Avoided Cost Calculator (ACC) the benefits of EDC financial savings from their Act 129 IE energy-efficiency programs quantified in this study. As this study has demonstrated, the energy-efficient technologies installed by the EDCs Act 129 energy-efficiency programs have resulted in reduced EDC costs through reduced arrearage carrying cost, reduced bad debt write-offs, fewer collection notices, fewer collection calls, and fewer shutoffs.

The SWE recommends adopting EDC-specific results for PECO, PPL, and Duquesne Light but statewide average values for the FE rate districts. The benefits apply for the Effective Useful Life (EUL) of the installed measures. The benefit values presented in this report ([Table 16](#)) are in 2023 dollars and the SWE recommends applying the inflation rate and escalation rate as defined in the TRC Test Order and assumed throughout the TRC model. In addition, the SWE recommends applying transmission and distribution losses (or line losses) to reflect the energy savings at the system level, as detailed in Volume 1 of the 2021 TRM (the average per kWh savings reported in [Table 16](#) are reported at the residence level).

[Table 18](#) presents the per MWh values in 2026 dollars, adjusted for line losses and inflation, the SWE recommends for each EDC.

The SWE recommends considering an updated study in the future for the FE rate districts. It is unclear why the study did not find reductions in arrears, collection notices, collections calls and shutoffs for the FE rate districts; differences between the treatment and comparison groups for the FE rate districts not found for the other EDCs could account for this. If a follow-up study is conducted, the SWE recommends replacing the statewide average with the results of the follow-up study for the FE rate districts.

**Table 18: Recommended Total Annual Monetized Impact for Use in the 2026 TRC Test Order**

EDC/Rate District	Average kWh savings per participant (System Level) <sup>1</sup>	Total Annual Impact Per MWh, 2026 Dollars
PECO	288	\$58.14
PPL	382	\$44.87
Duquesne Light	556	\$18.67
FE: Met-Ed	350	\$18.10
FE: Penelec	325	\$18.10
FE: Penn Power	358	\$18.10
FE: West Penn Power	372	\$18.10
<b>Statewide</b>	<b>341</b>	<b>\$18.10</b>

<sup>1</sup> Per participating kWh were adjusted for transmission and distribution losses (or line losses) to reflect the energy savings at the system level as detailed in Volume 1 of the 2021 TRM.