**BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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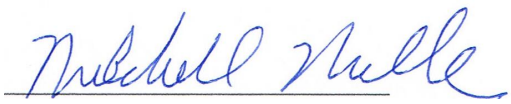
| Pennsylvania Public Utility Commission | : | |
| | : | |
| v. | : | Docket No. R-2020-3018929 |
| | : | |
| PECO Energy Company – Gas Division | : | |

**VERIFICATION**

I, Mitchell Miller, verify that the following testimony was prepared by me or under my direct supervision, and is true and correct to the best of my knowledge, information, and belief:

- CAUSE-PA Statement 1: Direct Testimony of Mitchell Miller and Appendices A-C
- CAUSE-PA Statement 1-SR: Surrebuttal Testimony of Mitchell Miller and Appendices A-C

I understand that statements made herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).



Mitchell Miller
*Witness for CAUSE-PA*

Date: February 15, 2021

R-2020-3018929
2/17/21 JK

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DIRECT TESTIMONY OF MITCHELL MILLER

ON BEHALF OF

THE COALITION FOR AFFORDABLE UTILITY SERVICES AND

ENERGY EFFICIENCY IN PENNSYLVANIA ("CAUSE-PA")

December 22, 2020

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# PREPARED DIRECT TESTIMONY OF MITCHELL MILLER

**Q: Please state your name, occupation, and business address.**

A: Mitchell Miller. I provide consulting services regarding utility programs that promote the public interest with a focus on low-income households. My address is 60 Geisel Road, Harrisburg, PA 17112.

**Q: Briefly outline your education and professional background.**

A: As my attached resume shows, I received a B.S. in Community Development from Pennsylvania State University, where I graduated *cum laude* in 1974, and an M.A. in Public Administration from Shippensburg University in 1984. I have over 35 years of experience in the development, implementation, and evaluation of program design for residential utility consumers. The focus of my work has concerned education, energy efficiency, credit and collections, and customer assistance programs.

After serving as a research analyst at both the Pennsylvania Governors Action Center and the Pennsylvania Public Utility Commission ("Commission"), I was appointed Chief of the Commission's Division of Research and Planning in 1978 and, in 1992, I was designated as the Director of the Bureau of Consumer Services, where I served until my retirement from the Commission in 2009.

Following my retirement from the Commission in 2009, I served for over three years as a consultant to the Pennsylvania Department of Community and Economic Development ("DCED") on weatherization and energy efficiency for the Pennsylvania Weatherization Assistance Program (WAP). My resume is attached as Appendix A.

**Q: Please describe the focus of your work over the past thirty-five years.**

A: During my tenure at the Commission, I was primarily engaged in activities relating to regulatory policy involving residential customer service, complaint handling, credit and collections, and universal service - including customer assistance programs and low-income energy efficiency and conservation programs. The Bureau of Consumer Services has regulatory authority and responsibility for policy development for all areas of consumer services, including resolving consumer complaints and problems; enforcing consumer regulations; developing, implementing, and evaluating programs involving complaint handling, complaint analysis, and collections; enforcement of consumer regulations; and design and implementation of customer assistance and conservation programs. My focus at DCED was the creation of a performance-based Weatherization Assistance Program system, dedicated to a high standard of quality, compliance, and production.

**Q: What is your relevant experience on issues of low-income utility affordability?**

A: During my tenure, the Commission emerged as a national leader in research, development, and oversight of programs addressing credit and collection issues affecting low-income utility consumers. I was responsible for evaluating utility and Commission customer service programs, identifying problems, and making recommendations for change. These activities led to the recognition of the need for development of integrated programs for low-income consumers. As director of BCS, I was responsible for the development, oversight, and monitoring of the initial pilot and then the statutorily required low-income Universal Service Programs. Each of these programs is structured to provide a different form of assistance to low-income customers to enable those customers to afford and maintain basic service. For example, the Customer Assistance Program (CAP) provides alternatives to traditional collection methods for low-income, payment

troubled utility customers, and the Low-Income Usage Reduction Program (LIURP) is a targeted weatherization program designed to assist low-income households with high consumption, payment problems, and arrearages. These programs work in tandem and are designed to assist low-income households have affordable utility services and safe living environments while reducing utility collection and therefore benefitting other ratepayers.

As director of BCS, I supervised the review and determination of thousands of low-income consumer complaints and inquiries, as well as the reviews of utility performance at handling these complaints and inquires.

I directed the creation, development, and evaluation of the effectiveness and the expansion of the Universal Service Programs in Pennsylvania that are targeted toward low-income households. These programs included CAP and LIURP, as well as the Customer Assistance Referral Evaluation (CARES) and Hardship Fund programs. From the inception of these programs and through my retirement in 2009, the Bureau of Consumer Services – under my direction – was responsible for Commission oversight of these programs. This oversight responsibility was codified and formalized after the passage of the Electricity Generation and the Natural Gas Customer Choice and Competition Acts, which explicitly require that the Commission ensure universal service and energy conservation services are appropriately funded and available in each utility distribution territory.

Further, upon my retirement from the Commission, I served as a consultant on weatherization and energy efficiency for the Pennsylvania Weatherization Assistance Program (WAP), which is administered by the Department of Community and Economic Development (DCED). I helped transform WAP by creating a performance-based system, dedicated to a high standard of quality, compliance, and production. Innovations included introducing performance

standards for production, quality, and compliance, as well as implementation of independent state certification and training for all state WAP workers. I was also responsible for coordinating DCED's WAP program with the Commission's LIURP and Act 129 low-income programs. In addition to consulting on WAP, I also served as a policy consultant for the Philadelphia Water Department from 2013 to 2016. In this role, I assisted the Department to improve the informal dispute and hearing process, and to develop deferred payment agreements.

I have participated at the National Association of Regulatory Utility Commissioners (NARUC), the National Low-income Energy Consortium and the National Energy Utility Affordability Conference meetings, and have presented numerous sessions related to low-income utility affordability. I also previously served on the board of directors of the Keystone Energy Efficiency Alliance (KEEA) and as co-chair of the KEEA annual conferences, and I am currently a member of the WAP Policy Advisory Council.

**Q: Have you testified in any proceeding before the Pennsylvania PUC?**

A: Yes. I have presented testimony in many proceedings before the PUC. A complete list is included in my resume, which is attached as Appendix A.

**Q: Have you provided litigation support for the Commission?**

A: Although I did not testify in any proceeding during my tenure at the Commission, I directed the Bureau's activities in policy development and enforcement litigation to ensure compliance with customer service regulations and statutes.

**Q: For whom are you testifying in this proceeding?**

A: I am testifying on behalf of the Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania (CAUSE-PA).

**Q: What is the purpose of your testimony?**

A: CAUSE-PA intervened in this proceeding to ensure that the proposed rate increase and rate design will not adversely affect the ability of low income customers in PECO Energy Company – Gas Division's (PECO, PECO Gas, or the Company) service territory to connect, maintain, and afford natural gas service, which is essential for heating, cooking, and hot water – all critical components to a safe and healthy home.

**Q: How is your testimony organized?**

A: My testimony is divided into four substantive sections and one section briefly summarizing the proposals and recommendations that I will make throughout my testimony.

In section I, I discuss the financial impact that PECO's proposed residential rate increase will have on its low-income ratepayers, particularly in the face of the ongoing global pandemic and unfolding economic crisis. According to PECO's own estimates, approximately 1 in 5 of its residential customers are low income.[1] These households were struggling to pay for basic life necessities before crisis hit, and now face unprecedented economic hardship as the state continues to grapple with a pandemic that has had a disproportionately devastating impact on low income families. Further increasing the cost of natural gas service will further increase levels of existing

[1] See CAUSE-PA to PECO I-10 (102,409 estimated low-income customers as of January 2020); see also CAUSE-PA to PECO I-5(a) (491,475 total residential customers as of October 2020).

**All interrogatory responses cited herein are attached as Appendix B.**

unaffordability, leading to increased terminations and associated health risks. As I will explain, PECO's current rates – *including reduced rates available to low income customers through its Customer Assistance Program (CAP)* – are already categorically unaffordable for economically vulnerable customers, leading to far greater payment trouble and terminations rates for low income households. Further increasing the cost of basic service will serve to further exacerbate the affordability gap – forcing more households to go without critical gas service, or to forego other life necessities like medicine, water, and electricity, in order to afford heat and cooking services to their home. As such, I recommend that PECO's rate increase be rejected in its entirety.

In section II, I will discuss PECO's proposed rate design. PECO is proposing to recover an increased portion of the residential cost of service through a fixed monthly customer charge. High fixed charge rate design undermines the cost savings achievable through energy efficiency and conservation, and devalues millions of dollars in ratepayer investments into energy efficiency and conservation through the Low Income Usage Reduction Program (LIURP) and through PECO's voluntary gas energy efficiency and conservation program.

In section III, I will briefly address PECO's voluntary Energy Efficiency and Conservation programs. While I am generally supportive of PECO's proposals, I recommend adjustments to the program to more equitably and proportionately serve low income consumers and to more appropriately coordinate programing with other utility, state, and federal programs available across PECO's service territory.

In section IV, I will address PECO's proposal for recovery of universal service costs. In this proceeding, PECO is proposing to continue recovering universal service costs exclusively from residential consumers, despite the Commission's recognition that energy poverty is not caused by the residential class alone, and its declaration that universal service costs should no

longer be routinely recovered exclusively from residential customers. I will address the need for equitable cost-sharing of public purpose program costs, including universal service program costs, across all rate classes.

Finally, in section V, I will summarize the recommendations and proposals which I provided throughout my direct testimony.

**Q: Please summarize the Company's requested rate increase as it applies to residential customers.**

A: PECO proposes to increase overall rates by approximately $68.7 million per year, or 8.9% over present revenues.[2] Of that amount, the Company proposes to generate approximately $43.2 million in additional revenue through an increase in residential rates.[3] PECO's proposal would increase the average residential customer's monthly bill from $78.85 to $85.97, an increase of $7.12 per month or approximately 9.03%.[4] Most of the impact of the proposed rate increase for residential customers comes from a substantial increase to the fixed monthly service charge – from $11.75 to $16.00, an increase of $4.25 or 36%.[5] Thus, homes using the least amount of gas will face the highest percentage increase, while homes using more gas will see a lower percentage increase.

**Q: As a preliminary matter, do you support the Company's requested rate increase?**

A: No. Now is not the time to raise rates for essential utility services, such as natural gas, that are critical to ensure that consumers are safe in their homes. As I will explain in greater detail

[2] PECO St. 1 at 5:13-14.

[3] PECO Exh. JAB-1.

[4] Rate Filing Cover Letter at 2; see also Ex. 111, Sched. 6 at 1.

[5] PECO St. 7 at 14:7-12.

below, the COVID-19 pandemic has thrust us into an unprecedented time of great economic uncertainty, which has undeniably fallen hardest on low income communities. While Pennsylvania has moved in recent months to reopen its economy, we continue to face setbacks as the deadly COVID-19 virus continues to spread across our communities. Many employers have already announced that they will never reopen, and those that do plan to reopen face tremendous hurdles to doing so safely - resulting in long-term job losses and ongoing reductions in staffing, especially for low wage, hourly workers.[6] The depth and breadth of Pennsylvania's long-term unemployment rates, and the resulting increase in the level of poverty in PECO's service territory and across the state, is not yet clear. That said, it is undeniable that the pandemic will have deep and lasting impacts on our economy that cannot be accurately assessed or accounted for in the context of this rate proceeding.

As a foundational principle, I do not believe that rates are just and reasonable if they are not also reasonably affordable for those seeking service. Right now, given the far-ranging economic uncertainty associated with the pandemic and its impact on poverty rates and rate affordability in PECO's service territory and across the state,[7] it is impossible to reasonably assess whether low income consumers will be able afford the Company's natural gas service if its rates are increased as proposed. As discussed in greater length below, PECO's rates for low income customers – including its reduced rates for those enrolled in its Customer Assistance Program

[6] See John C. Austin & Brad Hershbein, In Many Communities, COVID-19 Will Permanently Kill Jobs. Here's How They Can Respond, Brookings (Sept. 17, 2020); see also David Autor, Elizabeth Reynolds, The Nature of Work After the COVID Crisis: Too Few Low-Wage Jobs (July 16, 2020, https://www.hamiltonproject.org/papers/the_nature_of_work_after_the_covid_crisis_too_few_low_wage_jobs?_ga=2.234444569.601280638.1608005876-803488704.1608005876; Stephanie Aaronson & Wendy Edelberg, Tracking the Mounting Challenges Among Those Who Have Lost Their Jobs, Brookings (Nov. 5, 2020), https://www.brookings.edu/blog/up-front/2020/11/05/tracking-the-mounting-challenges-among-those-who-have-lost-their-jobs/.

[7] I discuss the impact of the pandemic on poverty rates at length in section I, below.

(CAP) – are already categorically unaffordable. Until we can more precisely understand the economic impact of the pandemic on local communities and individuals, I do not believe it is appropriate for the Commission to approve *any* increase in rates. Rather, I recommend that the Commission deny PECO's proposed rate request in its entirety, and take immediate steps to address categorical unaffordability within PECO's CAP through adoption of the Commission's revised energy burden standards.

Nevertheless, and notwithstanding this overarching recommendation, I will provide a number of recommendations below for how PECO could mitigate rate unaffordability for the Company's most economically vulnerable consumers. The majority of these recommendations apply regardless of whether any rate increase is ultimately approved, but are especially critical if the Commission ultimately approves an increase in rates for basic service in the midst of the unprecedented pandemic and economic crisis.

# I. RATE IMPACT ON LOW-INCOME HOUSEHOLDS

### *a. PECO Serves a Substantial Low Income Population*

**Q: How many customers in PECO's service territory are considered low-income?**

A: This is a difficult question to answer. While the Company has provided data about its low-income customers, the economic landscape has and continues to change drastically as a result of the pandemic. Issues with PECO's method of tracking low income customers also present a challenge in accurately assessing PECO' low income customer population. Regardless of these challenges, it is undeniable that PECO serves a considerable number of low income customers in its service territory.

Pennsylvania's large public utilities track and assess their low-income customer population two ways: estimated low-income customers and confirmed low-income customers.[8] While the number of estimated and confirmed low-income customers in PECO's service territory is sure to grow due to the economic impact of the COVID-19 pandemic, which I will discuss further below, available data shows that the Company had a substantial number of low-income customers even before the crisis - the vast majority of which are not served by PECO's universal service programs.

PECO estimates that 102,409 – or roughly 1 in 5 (20%) of its residential customers – are low-income.[9] This is PECO's "estimated low-income customer" count. PECO calculates its estimated low income customers as part of its Commission-approved needs assessment included in PECO's Universal Service and Energy Conservation Plan (USECP). To arrive at this estimate, PECO uses county level census data for low income households, which is then scaled consistent with its residential customer count in each county.[10]

PECO also tracks "confirmed low-income customers", which PECO defines as those who have provided "verified financial statements within the last two years."[11] As of October 2020, just

[8] See Pa. PUC, BCS, 2019 Report on Universal Service Programs & Collections Performance, at 4 (Sept. 2020) (herein 2019 Universal Service Report).

[9] See CAUSE-PA to PECO I-10 (102,409 estimated low-income customers as of January 2020); see also CAUSE-PA to PECO I-5(a) (491,475 total residential customers as of October 2020).

To be considered low-income, a household must have income which is at or below 150% of the federal poverty level (FPL). For context, a family of four with income at or below 150% FPL has a *maximum* gross annual income of $39,300 – or $3,275 per month. See US Dept. of Health and Human Services, HHS Poverty Guidelines for 2020, https://aspe.hhs.gov/poverty-guidelines.

[10] See CAUSE-PA to PECO I-10; see also PECO Energy Company Universal Service and Energy Conservation Plan 2016-2018, at 4 (Feb. 17, 2017), https://www.puc.pa.gov/pcdocs/1510970.pdf (hereinafter PECO USECP). Note that PECO's 2016-2018 USECP is still effective, as its subsequent USECP for 2019-2024 remains pending before the PUC.

[11] See CAUSE-PA to PECO I-3(a), I-4(a).

2.9% (14,257) of PECO's residential customers were classified as "confirmed low-income customers."[12] This figure is a gross underestimation of PECO's low income customer population.

In my opinion, PECO's estimated low-income customer count provides a far more realistic assessment of the number of low-income households served by PECO Gas because it uses verified census data and PECO customer data to arrive at a reasonable approximation of low income customers in the service territory. In contrast, PECO's confirmed low-income customer count provides a circular assessment of its low-income customer population – counting only the customers who have recently provided PECO with verified income documentation to enroll in an assistance program.

Notably, PECO's "confirmed low income customer" count is even lower than PECO's CAP enrollment, which stood at 20,147 at the end of October.[13] There are two reasons for this unusual result. First, PECO automatically recertifies LIHEAP recipients, and therefore does not consider them to be "confirmed low income" because they have not provided income documentation to PECO within the last two years – even though they must provide such documentation to the Department of Human Services in order to obtain a LIHEAP grant.[14] PECO has also temporarily waived recertification for some CAP participants as a result of challenges obtaining documentation created by the pandemic.[15] PECO does not count these customers as confirmed low income customers, despite the fact that they have previously provided PECO with income documentation in order to enroll in the program.

[12] CAUSE-PA to PECO I-3(a), I-4(a).
[13] CAUSE-PA to PECO I-6(a).
[14] CAUSE-PA to PECO I-5.
[15] CAUSE-PA to PECO I-5.

**Q: How much income must a household earn each month to be considered low-income?**

A: With some exceptions, most utility assistance programs require households to have income that is not greater than 150% of the federal poverty level (FPL) to qualify. The FPL is a measure of poverty based exclusively on the size of the household, but not the composition of the household (i.e., whether the household consists of adults or children) or geography. As a baseline, a family of four at 150% FPL has a gross annual income of just $39,300, while a family of four at 50% FPL has a gross annual income of just $13,100.[16] For further context, a full time (40 hour/week) worker making minimum wage ($7.25/hour) has a gross annual income of $15,080, assuming no time off. This is not very much money, and is substantially less than a household needs to meet their basic expenses in any of the counties in PECO's service territory.[17]

A benchmark often used to assess how much income a household needs to live without assistance in Pennsylvania is called the Self Sufficiency Standard. This is a tool that measures the income that a family must earn to meet their basic needs and consists of the combined cost of 6 basic needs – housing, child care, food, health care, transportation, and taxes – without the help of public subsidies.[18] Unlike the federal poverty level, which does not change based on geographic location or family composition, the Self Sufficiency Standard accounts for the varied costs of these six basic needs in different geographical areas and for differently aged household members.[19] For reference, the *average* Self Sufficiency Standard in PECO's service territory for a family of four

[16] U.S. Dept. of Health and Human Services, 2020 U.S. Federal Poverty Guidelines, available at https://aspe.hhs.gov/2020-poverty-guidelines.

[17] Self Sufficiency Standard, http://www.selfsufficiencystandard.org/Pennsylvania.

[18] See PathWays PA, Overlooked and Undercounted 2019 Brief: Struggling to Make Ends Meet in Pennsylvania, available at: http://www.selfsufficiencystandard.org/Pennsylvania.

[19] Id.

with two adults, one infant, and one preschooler is approximately $86,111 per year – approximately $46,811 more than a household of 4 with income at 150% FPL makes in a given year ($39,300).[20]

Most of PECO's confirmed low-income customers do not have income that is even close to these numbers. The average annual income for the Company's confirmed low-income customers is $15,647.24, and the average income for the Company's CAP customers is just $14,004.22.[21] These customers have far less than the amount needed to be self-sufficient and to live without financial assistance. Any increase in the cost of necessities, including the rates for natural gas service for heating, cooking, and hot water, will result in increased unaffordability for low and moderate income households, and will likely cause a corresponding increase in the rate of uncollectible expenses and involuntary service termination.

Note that these average CAP household income figures do not reflect any decrease in income for low-income customers from whom PECO had already obtained income information prior to the COVID-19 crisis but who may have suffered decreased income due to the pandemic.[22]

[20] Average Self Sufficiency Standard in the 5 Pennsylvania counties served by PECO-Gas (Bucks, Chester, Delaware, Montgomery, and York) for a four-person households that include two adults, one infant, and one preschooler. See 2020 Pennsylvania Sufficiency Standard, available at: http://www.selfsufficiencystandard.org/Pennsylvania.

[21] CAUSE-PA to PECO I-17, I-18.

[22] See Kim Parker, Rachel Minkin & Jesse Bennett, Economic Fallout from COVID-19 Continues to Hit Lower-Income Americans the Hardest (Sept. 24, 2020), www.pewsocialtrends.org/2020/09/24/economic-fallout-from-covid-19-continues-to-hit-lower-income-americans-the-hardest/. "Lower-income adults continue to be the most affected by coronavirus related job loss or pay cuts. Some 47% of those with lower incomes say they or someone in their household has had these experiences, compared with 42% of those with middle incomes and 32% of upper-income adults." Id. Half of adults who reporting being laid off as a result of the pandemic remain unemployed, and about 21% reported having personally experienced a reduction in pay or hours. Id.

**Q: Please explain how the COVID-19 pandemic has impacted the poverty rate in PECO's service territory.**

A: I believe the number of low-income households in PECO's territory is likely much higher than ever before as a result of the COVID-19 pandemic. Low-income workers are less likely to have paid sick leave or personal time to care for themselves or their families.[23] Many low wage and hourly workers and are employed in the service, hospitality, and retail sectors, which have been especially hard hit by the emergency closure of non-essential businesses.[24]

Until now, many of the emergency measures necessary to protect public health – including protections from eviction, foreclosure, and utility terminations, as well as short-term emergency unemployment assistance – have somewhat masked the extent of the problem. But available data is foreboding, and suggests unprecedented levels of long-term unemployment for low wage workers, as well as unconscionable levels of evictions, foreclosures, and utility terminations:

- In March 2020, Pennsylvania's unemployment claims rose from 15,439 to 378,900 in one week – the most of any state in the country.[25]

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[23] 92% of workers in the top quarter of earnings (meaning hourly wages greater than $32.21) have access to some form of paid sick leave, versus only 51% of workers earning wages in the lowest quarter ($13.80 or less). See Drew Desilver, As coronavirus spreads, which U.S. workers have paid sick leave – and which don't?, Pew Research Center, March 12, 2020, available at https://www.pewresearch.org/fact-tank/2020/03/12/as-coronavirus-spreads-which-u-s-workers-have-paid-sick-leave-and-which-dont/.

[24] See Martina Hund-Mehjean & Marcela Escobari, Brookings, Our Employment System has Failed Low-Wage Workers. How Can We Rebuild (April 28, 2020), https://www.brookings.edu/blog/up-front/2020/04/28/our-employment-system-is-failing-low-wage-workers-how-do-we-make-it-more-resilient/.

> [W]orkers who earn low wages and do not have employer-sponsored health care account for 22 percent or 32 million of the country's workforce. In a crisis, these workers are least attached to their employer and thus the most likely to be laid off or have their hours reduced. And nearly 40 percent of them, 12.3 million individuals, work in the hospitality and retail sectors, the two sectors most immediately impacted by COVID-19-related layoffs.

Id.; see also Stephanie Deluca et al., Johns Hopkins Univ. of Medicine, The Unequal Cost of Social Distancing, https://coronavirus.jhu.edu/from-our-experts/the-unequal-cost-of-social-distancing.

[25] See Kris Maher and Eric Morath, Pennsylvania, With Most Jobless Claims in U.S., Could Foretell High Numbers Elsewhere, Wall Street Journal (March 27, 2020), available at https://www.wsj.com/articles/pennsylvania-with-

- As of December 12, 2020, 2,447,996 Pennsylvanians had filed for unemployment since the start of the pandemic– representing over 19% of the state's total population.[26]
- While weekly unemployment claims improved through the fall, dropping to a low of 19,223 the week of October 11, that number more than doubled the week ending December 5, 2020, to 40,833 – and remained at 39,258 the week ending December 12, 2020.[27]
- Over 2.9 million (30.2%) Pennsylvania households anticipate a loss in household income in the next 4 weeks.[28]
- Approximately 333,205 Pennsylvania adults (35.2%) live in households that are not current on rent or mortgage, and eviction or foreclosure is either likely to somewhat likely in the next two months; and 619,033 Pennsylvania households report that they are currently behind on rent or mortgage payments, or have slight or no confidence that they will be able to pay next month's rent or mortgage on time.[29]
- As of November 30, 2020, residential utility debt for regulated natural gas, electric, and water services was up 71% year over year, from $429.5 million to $734.5 million, and the number of residential customers eligible for termination was up 35% year over year, from 663,349 to 894,944.[30]
    - Across PECO's electric and gas divisions, residential arrears increased 187% year over year, from $42.6 million in 2019 to $122.3 million in 2020; and residential customers eligible for termination was up 64% year over year, from 80,193 in November 2019 to 131,241 in November 2020.[31]

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most-jobless-claims-in-u-s-could-foretell-high-numbers-elsewhere-11585323969; see also Pa. Office of Unemployment Compensation, UC Claim Statistics, https://www.uc.pa.gov/COVID-19/Pages/UC-Claim-Statistics.aspx.

[26] Pa. Office of Unemployment Compensation, UC Claim Statistics, https://www.uc.pa.gov/COVID-19/Pages/UC-Claim-Statistics.aspx.; US Census Bureau, QuickFacts: Pennsylvania, https://www.census.gov/quickfacts/PA.

[27] Id.

[28] US Census Bureau, Household Pulse Survey: Measuring Household Experiences During the Coronavirus Pandemic, Interactive Data Tool (Oct. 28, 2020 to Dec. 21, 2020), https://www.census.gov/data/experimental-data-products/household-pulse-survey.html.

[29] Id.

[30] Appendix C, Residential Utility Debt and Arrears, which compiles data reported by utilities to the PUC at docket M-2020-3019244. See Public Utility Service Termination Proclamation of Disaster Emergency – COVID-19, PUC Docket No. M-2020-3019244, Responses of Electric, Gas, and Water Utilities to the PUC's Request for Data (filed Dec. 15, 2020).

[31] Appendix C, Residential Utility Debt and Arrears; see also Public Utility Service Termination Proclamation of Disaster Emergency – COVID-19, Response of PECO Energy Company, Docket No. M-2020-3019244 (filed Dec. 15, 2020).

As the crisis continues, the number of people who are out of work or who experience a reduction in available work or pay, will continue to grow – especially among low-wage workers most susceptible to pandemic related job losses.

### *b. PECO's Proposed Increase will Exacerbate Current Levels of Unaffordability*

**Q: What is the projected financial impact of the proposed rate increase on low-income households?**

A: Low-income households are struggling now more than ever. Even in good times, low-income families struggle to make ends meet each month, and are often forced to choose between critical necessities. Any increase in costs for essential services, like natural gas, will severely impact low-income households – forcing many to make impossible trade-offs between paying for shelter, food, utilities, or other basic needs. At proposed rates, a residential consumer using 8 mcf/month would face a monthly increase of $7.07 – or $84.84 each year. This is a substantial increase in basic living expenses for low income households. For PECO's average confirmed low income customer, whose income is just $15,647.24 each year ($1,303.94/month), this increase represents an additional 0.5% of their total gross annual household income. While this may seem like a small number, it is substantial in terms of measuring an affordable energy burden, defined as the percentage of total household income paid toward household energy costs.[32] For low-income households who already struggle to afford their monthly bills, the effects of the increase may profoundly impact their ability to connect, maintain, and afford natural gas service.

[32] See 52 Pa. Code § 69.265(2)(i).

**Q: What is an "affordable energy burden"?**

A: As I noted above, an "energy burden" is the percentage of gross household income that a consumer pays for home energy costs. According to formal Commission policy, a household's combined household energy burden (gas and electric) should not exceed 6% of household income for those with income between 0-50% FPL, or 10% of household income for those with income between 51-150% FPL.[33] For gas heating customers, the Commission's affordability standards are set at 4% and 6%, respectively.[34] Unfortunately, across Pennsylvania, households with income at or below 150% FPL spend as much as 29% of their income on *energy costs alone*.[35] In comparison, BCS estimates that the energy burden of Pennsylvania's residential customers as a whole is roughly 4%.[36]

**Q: Is there other evidence that PECO's low-income customers are already struggling to afford and maintain natural gas service – even before any rate increase is approved?**

A: Yes. As of October 2020, 67% of PECO's CAP customers were payment troubled,[37] compared to just 16% of non-low income residential customers.[38] Because PECO undercounts its confirmed low income customers, as explained above, it is likely that many in the latter group are

[33] Id.
[34] Id.
[35] See Fisher, Sheehan & Colton, The Home Energy Affordability Gap: Pennsylvania (April 2019), http://www.homeenergyaffordabilitygap.com/03a_affordabilityData.html.

[36] Energy Affordability for Low-income Customers, Docket No. M-201702587711, Order, at 8 (Jan. 17, 2019); see also Diana Hernandez, Energy Insecurity: A Framework for Understanding Energy, the Built Environment, and Health Among Vulnerable Populations in the Context of Climate Change, 103(4) Am. J. Pub. Health (2013), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3673265/#bib20.

[37] CAUSE-PA to PECO I-6(a) (total CAP customers was 20,147 in October 2020); CAUSE-PA to PECO I-20(a) (total payment troubled CAP customers was 13,453 in October 2020).
[38] CAUSE-PA to PECO I-5(a) (total residential non-CAP and non-confirmed low income was 469,323 in October 2020); CAUSE-PA to PECO I-20(a) (total payment troubled residential, excluding CAP and confirmed low income, was 75,687 in October 2020).

low income, but they have not recently been verified as low income by PECO or otherwise enrolled in CAP. This is especially true given the current economic crisis, in which many families have fallen into poverty for the first time. Chart 1 shows the disparity in payment trouble for residential customers compared to PECO's low income CAP customers over the last 3 years

**CHART 1: Payment Troubled Customers, Residential vs. CAP**[39]

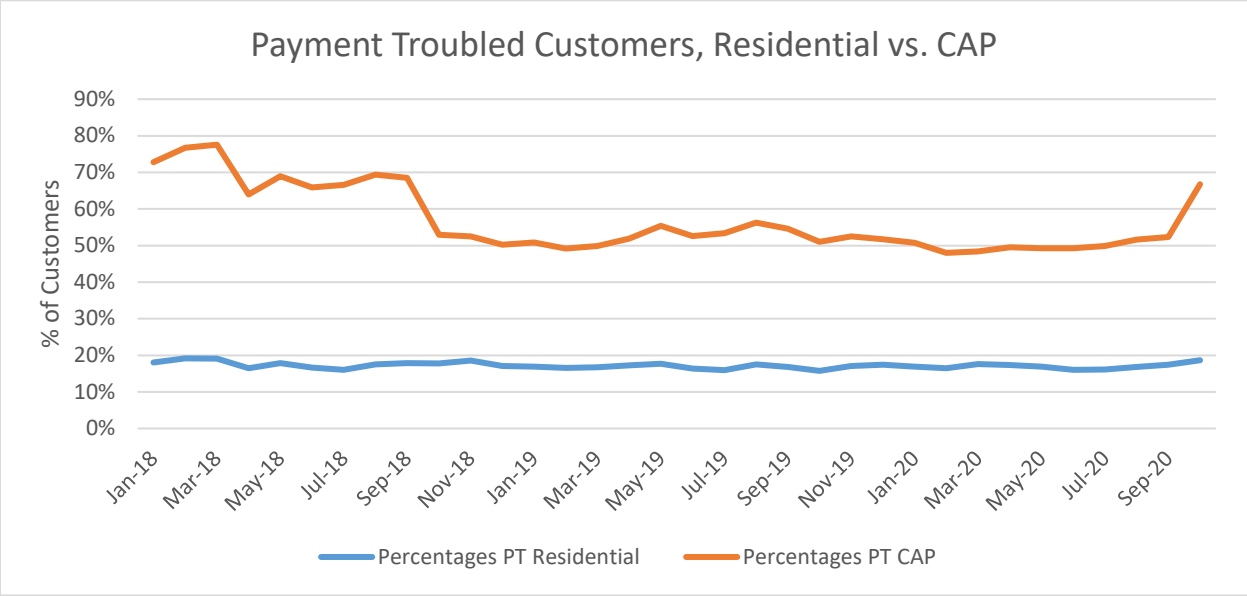
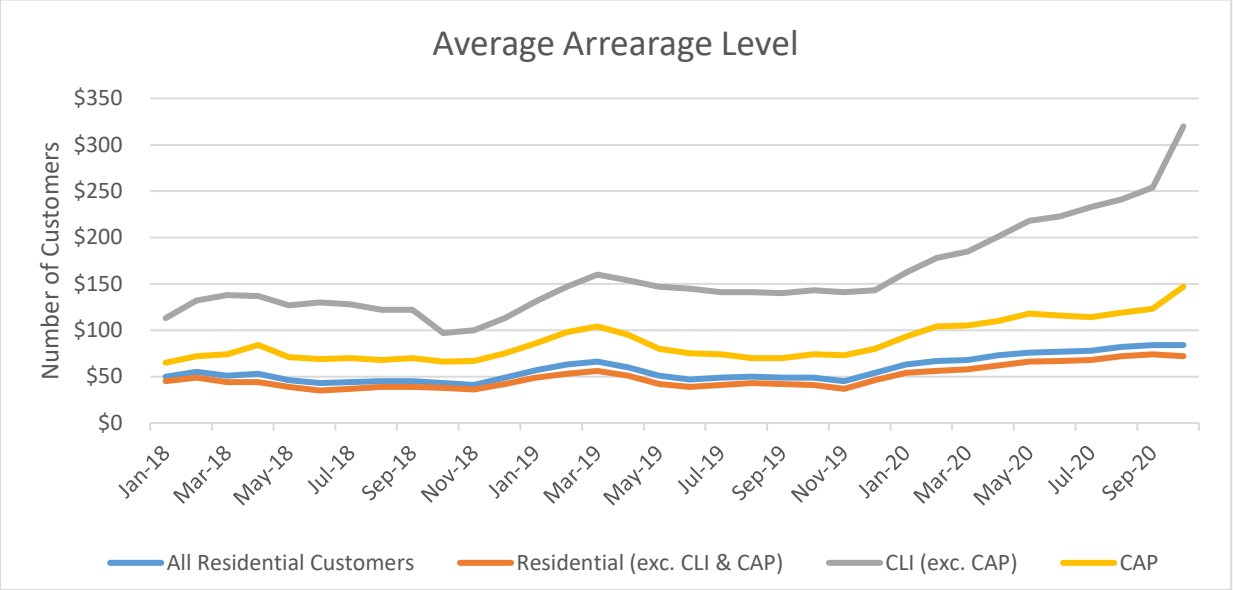



Chart 2 shows the average level of arrearages by five different subsets of the residential customer class, including: (1) all residential customers; (2) residential customers, excluding CAP and confirmed low income (CLI) customers; (3) CLI, excluding CAP; and (4) CAP.

[39] CAUSE-PA to PECO I-5 (total residential); I-6 (total CAP); I-20 (payment troubled customers).

**CHART 2: Average Arrearage – Residential and Low Income Customers**[40]




The average confirmed low income customer who is not enrolled in CAP currently carries an *average* debt of $320. While CAP customers have improved debt levels compared to non-CAP low income customers, they still carry nearly two times the average level of debt that a residential customer carries. These debt levels are growing at an alarming pace through the pandemic – even through the non-heating summer and shoulder months when gas usage is low. As we enter the winter heating months, I anticipate these figures will continue to grow as Pennsylvanians continue to suffer through this unprecedented economic crisis.

Finally, rates for nonpayment are substantially higher for low income customers compared to all residential customers. From 2017 through 2019, termination rates for PECO's confirmed low income customers ranged between 17.7% in 2017 to 19% in 2019.[41]

[40] CAUSE-PA to PECO I-23(b).
[41] 2019 Universal Service Report at 5, 6, 12.

**TABLE 1: Terminations, Confirmed Low Income (CLI) vs. All Residential (R)**[42]

| | CLI | CLI Terminations | CLI % Terminations | R | R Terminations | R % Terminations |
|---|---|---|---|---|---|---|
| 2017 | 27,784 | 4,917 | 17.7% | 480,586 | 19,813 | 4.1% |
| 2018 | 25,704 | 4,990 | 19.4% | 480,731 | 19,815 | 4.1% |
| 2019 | 24,977 | 4,734 | 19.0% | 484,678 | 22,036 | 4.6% |

In 2019 – before the pandemic began – nearly 1 in 5 (19%) of PECO's confirmed low income customers were terminated for non-payment. When emergency protections for low income consumers are eventually lifted, the percentage of low income consumers who will face the loss of service to their home as a result of their inability to pay is likely to increase dramatically over this already-high number of terminations.

Low income termination rates during the Great Recession provide an insightful look at the impact of a far-ranging economic crisis on low income consumers' ability to remain connected to essential utility services. In 2008, at the height of the Great Recession, 87.5% (nearly 9 out of 10) of PECO Gas's confirmed low income customers were terminated for nonpayment – compared to 6.2% of all residential customers (including confirmed low income customers) in the same year.[43]

Bottom line: PECO's low-income consumers already struggle profoundly to pay for natural gas service under the current rates – especially in light of COVID-19 and its wide-reaching effects on our economy, our livelihoods, and our health. These struggles will only worsen if the proposed rate increase is approved, especially if PECO fails to take necessary measures to mitigate the impact of the increase on low-income households.

[42] 2019 Universal Service Report at 5, 6, 12.
[43] 2008 Universal Service Report at 7, 9-10.

### *c. Assistance Programs are Inadequate to Remediate Unaffordability*

**Q: Does PECO's Customer Assistance Program (CAP) adequately address the impact of the proposed rate increase on low income customers?**

A: No. PECO's CAP serves a critically important role in improving rate affordability. However, as currently designed, PECO's CAP fails to adequately address current unaffordability.

First, PECO's CAP energy burden standards substantially exceed the energy burden standards in the Commission's CAP Policy Statement, which were revised last fall after a lengthy investigation into affordability within CAP.[44] Table 2 compares PECO's current CAP energy burden standards to the Commission's revised maximum energy burden standards.

**TABLE 2: Energy Burden Standards, Commission Standards vs. PECO Standards[45]**

| | Commission Energy Burden Standard | PECO Energy Burden Standard |
|---|---|---|
| 50-100% FPL | 6% | 13% |
| 51-100% FPL | 10% | 16% |
| 101-150% FPL | 10% | 17% |

I understand from counsel that PECO has a pending Petition seeking to reduce its energy burden thresholds, but that PECO is not proposing to reduce the 17% energy burden threshold for those with income between 101-150% FPL.[46] But that is a separate matter from the case at hand, which is to examine whether PECO's proposed rates – including its rates for CAP customers – are just

[44] 2019 Amendments to Policy Statement on Customer Assistance Program, 52 Pa. Code § 69.261-69.267, Final Policy Statement and Order, Docket No. M-2019-3012599 (order entered Nov. 5, 2019) (hereinafter Final CAP Policy Statement and Order); see also Energy Affordability for Low-Income Customers, Docket No. M-2017-2587711 (Energy Affordability proceeding) & Review of Universal Service and Energy Conservation Programs, Docket No. M-2017-2596907 (Universal Service Review proceeding).
[45] PECO USECP at 31, Addendum B; 52 Pa. Code § 69.265.
[46] See PECO Energy Company's 2019-2024 Universal Service and Energy Conservation Plan, Petition of PECO Energy Company, Docket No, P-2020-3020727 (filed July 8, 2020).

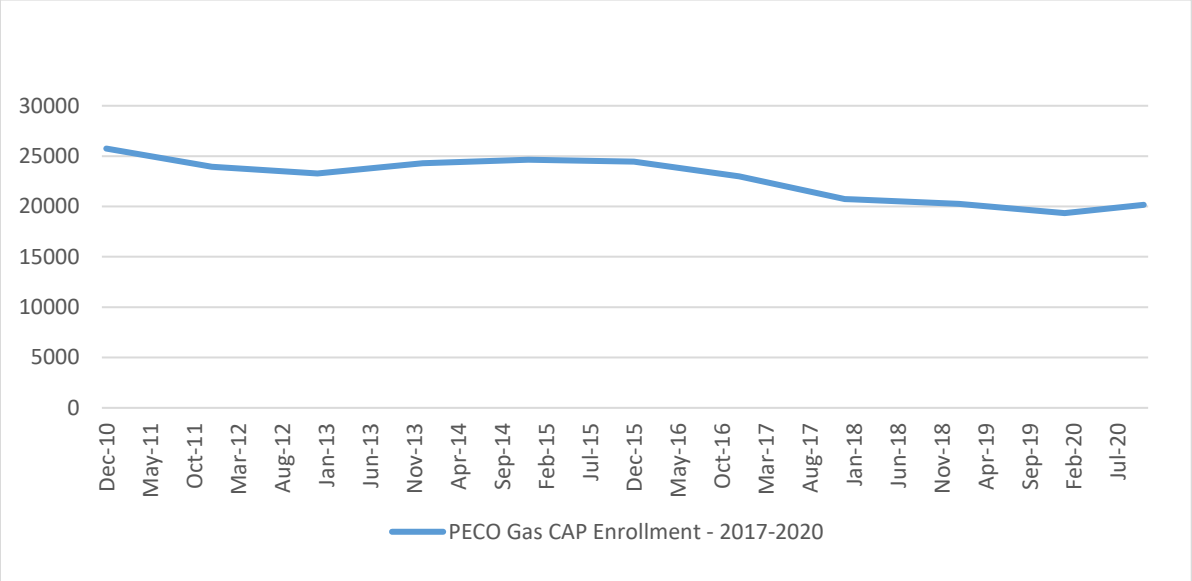
and reasonable. As it stands, PECO's CAP rates are categorically unaffordable and, as such, I believe they are unjust, unreasonable, and should not be approved.[47]

Second, PECO's program has continually failed to reach its own unacceptably high energy burden standards. In 2017, PECO's combined electric and gas CAP customers had an average energy burden of 20% - or roughly 1/5 of total household income.[48] This leaves very little left to pay for all other life necessities. In total, 31% of PECO's combined electric and gas CAP customers exceeded PECO's energy burden in 2017, and 41% exceeded PECO's energy burden in 2018.[49]

Third, CAP only reaches a small portion of PECO's estimated eligible population. As of October 2020, only 20,147 customers were enrolled in CAP[50] – just under 20% of PECO's estimated low-income customers.[51] In other words, approximately 80% of PECO's estimated eligible customers are not enrolled in CAP. PECO has not made progress in closing this gap over time. The chart below shows PECO's CAP enrollment over the last 10 years. Despite a steadily growing residential customer base,[52] stubborn poverty levels, and the emergence of an unprecedented economic crisis that is profoundly impacting low income consumers, PECO's CAP enrollment remains quite low – and has only recently shown signs of moderate improvement:

[47] The Commission apparently agrees with my conclusion. In adopting revised energy burden standards, the Commission found that the former CAP energy burden thresholds were unreasonable and unaffordable. Final CAP Policy Statement and Order at 27 ("[T]he current maximum energy burden ranges based on the FPIGs in the [former] CAP Policy Statement do not reflect reasonable or affordable payments for many low-income customers.").
[48] APPRISE, PECO Energy Universal Services Program Final Evaluation Report, at ix (June 28, 2019), https://www.puc.pa.gov/pcdocs/1626073.pdf (hereinafter APPRISE Report).
[49] APPRISE Report at 130.
[50] CAUSE-PA to PECO I-6(a).
[51] CAUSE-PA to PECO I-6(a) (20,247 CAP participants); CAUSE-PA to PECO I-10 (102,409 estimated low income customers).
[52] CAUSE-PA to PECO I-5.

**CHART 3: PECO Gas CAP Enrollment, 2017-2020**[53]




If CAP is not reaching the eligible population, it cannot improve identified unaffordability for low income consumers.

Finally, and of critical importance, PECO's current CAP design will do nothing to mitigate the impact of the rate case on CAP customers in the short term, and will only moderately offset the financial impact of the rate increase over time. As PECO explains in response to discovery, as a result of its Fixed Credit Option program design, CAP customers will experience the full financial impact of the rate increase in the first quarter following the rate increase.[54] In fact, at first, CAP customers will experience an even greater percentage rate increase compared to other residential customers because the initial increase will not affect the application of their credit. Thereafter, the fixed credit will increase slightly with each quarter as the CAP customers' fixed credit amount is adjusted over time. PECO provides a helpful explanation in discovery:

[53] CAUSE-PA to PECO I-6(a); 2010 Universal Service Report at 40; 2012 Universal Service Report at 35; 2014 Universal Service Report at 42; 2016 Universal Service Report at 50
[54] CAUSE-PA to PECO I-1.

> For a Residential GR customer using the standard 8 Mcf, PECO stated the bill impact would be an increase of $7.07 or 8.8% from $80.10 per month to $80.17. Using PECO's current average CAP Gas discount of $8.94 at the time of Rate increase, a PECO CAP customer see the same $7.07 bill increase but with a 9.9% increase. The Fixed Credit Option ("FCO") adjusts quarterly and over time will include the rate increase in the calculation of future credits. After a year, with equal 8 Mcf usage, the CAP Credit would grow to $9.73 per month, bringing the bill impact down to a $6.29 increase or 8.8% increase.[55]

I am advised by counsel that PECO has proposed to transition its FCO CAP design to a Percentage of Income Program (PIP) CAP design.[56] Adoption of a PIP would insulate CAP customers from the financial impact of a rate increase because CAP rates are calculated based squarely on household income - rather than establishing a fixed credit based on usage and other factors. But again, PECO is proposing to raise rates for all customers now, in this proceeding. Thus, unaffordability within CAP should likewise be addressed now, in this proceeding.

**Q: Does the Low Income Home Energy Assistance Program (LIHEAP) mitigate the harm of the proposed rate increase on low-income households?**

A: No. Relative to estimated need, few PECO customers receive LIHEAP assistance. In the 2019-2020 LIHEAP program year, just 14,564 PECO Gas customers received a LIHEAP Cash grant – 14% of the estimated eligible population.[57] And in the 2018-2019 program year, only 13,000 households – or 12.7% of the estimated eligible population – received a LIHEAP Cash grant.[58]

[55] Id.; Cf. PECO Energy Company Universal Service and Energy Conservation Plan for 2013-2015, Joint Petition for Settlement, Docket No. M-2012-2290911, at Exhibit A, page 6 (filed March 20, 2015) ("If PECO is granted a gas base rate increase, the portion of each rate R customer's Annual Credit that is attributable to distribution rates will be increased by a percentage equal to the system-wide residential gas distribution rate increase.").
[56] See PECO Energy Company's 2019-2024 Universal Service and Energy Conservation Plan, Petition of PECO Energy Company, Docket No. P-2020-3020727, M-2018-3005795 (filed July 28, 2020).
[57] OCA to PECO III-7(a); CAUSE-PA to PECO I-10 (102,409 estimated low income customers).
[58] OCA to PECO III-7(a); CAUSE-PA to PECO I-10 (102,409 estimated low income customers).

LIHEAP is a critically important program and provides life-sustaining assistance to those in need, but the program is intended to provide supplemental energy assistance – *not to mitigate the financial impact of a rate increase*. As proposed, a residential customer using an average of 8 MCF per month would increase to $87.17.[59] In comparison, the average cash grant amount for PECO Gas customers in the 2018-2019 and 2019-2020 LIHEAP program year was $258 and $255, respectively.[60] In other words, the proposed rate increase will consume roughly one-third (34%) of the average LIHEAP cash grant, eclipsing a significant portion of the benefit received by low-income customers through the LIHEAP program.

**Q: Does PECO's Low-Income Usage Reduction Program (LIURP) help mitigate existing unaffordability or offset the financial impact of the proposed rate increase on low-income households?**

A: PECO's LIURP program can play an important role in mitigating unaffordability for low income consumers, and I am a strong supporter of robust energy efficiency and weatherization to reduce low income bills over the long term. However, LIURP only serves a small portion of those in need of comprehensive energy efficiency and usage reduction services.[61] According to PECO's last third-party universal service program needs assessment, 67,015 of PECO's gas service customers were estimated to be income eligible for LIURP services.[62] In an average year, PECO provides LIURP services to approximately 1,000 low income consumers.[63] For LIURP to make a meaningful impact to remediate PECO's existing unaffordability and offset any impact of the

[59] PECO Attachment III-E-11(a).

[60] OCA to PECO III-7(a).

[61] CAUSE-PA to PECO I-14(b) at 62 (APPRISE Universal Service Needs Assessment at 47).

[62] Id.

[63] CAUSE-PA to PECO I-12(a) & I-14(a)

proposed rate increase, PECO must make critical changes to its LIURP policies, procedures, and budget to expand usage reduction services to more households.

As a practical matter, many customers are unable to access assistance through LIURP, as eligibility is limited to gas heating customers with average usage in excess of 50 Ccf per month are eligible for LIURP services.[64] This often excludes smaller homes, such as multifamily residences, even if usage in the home is high compared to similarly sized homes. The numbers of multifamily residences served by LIURP bears this out: Since 2018, only 110 multifamily households – out of 2,454 total LIURP jobs – received LIURP services.[65] Tenants are also underserved by LIURP, with just 632 tenants receiving services – compared to 1,822 homeowners.[66] Perversely, the high usage threshold for LIURP also prevents those with an inoperable gas heating system from participation in LIURP because fixing their gas furnace and reducing their electricity usage would cause their gas usage to increase.[67] These households are most often using unsafe, inefficient, and costly alternatives to heat their home, driving up electric usage and creating unsafe living conditions.

Moreover, many high usage households are unable to access LIURP services due to health and safety issues in the home, which prevent comprehensive weatherization and usage reduction services from being performed in the home. While PECO informs customers of these health and safety hazards, and will remediate carbon monoxide or combustion appliance hazards, it will not remediate other health and safety issues discovered at the property – even if the issue prevents the household from receiving LIURP services or is related to a home heating malfunction that has left

[64] PECO USECP at 14.
[65] CAUSE-PA to PECO I-13(a).
[66] CAUSE-PA to PECO I-13(a).
[67] See PECO USECP at 14.

the household without safe heat.[68] Those who live in poor, inefficient, and potentially unsafe housing stock are likely to face tremendous and unmitigated financial hardship as a result of PECO's proposed rate increase.[69]

As it stands, PECO has a disproportionately low LIURP budget compared to other natural gas distribution companies (NGDCs). Despite having the most natural gas customers in the state, PECO's gas LIURP budget is the second lowest overall – and the lowest level proportionate to PECO's customer base.

**TABLE 3: NGDC 2020 Projected LIURP Budget[70]**

| NGDC | LIURP Budget (2020) | Residential Customers (2019) | Est. Annual LIURP Cost per Residential Customer | Est. Monthly LIURP Cost per Residential Customer |
|---|---|---|---|---|
| Columbia Gas | $4,955,929 | 400,043 | $12.38 | $1.03 |
| NFG | $2,129,300 | 196,778 | $10.82 | $0.90 |
| **PECO Gas** | **$2,250,000** | **484,678** | **$4.64** | **$0.39** |
| Peoples | $3,244,097 | 335,583 | $9.67 | $0.81 |
| PGW | $7,988,818 | 480,347 | $16.63 | $1.39 |
| UGI South | $2,359.612 | 367,175 | $6.42 | $0.54 |
| UGI North | $1,470,997 | 157,025 | $9.37 | $0.78 |

PECO must take steps to serve additional households through its LIURP, including tenants and multifamily residents; to improve its health and safety program to remediate issues in the home that prevent PECO from performing comprehensive usage reduction services; and to ensure that PECO is able to provide services to those with an inoperable gas furnace who may be relying on inefficient alternatives that are exacerbating other household energy costs.

[68] PECO USECP at 13-14.
[69] See PECO Rate Schedule III-E-11 GR.
[70] 2019 Universal Service Report at 5, 46.

### *d. Consequences of Energy Unaffordability*

**Q: What are the consequences to a household with an unaffordable energy burden?**

A: Unaffordable energy burdens make it extremely difficult for low income households to pay for other basic necessities such as housing, food, and medicine; threatens stable and continued housing, employment, and education; has substantial and long-term impacts on mental and physical health; creates serious public health and safety risks to the household and the larger community; and negatively impacts the greater economy.[71] According to the US Energy Information Administration, roughly 1 in 5 households in 2015 – when the economy was experiencing a relatively prosperous economic period – reported that they reduce or forego other critical necessities like food and medicine to afford their home energy costs, and more than 1 in 10 reported keeping their home at an unsafe or unhealthy temperature.[72] Even with financial assistance, low-income households are still unable to afford the cost of energy: According to a survey conducted by the National Energy Assistance Directors' Association, 72% of LIHEAP recipients reported that they forego other necessities to afford energy, and 26% reported keeping their home at unsafe or unhealthy temperatures.[73] As recent research and data has continually showed, vulnerable low-income families simply cannot afford the cost of energy services. These

[71] US EIA, Residential Energy Consumption Survey (2015), https://www.eia.gov/consumption/residential/reports/2015/energybills/; see also NEADA, 2018 National Energy Assistance Survey, at 17, 20 (Dec. 2018), http://neada.org/wp-content/uploads/2015/03/liheapsurvey2018.pdf (hereinafter NEADA Survey).

[72] US EIA, Residential Energy Consumption Survey (2015), https://www.eia.gov/consumption/residential/reports/2015/energybills/.

[73] NEADA Survey at 17, 20.

national surveys are consistent with findings from PECO's most recent third-party evaluation of its universal service programs.[74]

Ultimately, an increase in rates for natural gas service such as the increase proposed here will necessarily result in increased unaffordability for vulnerable households, and is likely to result in a corresponding increase in uncollectible expenses and, in turn, involuntary payment-related terminations. These impacts can and do have a deep and lasting impact on the health and wellbeing of those in the household and the welfare of the community as a whole.[75]

**Q: How does the loss of natural gas service impact a household?**

A: Loss of natural gas service can and does have a deep and lasting impact on the health and wellbeing of the entire household – as well as the community as a whole.

When a family is unable to use a primary heating system, they often resort to dangerous, high usage / high cost heating methods – such as electric space-heaters, electric stoves, and/or portable generators – which increases the risk of carbon monoxide poisoning and deadly house fires.[76] Loss of essential utility service is also a common catalyst to homelessness,[77] which

[74] APPRISE Report at 58-64.

[75] See Id. When a family is unable to use their primary heating system, they often resort to dangerous, high usage, and high cost alternative heating methods such as electric space-heaters, electric stoves, and/or portable generators, which increases the risk of carbon monoxide poisoning and house fires – placing themselves and the greater community at risk of harm. See Nat'l Fire Protection Ass'n, Fire Analysis & Research Division, Home Fires Involving Heating Equipment, at 1 (Dec. 2018).

[76] Nat'l Fire Protection Ass'n, Fire Analysis & Research Division, Home Fires Involving Heating Equipment, at 1 (Dec. 2018) (finding that space heaters cause 44% of all home heating related fires, and 86% of deaths caused by home heating related fires).

[77] See Joint State Government Commission, General Assembly of the Commonwealth of Pennsylvania, Homelessness in Pennsylvania: Causes, Impacts, and Solutions: A Task Force and Advisory Committee Report (2016), http://jsg.legis.state.pa.us/resources/documents/ftp/documents/HR550%201%20page%20summary%204-6-2016.pdf.

ultimately causes communities to expend an even greater level of resources to adequately address homelessness and protect the safety of its community members.

COVID-19 has exacerbated the consequences of service termination to low income families. As a practical matter, the loss of gas for heating, cooking, and hot water acts as a functional equivalent to eviction – driving families from their homes. Research published in late November found that eviction proceedings allowed to proceed between March to September caused as many as 433,700 additional COVID-19 cases and 10,700 additional COVID-19 deaths.[78]

### *e. Recommendations to Remediate Unaffordability and Offset Any Rate Increase*

**Q: You mentioned at the outset that you have recommendations to reduce current levels of unaffordability, to offset the financial impact of any approved rate increase, and to help address the unprecedented utility debt crisis that has emerged as a result of the pandemic. What are those recommendations?**

A: I recommend that the Commission require PECO to take the following actions to remediate unacceptable levels of unaffordability for existing rates, offset the impact of any approved rate increase, and address the unprecedented utility debt crisis we currently face:

**(1) Adopt the Commission's revised energy burden standards.[79]**

The single most important step the Company could take to address current unaffordability and mitigate the impact of a rate case would be to reduce the maximum CAP energy burden threshold consistent with the Commission's revised energy burden standards. As I explained

[78] Kathryn M. Leifheit et al., Expiring Eviction Moratoriums and COVID-19 Incidence and Mortality, SSRN (Nov. 30, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3739576.
[79] 52 Pa. Code § 69.265.

earlier, PECO's CAP customers face categorically unaffordable energy burdens, which the Commission has already explicitly found to be unreasonable, unaffordable, and inconsistent with the Commission's duties to ensure that universal service programs are appropriately funded to ensure that service is universally accessible to those served.[80] As explained at length above, the overwhelming energy burdens faced by CAP customers make it more difficult to afford both gas service and other basic necessities, and can have negative effects on employment, education, and mental and physical health. This can, in turn, lead to serious risks to the household and the larger community; and negatively impacts the whole economy. This is not an issue that can wait for another proceeding. PECO's CAP rates should be adjusted now, in the context of this proceeding, to ensure that CAP customers are receiving a just and reasonable rate.

**(2) Improve efforts to accurately identify and track low income customers.**

PECO's current definition of confirmed low income customer is too narrow, and is inconsistent with the definition used by most utilities. PECO should begin counting all customers in their "confirmed low income" customer count who indicate to the Company, verbally or otherwise, that the customer has income at or below 150% FPL. As explained in the Commission's annual Universal Service and Collections Performance Report, "A low-income customer is classified as confirmed low-income after their utility has obtained information that would reasonably place them within this FPIG level."[81] There is no requirement that the utility obtain documentation.[82] If a customer calls PECO and orally verifies that they have low income, that

[80] Final CAP Policy Statement and Order at 27; see also 66 Pa. C.S. §§ 2203 (3), (7), (8).
[81] 2019 Universal Service Report at 2 (emphasis added).
[82] Id.

information should reasonably indicate that they are a low income customer and the customer should be counted as a confirmed low income customer.

Additionally, as explained in the Commission's annual Universal Service and Collections Performance Report: "Most confirmed low-income households are verified through the customer's receipt of a LIHEAP grant, enrollment in a Universal Service program or determined during the course of making a payment arrangement."[83] Thus, at a minimum, PECO should be required to include the following customers in its confirmed low income customer count, regardless of whether documentation of income was submitted directly to PECO within the last two years:

- Customers currently participating in CAP;
- Customers who have participated in CAP, LIURP, or the Hardship Fund Program within the last two years;
- Customers who have received a LIHEAP grant within the last two years;
- Customers who are protected by the winter utility moratorium; and
- Customers who have received a low income PECO or PUC-issued payment arrangement.

**(3) Develop a plan to increase CAP enrollment 50% by 2025.**

As noted above, PECO's CAP is only reaching about 20% of the estimated eligible customer base. PECO must be required to measurably improve its CAP enrollment rates to reach a greater number of households in need of assistance to access and maintain safe and affordable natural gas services. This is especially true if the Company's proposed rate increase is approved, as even more households will likely be unable to keep up with increasing rates. As of October 2020, PECO's CAP enrollment stood at 20,147. A 50% increase would bring PECO's CAP

[83] 2019 Universal Service Report at 2.

enrollment to 30,221 – or 6% of PECO's residential customer class, still far lower than the estimated eligible CAP population in PECO's service territory.

Specifically, I recommend that PECO be required to develop a plan to increase CAP enrollment 50% by 2025. PECO should include a range of tactics in its plan, such as increased outreach and education; GIS mapping of customer populations and poverty data to allow targeted outreach in areas with high concentrations of potentially eligible households; improved incentive structures or other adjustments to its contract with program administrators; streamlined application requirements; and improved recertification processes. Rather than proscribe the specific methods for improved enrollment through this proceeding, the Commission should require PECO to work with its stakeholders to identify the most workable solutions to achieve measurable improvements in CAP enrollment. PECO should be required to report the Commission annually to help benchmark progress and adjust efforts to ensure it is on track to achieve its enrollment goals. PECO's success or failure to meet its established CAP enrollment targets should be explicitly considered as part of any future rate increase requests.

**(4) Adjust the CAP fixed credit level immediately upon approval of any rate increase.**

As explained above, PECO's CAP applies a fixed credit to a customer's bill, which is calculated based on a formula that accounts for historical usage and household income. The credit is recalculated quarterly, and then applied to the customers' bill. As a result of this design, CAP customers will initially experience a larger percentage increase compared to residential customers, with average usage CAP customers (8Mcf) experiencing a 9.9% increase compared to an 8.8% increase for other residential customers.[84] After a year of quarterly adjustments to the credit limit,

[84] CAUSE-PA to PECO I-1(a).

the percentage increase will eventually be consistent with the percentage increase of other residential consumers.

To the extent any increase is approved, PECO should be required to adjust the CAP fixed credit to account for the rate increase immediately – rather than forcing low income CAP customers to pay a higher proportional increase than other residential consumers for the first year after a rate increase is implemented. I am advised by counsel that my recommendation is consistent with the terms of a March 2015 Settlement agreement establishing PECO's CAP FCO.[85]

**(5) Adopt policy, budget, and programmatic changes to LIURP.**

***a. Increase LIURP Budget to Level Comparable to Similarly Sized NGDCs***

To help bring parity to PECO's LIURP budget (consistent with similarly sized NGDCs[86]), and to help reduce the financial impact of any rate increase approved in this case on low income high usage customers, I recommend that PECO increase its LIURP budget by $2,000,000, bringing its annual LIURP budget for gas customers to $4,250,000. At this spending level, PECO's total per customer LIURP spend would cost residential consumers roughly $0.72/month – still well below per customer LIURP spending levels for similarly sized NGDCs.[87] As I explain further below, my later recommendation that universal service costs be equitably recovered across all rate classes will further reduce the per customer cost of addressing energy poverty.

[85] PECO Energy Company Universal Service and Energy Conservation Plan for 2013-2015, Joint Petition for Settlement, Docket No. M-2012-2290911, at Exhibit A, page 6 (filed March 20, 2015) ("If PECO is granted a gas base rate increase, the portion of each rate R customer's Annual Credit that is attributable to distribution rates will be increased by a percentage equal to the system-wide residential gas distribution rate increase.").
[86] See Table 3, above, citing 2019 Universal Service Report at 5, 46.
[87] See CAUSE-PA to PECO I-5(a) (491,475 residential gas customers as of October 2020).

### *b. Health and Safety*

As explained above, PECO performs only the most basic health and safety remediation necessary to perform weatherization and energy efficiency measures in a home. As a result, those most in need of usage reduction services often go unserved. I recommend that PECO establish a $2,000 health and safety budget for LIURP jobs to remediate a range of health and safety issues that prevent full energy efficiency and weatherization services. PECO should permit its LIURP contractors to exceed this budget in appropriate cases, where health and safety remediation will permit energy usage reductions consistent with the average per job usage reduction achieved in the previous program year.

In turn, rather than simply "inform" customers of health and safety hazards identified while conducting a LIURP audit,[88] PECO should actively coordinate referrals to other programs that could remediate issues that cannot be resolved through PECO's health and safety, and should return to those properties to deliver comprehensive energy efficiency and usage reduction services after identified issues unable to be resolved with PECO's increased health and safety budget are remediated.

### *c. Defacto Electric Heating / Gas Furnace Repair & Replacement Program*

As explained above, customers with inoperable or inadequate gas heating systems often rely on inefficient, expensive, and unsafe alternatives like electric space heaters to stay warm in winter. These households are most often ineligible for LIURP assistance on the gas side because, without their main source of heat, they do not meet the high usage threshold. At the same time, despite higher than average electric usage driven by reliance on inefficient electric space heaters,

[88] PECO USECP at 12.

electric LIURP services are typically unable to remediate inoperable gas furnaces. In 2017, PECO launched a 3-year pilot de facto heating program through its electric LIURP to help address this issue.[89] However, that pilot program is set to conclude at the end of 2020. I am informed by counsel that PECO has filed a Petition to continue the program into 2021, until all originally budgeted funding is spent, but there are no plans to continue providing this critically important service thereafter.[90] Apart from this short-term pilot, PECO otherwise addresses inefficient space heaters "through client education" alone.[91] No amount of education can help a low income family to afford to fix their main heating system to alleviate their reliance on electric space heating.

I recommend that PECO incorporate its de facto heating pilot program as a permanent part of its LIURP. The program should continue to be funded at its current $700,000 level, incremental to its general LIURP budget. Through the program, PECO should provide emergency repair and replacement services for gas heating customers with inoperable or inadequate main heating sources. When circumstances warrant for its dual gas and electric customers, PECO should consider whether it is cost-effective to transition the household to an electric heat pump which may further reduce overall household energy costs.[92]

### *d. Improve Delivery of LIURP Services to Tenants and Multifamily Residents*

As noted above, tenants and residents in multifamily buildings are not served at a rate consistent with services to homeowners and those who live in single family residences. PECO should be required to improve services to these groups.

[89] PECO USECP at 11.
[90] PECO Energy Company's 2016-2018 Universal Service and Energy Conservation Plan, Petition of PECO Energy Company, Docket M-2015-2507139 (filed Oct. 13, 2020); Pa. PUC v. PECO Energy Co., Petition of PECO Energy Co., Docket No. R-2018-3000164 (filed Oct 13, 2020).
[91] PECO USECP at 12.
[92] 52 Pa. Code § 58.11(b).

With regard to multifamily buildings, I recommend that PECO adopt a lower high usage threshold for multifamily units to ensure that these smaller living units are able to access critical energy efficiency and usage reduction services. PECO should be required to work with its Universal Service Advisory Committee to review multifamily usage data, and identify an appropriate high usage threshold for this group. Within six months of a final order in this proceeding, PECO should file for approval to implement a reduced high usage threshold for this unique building type.

With regard to improving LIURP services to tenants, I recommend that PECO be required to review and make changes to its process for outreach to tenants and its landlord approval process in consultation with its Universal Service Advisory Committee.

### *e. Ensure that Unspent LIURP Funds Roll Over and are Added to Next Budget*

PECO generally spends its entire budget during the program year.[93] This year, as a result of the pandemic, PECO was unable to spend its entire LIHEAP budget within the program year. PECO has sought approval from the Commission to roll over unspent funds.[94] But seeking Commission approval to carry over and add unspent funds to the budget for the following year takes substantial resources of PECO and stakeholders, which could be avoided by establishing a policy regarding unspent LIURP funds. Going forward, I recommend that PECO establish a policy that any unspent LIURP funds will automatically roll over and be added to the LIURP budget for the following year.

[93] CAUSE-PA to PECO I-16.
[94] CAUSE-PA to PECO I-16.

**(6) Implement emergency pandemic provisions to help equitably address the growing utility debt crisis.**

Regardless of whether any rate increase is approved, PECO should be required to implement a number of short-term emergency pandemic provisions to help equitably address the growing utility debt crisis.

***a. Hardship Fund Program (Matching Energy Assistance Fund)***

**i. Increase Funding for Hardship Fund Grant Assistance**

Unlike other utilities across the Commonwealth, PECO has not proposed to increase funding for its Hardship Fund program, known as the Matching Energy Assistance Fund, to help alleviate the extreme economic hardship faced by its economically vulnerable customers as a result of the pandemic. I recommend that PECO increase its Hardship Fund by $2 million to provide increased grant assistance to those in desperate need of assistance. PECO should fund this increase through pipeline penalty credits and refunds, to the extent such funds are available, similar to the proposals of other natural gas utilities in recent months.[95] The crisis we face is unprecedented, and calls for creative solutions to ensure that economically vulnerable consumers facing untold economic hardship are able to maintain natural gas services to their home.

[95] UGI Gas, Peoples Natural Gas, Peoples Gas, and Columbia Gas have all proposed to use pipeline penalty credits and refunds to provide emergency funding to their respective Hardship Fund grant assistance programs. See Petitions of Peoples Natural Gas Company, LLC and Peoples Gas Company, LLC for Expedited Approval to Use Pipeline Penalty Credits and Refund Proceeds as Funding for a Temporary Program to Provide Certain Customers Experiencing a Reduction of Income Due to COVID-19 Pandemic, Docket Nos. P-2020-3022041 (filed September 21, 2020); see also Pa. PUC v. UGI Utilities, Inc. Gas Division, Joint Petition for Approval of Unopposed Settlement of All Issues, Docket No. R-2019-3015162, at 12 (filed Aug. 2, 2020, approved Sept. 8, 2020);

**ii. Waive Requirement that Hardship Recipients Achieve Zero Balance**

PECO's Hardship Fund program, known as the Matching Energy Assistance Fund (MEAF), requires customers to bring their balance to zero in order to be eligible for grant assistance.[96] This is despite the fact that low income customers who are eligible for MEAF may be eligible for a long-term payment arrangement that, combined with grant assistance, would help improve affordability, prevent termination, and stabilize the household's access to natural gas services. MEAF is the only Hardship Fund program in the state with this burdensome eligibility requirement.

To help address the unprecedented utility debt crisis, and stabilize low income families' access to natural gas service, I recommend that PECO be required to waive this burdensome eligibility requirement, and allow low income households to obtain hardship grant assistance. Any remaining balance for a hardship fund recipient should be placed in a 60-month payment arrangement.

***b. Customer Assistance Program***

**i. Waive Income Certification Requirements**

As noted above, PECO has already temporarily waived recertification requirements for CAP given the unique challenges the pandemic has created to obtaining documentation. This flexibility should continue until all businesses are fully reopened and the state is no longer under a state of emergency. It is critical that PECO also develop a transition plan to allow consumers to recertify after the emergency period ends. I recommend that PECO work with its Universal Service

[96] PECO USECP at 16.

Advisory Committee to develop a transition plan that will provide consumers with adequate notice and time to comply.

### ii. Provide Arrearage Forgiveness for In-CAP Arrears

I have explained at length the dire financial circumstances facing low income consumers as a result of the COVID-19 pandemic. To help equitably alleviate the debt accrued by low income and vulnerable families, I recommend that PECO roll arrears accrued by CAP customers into preprogram arrearage forgiveness. CAP is designed as an alternative to collections, and is supposed to provide an affordable bill that low income households can reasonably maintain. This is in recognition of the fact that traditional collections methods are ineffective for very low income households, who are unable – not unwilling – to pay for utility costs.[97] As I have discussed, PECO's current CAP is not providing affordable bills, and the pandemic has exacerbated the economic struggle for low income households across the board. Rolling debts accrued through the pandemic into pre-program arrearages will stabilize low income CAP customers – ensuring that they can remain connected to service and helping to improve payments. In essence, it would hit the restart button, allowing low income CAP customers to have a chance to recover as we emerge from this unprecedented economic crisis. It would also help prevent mass terminations when the temporary moratorium protections expire. As I have explained previously, involuntary termination of critical utility services to a home not only pose a threat to the health and safety of the individual family, it also presents a threat to the health and safety of the entire community.

[97] See 52 Pa. Code § 69.261.

### *c. Waive Late Fees and Reconnection Fees*

Given the depth of economic devastation, and the likelihood that economically vulnerable consumers will continue to struggle to pay bills on time and will face unprecedented termination levels when temporary protections are lifted, I recommend that PECO waive all late fees and reconnection fees for at least one year after a final order in this proceeding is issued.

## II. RATE DESIGN

**Q: Please describe PECO's residential rate design proposal.**

A: PECO seeks to increase its fixed monthly residential customer charge from $11.75 to $16.00, an increase of $4.25 or 36%.[98]

**Q: How would PECO's proposed rate design impact low-income households?**

A: Increasing the fixed charge as proposed will undermine the ability for consumers to control costs through energy efficiency, conservation, and consumption reduction, which is particularly problematic for low-income customers. These customers already struggle to pay for natural gas service, and rely on the ability to offset high bills through careful conservation and usage reduction. Regardless of the level of household usage, any increase to the fixed charge prevents customers from exercising the ability to use conservation measures to mitigate that portion of the rate increase.

[98] PECO St. 7 at 12:14.

**Q: Would PECO's proposed increase to the fixed charge affect the Company's LIURP program?**

A: Yes. PECO's proposal undermines the explicit goals of the Low-Income Usage Reduction Program (LIURP). The Commission's LIURP regulations explicitly provide that the program is intended to help low-income customers to reduce their *bills* and, in turn, to "decrease the incidence and risk of customer payment delinquencies and the attendant utility costs associated with uncollectible accounts expense, collection costs and arrearage carrying costs."[99] By reducing the amount of bill reduction that can be obtained through LIURP measures, the proposed increase to the fixed charge threatens the continued effectiveness of ratepayer investments intended to reduce energy consumption, delinquencies, collections, and uncollectible costs. The explicit goals of the program will be more difficult to achieve as the fixed portion of the bill is increased.

LIURP is effective at achieving these goals and producing meaningful average bill savings. In 2018, LIURP saved gas participants an average of $101 per year, or $8.41 per month.[100] It also improved participants bill payment by 12.1%, or approximately $166 annually, and improved bill coverage by 4.6%.[101] The ability to save money through energy efficiency, and therefore drive improved bill payment behavior, is tied directly to a bill structure that bases costs on throughput. But as more residential customer costs are shifted to the fixed charge, the achievable bill savings – and the corresponding impact on bill payment behavior – will erode.

[99] 52 Pa. Code § 58.1 ("The programs are intended to assist low-income customers conserve energy and reduce residential energy bills. The reduction in energy bills should decrease the incidence and risk of customer payment delinquencies and the attendant utility costs associated with uncollectible accounts expense, collection costs and arrearage carrying costs.").

[100] OCA to PECO III-1(e), APPRISE, PECO Energy 2018 LIURP Evaluation Final Report, at xii (April 2020).

[101] Id.

The current customer charge ($11.75) makes up 14.7% of the current average residential bill ($80.10).[102] If the proposed fixed charge is approved at $16.00, it would equal 20% of the current average residential bill ($80.10) – or 18% of the average bill if PECO's rate increase is approved as requested ($87.17).[103] In other words, if the proposed increase in the fixed customer charge is approved, PECO's customers will lose the ability to control (on average) between 3-5% of their monthly bill through energy conservation and consumption reduction efforts –undermining the effectiveness of LIURP to achieve meaningful bill savings for low-income consumers.

This is even more critical for households with income above 150% FPL but less than 200% FPL who are ineligible for CAP or LIHEAP, but are eligible for energy efficiency and conservation services through LIURP or the federal Weatherization Assistance Program (WAP) – both of which have income guidelines of up to 200% FPL.[104] It is critical that these households retain the ability to reduce their monthly energy costs through adoption of comprehensive energy efficiency and conservation programming.

Given low-income households are disproportionately payment troubled, and often lack the ability to control usage due to poor housing stock and older, less efficient appliances,[105] it is critical that they continue to have access to effective conservation tools capable of producing meaningful and lasting bill reductions. Of course, in addition to undermining the effectiveness of millions of

[102] See PECO Rate Schedule Attachment III-E-11 GR. PECO asserts that the average residential customer uses 8 Mcf/month. Low income customers with high usage (a requirement to receive LIURP services) would exceed this average usage rate.

[103] See PECO Rate Schedule Attachment III-E-11 GR.

[104] See PECO USECP at 14; see also Pa. DCED, Weatherization Assistance Program, https://dced.pa.gov/programs/weatherization-assistance-program-wap/.

[105] See ACEEE, Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-income and Underserved Communities (April 2016), https://www.aceee.org/sites/default/files/publications/researchreports/u1602.pdf.

dollars in LIURP investments, PECO's high fixed charge proposal will also undermine the millions of ratepayer dollars that the Company is proposing to invest in energy efficiency through its voluntary Energy Efficiency and Conservation Program Plan.[106]

**Q: Proponents of a higher fixed charge argue that the pricing structure is beneficial to customers because the rates are easier to understand and provide enhanced predictability. How do you respond?**

A: It may be the case that shifting cost recovery from a volumetric-based rate to a fixed charge will produce a more predictable bill because there is no calculation required to assess a fixed charge. However, it is unlikely that overwhelmed, time-strapped households who are struggling to pay their bills readily scrutinize their bills for this level of detail. Nonetheless, a more predictable bill does not benefit low-income customers if it remains *unaffordable*. While shifting cost recovery to a volumetric charge may require a more intricate calculation, it should be easy for customers to understand that lower usage equals lower bills.

**Q: Do you have any recommendations that could help mitigate the effect of the proposed rate design on low-income households?**

A: Yes. PECO's fixed monthly customer charges should not be increased. To the extent any increase in the Company's residential distribution rate is approved, it should be applied to the volumetric charge. This would protect the ability of low-income households to lower their utility costs by reducing consumption and would preserve the effectiveness of the LIURP program at reducing customer bills and improving payment behavior.

[106] See PECO St. 9.

# III. VOLUNTARY ENERGY EFFICIENCY PROGRAMMING

**Q: PECO is proposing to continue and expand its voluntary Energy Efficiency and Conservation program. Do you support PECO's proposal?**

A: I am generally very supportive of energy efficiency and conservation (EE&C) programming. That said, PECO's low income program component within its EE&C Plan requires adjustment to improve the equitable distribution of program benefits.

**Q: Please summarize the low income program component of PECO's proposed EE&C Plan.**

A: PECO is proposing a "Safe and Efficient Heating Program" that will be targeted to serve those who are ineligible for LIURP services.[107] The program will provide a site visit and inspection, combustion test, carbon monoxide detector, and heating system service and filter replacement.[108] The program will also replace a limited number of furnaces over 25 years old and boilers over 30 years old – though PECO does not provide an estimate of the number of replacements it anticipates will complete through the program.[109] Eligibility for this program is limited to homeowners with income at or below 100% FPL and tenants with income at or below 0-50% FPL.[110] PECO proposes a $1 million budget for its low income program, which includes approximately 11.6% for program administration - with an estimated $883,866 for direct installation measures and $116,134 for administration by a third party conservation service

[107] PECO St. 9 at 7:9-13.
[108] PECO St. 9 at 7:19-21.
[109] PECO St. 9 at 7:21-22.
[110] PECO St. 9 at 7:14-18.

provider (CSP).[111] PECO estimates the program will serve 289 low income consumers, and will generate savings of 3,529 MCF.

**Q: How does the projected participation and savings level in the low income program compare to the projected participation and savings level for the overall residential program?**

A: PECO's overall residential EE&C program is projected to serve 27,664 consumers (inclusive of 289 projected low income consumers). Low income customers make up just 1% of those projected to be served through PECO's EE&C Plan. In terms of savings, PECO projects savings of 492,983 MCF (inclusive of the projected 3,529 MCF savings through the low income program). Low income savings are projected at approximately 0.72% of savings achieved through the program for the general residential class.

In short, PECO's proposal does not provide proportional benefits to low income consumers. As I have previously explained, over 20% of PECO's residential customers are estimated to be low income. That said, I note that PECO's proposal includes direct installation programming. While more costly to administer, direct installation is preferable to rebates and other up-stream energy efficiency programming because low income households typically lack the resources to pay for the incremental cost of efficient equipment and installation – even with a rebate.

[111] PECO St. 9 at 8:1-2, 9:13-14; PECO Exhibit DLM-2.

**Q: What are your concerns with PECO's proposed EE&C Program Plan?**

A: I have three primary concerns. First, PECO has not provided any justification for its decision to limit its low income programming to homeowners with income at or below 100% FPL and tenants with income at or below 50% FPL. These income thresholds are arbitrary, and do not align with any of PECO's existing low income programs. PECO has also failed to justify its decision to exclude tenants with income over 50% FPL from participating in the program.

Second, I am concerned about the lack of proportional measures available for low income consumers. While I am supportive of the direct installation program proposed by PECO, I believe more should be done to ensure that low income consumers are equitably served through PECO's proposed EE&C portfolio.

Third, while PECO is explicit that LIURP eligible households cannot participate in the voluntary EE&C program, it does not explain how these programs will work in tandem to ensure that its service delivery is coordinated across the two programs. PECO also makes no mention of whether and to what extend PECO will coordinate its voluntary EE&C programs with its Act 129 programming and other local, state, and federal programming, like the Weatherization Assistance Program. Program coordination is critical to help leverage scarce resources and provide holistic energy reduction services to low income consumers.

**Q: Do you have any recommendations for improvements to PECO's proposed EE&C program?**

A: Yes, I have three recommendations. First, I recommend that PECO allow all customers with income at or below 150% FPL to participate in its low income EE&C program, including

homeowners and tenants. Second, I recommend that PECO include additional opportunities within its general residential program for low income consumers to access energy efficient equipment without an upfront cost. While this will increase the cost of the program, thereby reducing the total number of residential customers served, it will help to better ensure that low income customers are able to access a proportionate level of benefits consistent with the requirements in Act 129. Finally, I recommend that PECO be required to host a collaborative meeting with interested parties to develop a specific plan for coordinating its voluntary EE&C programs with other energy efficiency and conservation programs – including but not limited to LIURP, Act 129, and WAP. PECO should file this plan with the Commission within 6 months of a final order in this proceeding, subject to review and comment by interested parties.

# IV. EQUITABLE RECOVERY OF UNIVERSAL SERVICE COSTS

**Q: How has PECO proposed to allocate the cost of its Universal Service Programs?**

A: PECO has proposed to continue to recover the cost of its Universal Service Programs exclusively from the residential class.[112]

**Q: Has the Commission given any recent directives on this issue?**

A: Yes. I am advised by counsel that, in its recent Final CAP Policy Statement and Order, the Commission amended the CAP Policy Statement to address recovery of CAP costs.[113] In its Order, the Commission indicated that utilities should be prepared to address cross-class recovery of CAP

[112] See PECO Gas-Pa. P.U.C. No. 4, Original Page No. 38 (Provisions for Recovery of Universal Service Fund Charge).

[113] Final CAP Policy Statement and Order at 97; see also 52 Pa. Code §§ 69.625(1), 69.266(b).

costs in future rate case filings.[114] I understand from counsel that the Commission did not order utilities to propose a *specific* allocation, but explicitly indicated that it is appropriate to consider recovery of the costs of CAP costs from all ratepayer classes.[115] The Commission directed that utilities and stakeholders address CAP cost recovery in utility-specific rate cases and stated that "the Commission will no longer routinely exempt non-residential classes from universal service obligations."[116] To be clear, in noting this Commission order, I am not arguing a legal position on universal service cost recovery. Rather, my testimony on this issue is focused on the policy reasons why cross-class recovery of universal service program costs is appropriate, as I will explain in detail below.

**Q: Should PECO propose a different method of allocating the cost of its Universal Service Program?**

A: Yes. In my view, it is not appropriate to recover the costs of universal service programs that address poverty from the residential class alone. Energy insecurity impacts all customer classes (industry, business, commerce, educational institutions, hospitals, local and state governments, and other residential consumers) in specific and identifiable ways. The responsibility to provide universal access to life-sustaining utility service should be shared by all utility consumers. Poverty is a broad societal problem, impacting all customers and customer classes and requiring a collective, societal solution. While the most *direct* benefits of universal service programs are derived by program participants, who by definition are *part of* the residential customer class, there are a multitude of societal benefits which inure to non-residential ratepayers

[114] Final CAP Policy Statement and Order at 7.

[115] Id.

[116] Id.

that should not be ignored. As a public good, the cost of ensuring affordable access to very basic human needs should be borne by all those who enjoy the benefits of the public utility.

Currently, universal service costs are allocated exclusively to the residential class, but nonresidential customers benefit from the programs in real and identifiable ways. Indeed, many universal service program participants are employed[117] – yet their employers do not pay a living wage that is adequate to afford basic household needs. Many others are retired Seniors that do not receive enough in Social Security or retirement benefits to afford basic life necessities.[118] In 2019, 65.4% of natural gas CAP customers received employment or retirement income, yet these workers and retired workers could not afford basic living expenses without assistance.[119] Moreover, low-income customers faced with energy insecurity often struggle to cope with heightened levels of stress and anxiety, and must take time away from work to arrange payments, locate or apply for assistance programs, and arrange for reconnection – all of which can significantly undermine worker productivity and increase employee turn-over and absenteeism.[120] Providing energy security through universal service programs benefits businesses by filling the gap between what employers are able to pay and the amount employees need to afford energy.

The toll of poverty extends to nearly every aspect of our economy. Childhood poverty costs the U.S. over $1 trillion per year, representing 5.4% of the gross domestic product due to loss of

[117] 2018 Universal Service Report at 45.

[118] Id.

[119] See 2019 Universal Service Report at 43.

[120] Diana Hernadez, Understanding 'energy insecurity' and why it matters to health, Social Science & Medicine, Volume 167, October 2016, available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5114037/ ; See also Ariel Drebohl & Lauren Ross, ACEEE, Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-income and Underserved Communities, at 13 (April 2016), http://aceee.org/research-report/u1602.

economic productivity, increased health and crime costs, and increased costs as a result of child homelessness and maltreatment.[121] It is estimated that for every dollar spent on reducing childhood poverty, the country would save at least seven dollars due to the economic costs of poverty on our communities.[122] Energy insecurity is a pervasive and often overlooked problem for low-income families with children, which leads to coping strategies that can compromise the quality of the home environment and have negative health consequences.[123] Ensuring energy security for vulnerable households benefits the entire community by improving economic productivity and protecting the lives and health of children and families.

The effects of poverty on our healthcare system are especially profound and of particular concern due to the current pandemic. COVID-19 has undeniably gripped all of our communities. But data is emerging to show that the health impact and resulting loss of life is even more profound in low-income and minority communities.[124] People of color in particular are dying from COVID-19 at younger ages and at higher rates.[125] Low-income and minority communities are more likely to live near polluting industries, more likely to live in homes with mold and ventilation problems, and more likely to lack access to adequate health care – all of which are attributed to poorer health

[121] Michael McLaughlin, Mark R Rank, Estimating the Economic Cost of Childhood Poverty in the United States, Social Work Research, Volume 42, Issue 2, at 73-83 (June 2018), available at https://academic.oup.com/swr/article-abstract/42/2/73/4956930?redirectedFrom=fulltext

[122] Id.

[123] Diana Hernández, Yumiko Aratani, Yang Jiang, Energy Insecurity among Families with Children, National Center for Children in Poverty, January 2014, at 3, available at: http://www.nccp.org/publications/pub_1086.html

[124] Liz Szabo and Hannah Recht, The other COVID-19 risk factors: How race, income, ZIP code can influence life and death, USA Today, April 22, 2020, available at: https://www.usatoday.com/story/news/health/2020/04/22/how-coronavirus-impacts-certain-races-income-brackets-neighborhoods/3004136001/ ; see also Vanessa Williams, Disproportionately black counties account for over half of coronavirus cases in the U.S. and nearly 60% of deaths, study finds, Washington Post, May 6, 2020, available at: https://www.washingtonpost.com/nation/2020/05/06/study-finds-that-disproportionately-black-counties-account-more-than-half-covid-19-cases-us-nearly-60-percent-deaths/ .

[125] Bassett MT, Chen JT, Krieger N (2020) Variation in racial/ethnic disparities in COVID-19 mortality by age in the United States: A cross-sectional study. PLoS Med 17(10): e1003402. https://doi.org/10.1371/journal.pmed.1003402 .

outcomes related to COVID-19 exposure. [126] Energy insecurity is associated with poor respiratory outcomes including asthma and pneumonia, likely due to dampness, mold, and cold temperatures that can aggravate respiratory ailments.[127] The economic impact of COVID-19 is likewise more profound for low-income and minority communities. Comprehensive energy affordability programming, such as CAP and LIURP, can help alleviate the burdens that energy poverty creates on our healthcare system, providing broad benefits to all utility consumers and our economy overall.

Providing an affordable bill to low-income consumers comes at a cost, and right now that cost is borne solely by other residential ratepayers. While it is true that residential consumers may fall victim to energy poverty – as we are seeing on an alarming scale as a result of the pandemic – residential consumers do not *cause* energy poverty and should not alone shoulder the cost of the solution. The impact of universal service program costs on residential ratepayers can and should be mitigated by permitting these costs to be appropriately and equitably recovered from every customer class – rather than requiring the residential class to bear the entire burden of addressing energy poverty in our state. Appropriate cost-sharing for these critical public purpose programs would help alleviate the financial impact on residential customers while providing more affordable

[126] Xiao Wu & Rachel C. Nethery, Dep't of Biostatistics, Harvard TH Chan School of Public Health, Exposure to Air Pollution and COVID-19 Mortality in the United States (April 5, 2020), https://projects.iq.harvard.edu/files/covid-pm/files/pm_and_covid_mortality.pdf; see also Rachel Frazin, Experts See Worrisome Link Between Coronavirus, Pollution, The Hill (April 12, 2020), https://thehill.com/policy/energy-environment/492314-experts-see-worrisome-link-between-coronavirus-pollution; Samantha Artiga, Rachel Garfield, Kendal Orgera, Kaiser Family Foundation, Communities of Color at Higher Risk for Health and Economic Challenges Due to COVID-19 (April 7, 2020), https://www.kff.org/disparities-policy/issue-brief/communities-of-color-at-higher-risk-for-health-and-economic-challenges-due-to-covid-19/.

[127] Diana Hernández, Eva Laura Siegel, Is Energy Insecurity Making Us Sick?, Public Health Post, July 25, 2019, available at: https://www.publichealthpost.org/research/is-energy-insecurity-making-us-sick/ ; See also Diana Hernadez, Understanding 'energy insecurity' and why it matters to health, Social Science & Medicine, Volume 167, October 2016, available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5114037/

service to CAP customers and more fairly allocate the costs of these critical programs between all of the entities who enjoy the benefits of PECO's service.

**Q: How do other states allocate the cost of public purpose program costs?**

A: To my knowledge, Pennsylvania is the only state that limits cost recovery of universal service programming to the residential class. I am advised by counsel that other states which operate universal service programming, including Colorado, Ohio, New Jersey, Maine, New Hampshire, New York, Washington, Oregon, Illinois, and California, recover the costs of universal service programming from every rate class.[128] I am further advised by counsel that the legal aspects of this issue, including the laws pertaining to cost recovery of universal service costs in other states, will be more thoroughly addressed as necessary through briefing.

**Q: Are you proposing a specific recommendation for how universal service programs should be allocated across classes?**

A: No. I recommend that PECO be required to study the issue, and put forth a proposed allocation for how to equitably recover universal service program costs across rate classes. I intend to review and comment on the efficacy of other universal service program allocation proposals, should other parties put forward such a proposal in this proceeding, and I reserve the right to

[128] Roger D. Colton, Best Practices: Low-income Rate Affordability Programs (Nov. 2007), http://www.fsconline.com/downloads/Papers/2007%2011%20BestPractice_RateAffordability.pdf ("With the exception of Pennsylvania, whose utility commission has chosen to limit cost recovery exclusively to the residential class, low-income rate affordability programs recover their costs from all customer classes."); see, e.g., 4 CCR 723-3, § 3412(g) (Colorado); Ohio Rev. Code § 4928.52; NJ Rev. Stat. § 48:3-60; Amendments to Consumer Protections Standards for Electric and Gas Transmission and Distribution Utilities (Chapter 815) and Statewide Low-income Assistance Plan (Chapter 314), No. 2013-00228, Order (Me P.U.C. July 17, 2013); Re Statewide Low-Income Electric Assistance Program, 87 NH PUC 349, 218 P.U.R.4th 442 (N.H. PUC 2002); Order Adopting Low-income Program Modifications and Directing Utility Filings, NY Pub. Service Comm'n Docket No. 14-M-0565 (May 20, 2016); 2015 ORS § 757.612(7); Re Investigation into Percentage of Income Payment Program, No. 16-254, Order (Or. P.U.C. July 6, 2016); Illinois Energy Assistance Act (the "IEAA"), 305 ILCS 20/18; Cal. Pub. Util. Code § 382.

support or oppose any such proposals in the context of this proceeding. Nevertheless, and notwithstanding this reservation, my recommendation is that PECO be ordered to file a proposal to equitably recover universal service program costs across its rate classes within one year of a final order in this proceeding. PECO should host at least two stakeholder collaborative meetings to gather input on its proposal prior to filing. Consistent with the Commission's most recent guidance on the matter, I do not believe it is appropriate for PECO to continue to routinely recover costs for universal service programs from residential customers alone.

# V. SUMMARY OF RECOMMENDATIONS

**Q: Please summarize your recommendations.**

A: As I noted from the outset of my testimony, I do not believe that PECO's proposed rate increase is appropriate at this time, given the grave and uncertain economic impact of the COVID-19 pandemic on our communities as a whole, and on low-income consumers specifically. I recommend that PECO's rate increase be rejected in its entirety.

Nevertheless, I made several recommendations throughout my testimony to address current levels of unaffordability and mitigate the financial impact of any approved rate increase on low-income households, including the following:

**Improve Existing Unaffordability and Offset Impact of Rate Increase**

(1) Adopt the Commission's revised energy burden standards.

(2) Improve efforts to accurately identify and track low income customers.

(3) Develop a plan to increase CAP enrollment 50% by 2025.

(4) Adjust the CAP fixed credit level immediately upon approval of any rate increase.

(5) Adopt policy, budget, and programmatic changes to LIURP.

*a. Increase LIURP budget by $2 million to reach better parity with similarly sized NGDCs.*

*b. Establish per-job budget to address health and safety issues that prevent PECO from providing comprehensive usage reduction services to those most in need.*

*c. Continue PECO's Defacto Heating / Furnace Repair & Replacement Program as a permanent component of PECO Gas's LIURP.*

*d. Improve delivery of LIURP services to tenants and multifamily residents by adopting a lower high-usage threshold for this unique building type.*

*e. Require that unspent LIURP funds roll over and be added to PECO's LIURP budget for the following year.*

(6) Implement emergency pandemic provisions to help equitably address the growing utility debt crisis.

*a. Hardship Fund Program (Matching Energy Assistance Fund)*

i. Increase funding for PECO's Hardship Fund Program.

ii. Waive the requirement that grant recipients achieve zero balance, and require that grant recipients be provided with an affordable payment arrangement for any remaining balance after application of a hardship grant.

*b. Customer Assistance Program*

i. Waive income certification requirements until businesses are fully reopen and the state of emergency ends, and require PECO to work with stakeholders to develop a transition plan.

ii. Provide arrearage forgiveness for in-CAP arrears accrued during the pandemic.

*c. Waive Late Fees and Reconnection Fees*

**Ensure Equity in Rate Design**

- Deny PECO's request to increase its fixed charge.

**Improve Proportionality of Low Income Energy Efficiency and Conservation Programming**

- Increase eligibility for low income EE&C program to 150% FPL for homeowners and tenants.
- Revise general residential programs to include additional opportunities for low income customers to access energy efficient equipment at no cost.
- Require PECO to host a collaborative stakeholder meeting and to develop and file a plan for coordination of services provided through its voluntary EE&C program with services provided across LIURP, Act 129, and WAP.

**Equitably Recover Universal Service Costs from All Ratepayers**

- Consistent with formal Commission policy guidelines, require PECO to develop a proposal to recover universal service program costs from all ratepayers, and seek approval of such a proposal within one year of a final order in this proceeding.

These critical reforms are necessary to ensure that PECO's service is universally accessible to all consumers based on just and reasonable terms and conditions of service.

**Q: Does this conclude your direct testimony?**

A: Yes.

# APPENDIX A

## Resume of Mitchell Miller

**MITCHELL MILLER**
60 GEISEL Road
Harrisburg, PA 17112
Home: (717) 599-5510 Mobile: (717) 903-2196
Mitchmiller77@hotmail.com

## EMPLOYMENT

**2009-Present** **Mitch Miller Consulting, LLC**

Practice provides consulting services that promote the public interest with a focus on low income households. Specifically over 35 years of expertise is applied to the evaluation of regulatory policy involving customer service, complaint handling, credit and collections and universal service. Objective is to promote public policy development, program design, and implementation of programs for consumer education, energy efficiency, credit and collections, and customer assistance.

**2009-2012** **Pennsylvania Department of Community and Economic Development**
**Consultant**

Served as a Consultant on weatherization and energy efficiency for the Pennsylvania Weatherization Assistance Program (WAP) at PA DCED. Was instrumental in transforming the WAP program by creating a performance-based system, dedicated to a high standard of quality, compliance and production. Innovations include introducing performance standards for production, quality and compliance and independent certification and training for all state WAP workers. Also responsible for coordinating the states WAP program with the PUC, utilities and other efficiency programs.

**1992-2009** **Pennsylvania Public Utility Commission**

**Director, Bureau of Consumer Services**

Until his retirement from state service Mr. Miller was director of Consumer Services and PA PUC. His bureau has regulatory authority and responsibility for policy development for all areas of consumer services including resolving consumer complaints and problems, enforcing consumer regulations, developing, implementing and evaluating programs involving complaint handling, complaint analysis collections, enforcement of consumer regulations, utility customer assistance programs and low income conservation. He also directed BCS responsibilities for implementing the Pennsylvania Electric, Gas and Telephone Customer Choice Programs. Specific areas under his Direction include:

### Program Evaluation and Regulation

- Monitoring and evaluating the customer service practices and programs of utilities
- Promulgating regulations, implementing procedures to meet regulatory requirement and taking enforcement action to assure compliance

- Field reviews and audits of utilities' operations and advice the Commission regarding issues of interest and concern of utility consumers
- Compliance enforcement including informal investigations and prosecution of formal cases

- Track trends in the number and type of consumer complaints and inquiries, utility performance at handling customer complaints and payment arrangement requests. Other databases utilized to track utility termination activity, collection of delinquent accounts, compliance with customer service regulations and other areas critical to evaluating utility customer service performance.
- Produce utility performance and evaluative reports for the PUC, utilities and the public

**Universal Service Programs**

- The LIURP is targeted toward low-income households with the highest energy consumption, payment problems, and high arrearages. Since the program's inception to 2009, the major electric and gas companies required to participate in LIURP have spent over $530 million to provide weatherization treatments to more than 350,000 low-income households in Pennsylvania. The budgets for 2008 were 22.million for electric utilities and 9 million for gas utilities
- Customer Assistance Programs (CAPs) provide an alternative to traditional collection methods for low income, payment troubled utility customers. Customers make regular monthly payments, which may be for an amount that is less than the current bill for utility service. Budgets for CAP programs in 2008 were 189 million for electric companies and 174 million for gas companies. Utility companies have spent over 2 billion dollars for CAP through 1998.

**Utility Complaint Handling and Regulation**

- Responsible for establishing procedures and directing 90 staff in investigating annually over 100,000 informal consumer complaints for regulated fixed utilities, payment arrangement requests and responding to over 70,000 inquiries.
- Arbitrate billing, credit and other informal complaints and issue binding decisions to resolve informal disputes expeditiously. Investigators also issue decisions regarding the amortization of overdue electric, gas, steam heat, water, wastewater and basic telephone bills.

**1978-1992 Pennsylvania Public Utility Commission**

**PA Chief, Division of Research and Planning**

Reported to Director of Bureau of Consumer Services with direct responsibility for the direction, supervision and planning of a Division of 15 professionals who are delegated program responsibilities for regulation enforcement, utility program evaluation, customer assistance programs and consumer education. As the first Division Chief he was instrumental in creating these activities

- Bureau's compliance program in enforcing customer service regulations and statues through regulator interpretations, citations and litigation; including preparing with legal staff formal records, briefs, motions, interrogatories, reviewing utility responses and negotiating equitable settlements.

- Development and implementation of computer information evaluation systems for evaluation of utility customer service programs; systematic performance problems are identified through statistical analysis and observation and correction actions recommended via public reports, formal rate cases and consumer services audit programs.
- Managed the development of Commission's first consumer education program including proposing annual plans, statewide networking, supervising staff in conducting of workshops and conferences, and preparation of consumer education materials.

- Supervised the development of an integrated program for low income consumers; through program evaluation, leading to testimony, preparation of policy recommendations, interdepartmental coordination, regulation promulgation and establishing evaluation criteria

### 1977-1978 Pennsylvania Public Utility Commission Harrisburg, PA Research Analyst

Responsible for evaluating existing utility and Commission customer service programs and identifying problems and recommendations for change, which led to Division's current programs.

### 1974-1977 Governor's Action Center Harrisburg, PA
**Research Supervisor**

Office supervisor for a research and information unit. Duties included the modification and maintenance of an information and evaluation system, writing technical and topical reports, quality control review and staff training. Responsible for the supervision of five case evaluator and student interns.

## EDUCATION

M.S., Shippensburg University, 1984
Major: Public Administration
G.P.A. 3.9/4.0

B.S., Pennsylvania State University, 1974
Major: Community Development
Cum Laude

## ADDITIONAL AFFILIATIONS

Member, Pennsylvania WAP Policy Advisory Council

Member, Keystone Energy Efficiency Alliance

Past Co-Chair Keystone Energy Efficiency Alliance Conference

Past Co-Chair National Energy and Utility Affordability Conference

**EXPERT TESTIMONY**

- Pa. PUC v. Pennsylvania American Water Co., Docket Nos. R-2020-3019269, -3019371
- Pa. PUC v. Columbia Gas of Pennsylvania, Docket No. R-2020-3018835
- Pa. PUC v. UGI Gas of Pennsylvania, Inc., Docket No. R-2019-3015162
- Pa. PUC v. UGI Gas of Pennsylvania, Inc., Docket No. R-2018-3006814
- Implementation of Chapter 32 of the Public Utility Code Re Pittsburgh Water and Sewer Authority, Docket Nos. M-2018-2640802, M-2018-2640803
- Pa. PUC v. Pittsburgh Water and Sewer Authority, Docket No. R-2018-3002645; R-2018-3002647
- Pa. PUC v. PECO Energy Co., Docket No. R-2018-30000164
- Pa. PUC v. Columbia Gas of Pennsylvania, Inc., Docket No. R-2018-2647577
- PECO Energy Company's Pilot Plan for an Advance Payments Program and Temporary Waiver of Portions of the Commissions Regulations, Docket No. P-2016-2573023
- Pa. PUC v. UGI Penn Electric, Inc., Docket R- 2016-2580030
- Pa. PUC v. Metropolitan Edison Company, Docket No. R-2016-2537349
- Pa. PUC v. Pennsylvania Electric Co., Docket No. R-2016-2537352
- Pa. PUC v. Pennsylvania Power Co., Docket No. R-2016-2537355
- Pa. PUC v. West Penn Power, Docket No. R-2016-2537953
- Pa. PUC v. UGI Utilities, Inc. – Gas Division, Docket No. R-2015-2518438
- Petition of Duquesne Light for Approval its Act 129 Phase III Energy Efficiency and Conservation Plan, Docket No. M-2015-2515375
- Petition of PECO Energy Co. for Approval its Act 129 Phase III Energy Efficiency and Conservation Plan, Docket No. M-2015-2515619
- Consolidated Petition of First Energy Companies for Approval its Act 129 Phase III Energy Efficiency and Conservation Plan, Docket Nos. M-2015-2514767, -2514768, -2514769, 2514772
- Petition of Philadelphia Gas Works for Approval of its Phase II Demand Side Management Plan, Docket No. P-2014-2459362
- Pa. PUC v. PECO Gas of Pa., Inc., Docket No. R-2015-2468056
- Pa. PUC v. PPL Electric Utilities Corporation, Docket No. R-2015-2469275
- Pa. PUC v. PECO Gas of Pa., Inc., Docket No. R-2014-2406274
- Verizon Pa., LLC, and Verizon North, LLC, Petition for Competitive Classification, Docket Nos. P-2014-2446303, P-2014-2446304
- Petition of PECO Energy Co. for Approval its Act 129 Phase II Energy Efficiency and Conservation Plan, Docket No. M-2012-2333992
- Petition of PECO Energy Co. for Approval of its Default Service Program II, Docket No. P-2012-2283641
- Petition of PECO Energy Co. for Approval of its Universal Service and Energy Conservation Plan, Docket No. M-2012-2290911.

# Appendix B
# Cited Responses to Interrogatories

## Interrogatories of CAUSE-PA to PECO

CAUSE-PA to PECO I-1…… B-1
CAUSE-PA to PECO I-3…… B-3
CAUSE-PA to PECO I-4…… B-5
CAUSE-PA to PECO I-5…… B-6
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## Interrogatories of the Office of Consumer Advocate to PECO

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CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-1

Please identify the financial impact of the proposed increase on customers enrolled in PECO's Customer Assistance Program (CAP) by payment plan type and income tier. If you are unable to identify the financial impact, or assert that there will be no impact, please explain.

RESPONSE:

In Rate schedule III-E-11 GR, PECO provided bill impacts with various ranges of Mcf usage. For a Residential GR customer using the standard 8 Mcf, PECO stated the bill impact would be an increase of $7.07 or 8.8% from $80.10 per month to $87.17. Using PECO's current average CAP Gas discount of $8.94. at the time of Rate increase, a PECO CAP customer would see the same $7.07 bill increase but with a 9.9% increase. The Fixed Credit Option ("FCO") adjusts quarterly and over time will include the rate increase in the calculation of future credits. After a year, with equal 8 Mcf usage, the CAP Credit would grow to $9.73 per month, bringing the bill impact down to a $6.29 increase or 8.8% increase. The Company has proposed to transition from the FCO, to a Percent of Income Payment Plan ("PIPP") as part of its proposed USECP pending before the Commission. With the PIPP in place, rate case increases will not have a bill impact to CAP customers because PIPP bills are based on the customer's income.

| MCF | Bill at Present Rates | Bill at Proposed | Increase $ | Increase % |
|---|---|---|---|---|
| GR bill at 8 Mcf | $80.10 | $87.17 | $7.07 | 8.8% |
| | | | | |
| Average CAP Discount | $8.94 | $8.94 | | |
| | | | | |
| Net CAP Bill | $71.16 | $78.23 | $7.07 | 9.9% |

| MCF | Bill at Present Rates | Bill at Proposed | Increase $ | Increase % |
|---|---|---|---|---|
| GR bill at 8 Mcf | $80.10 | $87.17 | $7.07 | 8.8% |
| | | | | |
| Average CAP Discount | $8.94 | $9.73 | | |
| | | | | |
| Net CAP Bill | $71.16 | $77.44 | $6.29 | 8.8% |

Responsible Witness: Kelly Colarelli

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Response Date: 12/11/2020

CAUSE-PA-I-3

For 2016, 2017, 2018, 2019, and to date in 2020, how many PECO Gas customers were/are categorized as a confirmed low-income customer, disaggregated by month?

RESPONSE:

a. Please refer to Attachment CAUSE-PA-I-3(a). The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers include CAP customers who were verified within the last two years.

Responsible Witness: Kelly Colarelli

| Month | 2020 | 2019 | 2018 |
|---|---|---|---|
| Jan | 16,141 | 17,639 | 20,263 |
| Feb | 16,150 | 17,677 | 19,872 |
| Mar | 15,967 | 17,657 | 19,836 |
| Apr | 15,679 | 17,762 | 19,605 |
| May | 15,296 | 17,654 | 19,318 |
| Jun | 15,181 | 17,472 | 18,896 |
| Jul | 15,073 | 17,333 | 18,368 |
| Aug | 14,713 | 17,000 | 18,275 |
| Sep | 14,451 | 16,687 | 18,125 |
| Oct | 14,257 | 16,310 | 17,709 |
| Nov | NA | 16,320 | 17,525 |
| Dec | NA | 16,325 | 17,855 |

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Response Date: 12/11/2020

CAUSE-PA-I-4

Please identify all of the categories or identifiers that PECO includes when calculating its "confirmed low income customers" as reported to the Commission in its annual reporting pursuant to 52 Pa. Code § 62.1 *et seq.*

RESPONSE:

A Confirmed Low-Income Customer is identified as a residential utility customer whose gross household income is at or below 150% of the Federal poverty guidelines and has been verified within the last two years.

Responsible Witness: Kelly Colarelli

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Response Date: 12/11/2020

CAUSE-PA-I-5

For 2016, 2017, 2018, 2019, and to date in 2020, please identify the following, disaggregated by month:

a. The total number of residential PECO Gas customers.

b. The total number of residential PECO Gas customers, excluding confirmed low-income customers and CAP customers.

RESPONSE:

Please refer to Attachment CAUSE-PA-I-5(a). The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers include CAP customers who were verified within the last two years.

The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also due to the Company's response to COVID, customers have not been removed from CAP for failure to recertify.

Responsible Witness: Kelly Colarelli

| a. | Total Number of Residential PECO Gas Customers | | | |
|---|---|---|---|---|
| | **Month** | **2018** | **2019** | **2020** |
| | Jan | 485,837 | 481,973 | 485,333 |
| | Feb | 486,621 | 483,053 | 487,684 |
| | Mar | 478,714 | 483,662 | 487,078 |
| | Apr | 478,788 | 482,843 | 489,073 |
| | May | 478,705 | 484,032 | 489,581 |
| | Jun | 479,080 | 484,236 | 490,145 |
| | Jul | 479,209 | 484,864 | 489,669 |
| | Aug | 479,505 | 484,963 | 491,388 |
| | Sep | 477,421 | 483,876 | 492,470 |
| | Oct | 480,742 | 483,255 | 491,475 |
| | Nov | 481,385 | 484,250 | NA |
| | Dec | 482,435 | 486,613 | NA |

| b. | Total Number of Residential PECO Gas customers, excluding confirmed low income customers and CAP customers. | | | |
|---|---|---|---|---|
| | **Month** | **2018** | **2019** | **2020** |
| | Jan | 462,009 | 459,562 | 463,342 |
| | Feb | 463,053 | 460,818 | 465,555 |
| | Mar | 455,277 | 461,520 | 464,848 |
| | Apr | 455,428 | 460,609 | 466,905 |
| | May | 455,367 | 461,845 | 467,447 |
| | Jun | 455,956 | 462,054 | 467,972 |
| | Jul | 456,530 | 462,826 | 467,487 |
| | Aug | 456,881 | 462,980 | 469,228 |
| | Sep | 454,740 | 461,943 | 470,330 |
| | Oct | 458,212 | 461,505 | 469,323 |
| | Nov | 458,823 | 462,433 | NA |
| | Dec | 459,886 | 464,684 | NA |

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Response Date: 12/11/2020

CAUSE-PA-I-6

How many PECO Gas customers were/are enrolled in CAP in from 2016 to date in 2020, disaggregated by month and year? Please identify enrollment as of the last day of each month

RESPONSE:

Please refer to Attachment CAUSE-PA-I-6(a). The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also due to the Company's response to COVID, we have not been removing customers from CAP for failure to recertify.

Responsible Witness: Kelly Colarelli

| Month | 2018 | 2019 | 2020 |
|---|---|---|---|
| Jan | 20,710 | 20,267 | 19,339 |
| Feb | 20,579 | 19,921 | 19,435 |
| Mar | 20,486 | 19,666 | 19,566 |
| Apr | 20,430 | 19,549 | 19,607 |
| May | 20,439 | 19,441 | 19,700 |
| Jun | 20,463 | 19,452 | 19,817 |
| Jul | 20,096 | 19,291 | 19,948 |
| Aug | 19,953 | 19,258 | 20,028 |
| Sep | 20,166 | 19,299 | 20,118 |
| Oct | 20,265 | 19,158 | 20,147 |
| Nov | 20,333 | 19,141 | |
| Dec | 20,412 | 19,258 | |

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Response Date: 12/11/2020

CAUSE-PA-I-9

How many of PECO Gas's confirmed low-income customers received a LIHEAP Cash and/or Crisis Grant in the 2018-2019 LIHEAP program year and to date in the 2019-2020 LIHEAP program year? Please disaggregate by program year and type of grant received (Cash Only, Crisis Only, Both Cash and Crisis, Supplemental)?

RESPONSE:

Please see the response to OCA-III-7. This data represents all PECO Gas customers who were LIHEAP recipients. A PECO customer who received a LIHEAP grant would be considered as confirmed as low income by the State.

Responsible Witness: Kelly Colarelli

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Response Date: 12/11/2020

CAUSE-PA-I-10

As of January 1, 2020, how many estimated low-income customers reside within PECO Gas's service territory? Please explain how PECO arrived at its estimated figures and include citation and/or copies of any and all workpapers used to perform the estimation.

RESPONSE:

| **PECO Service Territory Poverty Chart** | |
|---|---|
| **County** | **Households < 150% FPL *(FPL - Federal Poverty Level)*** |
| **Bucks** | **23,457** |
| **Chester** | **15,824** |
| **Montgomery** | **31,635** |
| **Delaware** | **30,643** |
| **York** | **850** |

This data comes from the Needs Assessment section of PECO's 2019-2024 Universal Services and Energy Conservation Plan.

Responsible Witness: Kelley Colarelli

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Response Date: 12/11/2020

CAUSE-PA-I-12

How many LIURP jobs were completed by PECO Gas for calendar years 2016, 2017, 2018, 2019, and to date in 2020, disaggregated by year?

RESPONSE:

Please refer to Attachment CAUSE-PA-I-12(a). By agreement of counsel, PECO is not providing data for 2016 and 2017.

Responsible Witness: Kelly Colarelli

| Years | LIURP Jobs Complete |
|---|---|
| 2018 | 1298 |
| 2019 | 970 |
| 2020 | 186 |

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Response Date: 12/11/2020

CAUSE-PA-I-13

Of the jobs indicated in response to CAUSE-PA I-12, please provide the number of LIURP jobs completed for each subset of customer:

a. Homeowners

b. Tenants

c. Single family homes

d. Multifamily homes

e. Customers receiving LIHEAP who are not enrolled in CAP

f. CAP customers who did not receive LIHEAP

g. CAP customers who also received LIHEAP

h. Confirmed low-income customers not enrolled in CAP and who did not receive LIHEAP.

RESPONSE:

Please refer to Attachment CAUSE-PA-I-13(a). By agreement of counsel, PECO is not providing data for 2016 and 2017.

Responsible Witness: Kelly Colarelli

| Years | a. Homeowners | b. Tenants | c. Single Family/Other | d. Multifamily | Note |
|---|---|---|---|---|---|
| 2018 | 911 | 387 | 1221 | 77 | |
| 2019 | 762 | 208 | 939 | 31 | |
| 2020 | 149 | 37 | 184 | 2 | Pandemic has impacted participation |

| Years | e. LIHEAP, not CAP | f. CAP , no LIHEAP | g CAP & LIHEAP | h. Confirmed low-income, not CAP, no LIHEAP |
|---|---|---|---|---|
| 2018 | 14 | 452 | 634 | 23 |
| 2019 | 23 | 359 | 430 | 20 |
| 2020 | 5 | 85 | 67 | 4 |

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Response Date: 12/11/2020

CAUSE-PA-I-14

Please provide PECO Gas's most recent LIURP needs assessment approved by the Pennsylvania Utility Commission.

a. If PECO has prepared and submitted a needs assessment that has not yet been approved, please provide a copy.

b. Assuming that PECO Gas treats an identical number of low income units as will be treated through LIURP in the current fiscal year, and assuming no unit will be retreated, please indicate the number of years it would take to treat 100% of the low income units identified in the above requested needs assessment(s).

RESPONSE:

Please see Attachment CAUSE-PA-I-14(a) for the 2016-2018 PUC approved needs assessment.

a) Please see Attachment CAUSE-PA-I-14(b). For reference, the needs assessment can be found on Page 2 of 58 from the section labeled, Attachment A.
b) Per the needs assessment, PECO estimates 155,000 low-income households exist in our PECO gas territory. In response to CAUSE-PA-I-3(a), PECO stated there are 14,257 confirmed low-income gas customers in October 2020. Not all of these customers would be eligible for LIURP as they must also be deemed high users to qualify for LIURP.

In response to CAUSE-PA-I-12, PECO states that we have completed on average 1,000 LIURP gas jobs per year.

Responsible Witness: Kelly Colarelli

# ADDENDUM E

## APPRISE Universal Services Needs Assessment Memo

# MEMO

**DATE:** August 7, 2018

**TO:** Patricia King

**FROM:** Jackie Berger and Jorge Mancilla

**SUBJECT:** PECO Universal Services Needs Assessment Memo

Applied Public Policy Research
APPRISE
Institute for Study and Evaluation

PECO customers are income-eligible for the Customer Assistance Program (CAP) if they have income below 150 percent of the poverty level and they are income-eligible for the Low-Income Usage Reduction Program (LIURP) if they have income below 200 percent of the poverty level. This memo provides an assessment of the number of PECO customers who are income-eligible for CAP and LIURP.

### I. Methodology

This memo provides a profile of low-income households in the PECO service territory using data from the American Community Survey (ACS). The ACS data provide information on household characteristics, including income level and demographic characteristics. We use data on household size and income to construct the poverty ratio for each household and identify those households that were income-eligible for the CAP and LIURP.

Most of the analyses are conducted using the 2014, 2015, and 2016 ACS data files. An average of the three years of data is used to provide a larger sample for analysis than would be available in the one-year file. Table III-2B also provides an analysis of the 2013-2015 files and the 2012-2014 files to assess whether there have been changes in the income-eligible population.

### II. PECO Electric and Natural Gas Customers

There are approximately 1,700,000 households in the PECO service territory (excluding vacant units and group quarters). About 1,600,000 of these households are categorized as having PECO Residential Service because they received electric or gas service from PECO. Households are categorized as receiving electric or gas service from PECO if they provided a numeric value for their most recent month's gas or electricity bill and lived in one of the counties where PECO provides that service. Households are not included if their electricity and gas bills are included in their rent or condo fee, or if there was no charge for gas and electricity, or if neither gas nor electricity were used.

PECO Electric Service includes households in Bucks, Chester, Delaware, Montgomery, Philadelphia, and York counties. PECO Gas Services includes households in these counties except for Philadelphia county, as Philadelphia Gas Works (PGW) services these customers.

Table II-1
**Distribution of Service Status for Households in PECO Service Territory**

| Service Status | Number | Percent |
|---|---|---|
| PECO Residential Service | 1,599,172 | 95% |
| PECO Electric Service | 1,595,669 | 95% |
| PECO Gas Service | 384,256 | 23% |
| PECO Electric-Only Service | 1,214,916 | 72% |
| PECO Combination Gas and Electric Service | 380,753 | 23% |
| PECO Gas-Only Service | 3,503 | <1% |
| PECO Heating Service | 606,219 | 36% |
| PECO Non-Heating Service | 992,953 | 59% |
| **All Households** | **1,683,831** | **100%** |

Table II-2 shows the number households in each county who receive utility service from PECO. The county with the most households receiving PECO Residential Service is Philadelphia County with 539,462 such households, representing 34 percent of all the households who receive PECO service. The county with the most households receiving PECO Gas Service is York County, with 108,848 households.

Table II-2
**Distribution of Service Type for Households in PECO Service Territory, By County**

| County | All Households | PECO Residential Service | | PECO Electric Service | | PECO Gas Service | |
|---|---|---|---|---|---|---|---|
| | N | N | % | N | % | N | % |
| Bucks | 233,644 | 225,387 | 14% | 224,935 | 14% | 63,505 | 17% |
| Chester | 187,151 | 180,016 | 11% | 179,218 | 11% | 61,128 | 16% |
| Delaware | 204,321 | 195,709 | 12% | 195,339 | 12% | 62,341 | 16% |
| Montgomery | 310,568 | 296,237 | 19% | 295,515 | 19% | 88,434 | 23% |
| Philadelphia | 579,891 | 539,462 | 34% | 539,462 | 34% | - | - |
| York | 168,256 | 162,361 | 10% | 161,200 | 10% | 108,848 | 28% |
| **Total Service Territory** | **1,683,831** | **1,599,172** | **100%** | **1,595,669** | **100%** | **384,256** | **100%** |

Table II-3 shows the number households in each county who receive service from PECO, broken down by whether their primary heating service is provided by PECO.

Table II-3
**Distribution of Heating Service for Households in PECO Service Territory**
**By County**

| County | PECO Residential Service | PECO Heating Service | | PECO Non-Heating Service | |
|---|---|---|---|---|---|
| | Number | Number | Percent | Number | Percent |
| Bucks | 225,387 | 104,253 | 17% | 121,134 | 12% |
| Chester | 180,016 | 80,286 | 13% | 99,729 | 10% |
| Delaware | 195,709 | 81,845 | 14% | 113,864 | 11% |
| Montgomery | 296,237 | 135,521 | 22% | 160,716 | 16% |
| Philadelphia | 539,462 | 88,261 | 15% | 451,201 | 45% |
| York | 162,361 | 116,053 | 19% | 46,308 | 5% |
| **Total Service Territory** | **1,599,172** | **606,219** | **100%** | **992,953** | **100%** |

## III. PECO CAP and LIURP Income-Eligible Customers

Table III-1 presents data on income-eligible households by service type and heating service. We estimate in the most recent 3-year combined files that 18 percent of all households with PECO residential service are income-eligible for the CAP, and 26 percent for LIURP. Of the 1,599,172 households with residential utility service from PECO, approximately 292,913 have income at or below 150 percent of the federal poverty guidelines, and 411,542 have income at or below 200 percent of the federal poverty guidelines.

Table III-1
**CAP and LIURP Income Eligibility Rate**
**By PECO Service Status**

| Service Status | Total Households | CAP Income-Eligible Households (150% of FPL) | | LIURP Income-Eligible Households (200% of FPL) | |
|---|---|---|---|---|---|
| | | Number | Percent | Number | Percent |
| PECO Residential Service | 1,599,172 | 292,913 | 18% | 411,542 | 26% |
| PECO Electric Service | 1,595,669 | 291,780 | 18% | 410,136 | 26% |
| PECO Gas Service | 384,256 | 43,735 | 11% | 67,015 | 17% |
| PECO Electric-Only Service | 1,214,916 | 249,178 | 21% | 344,528 | 28% |
| PECO Combination Gas and Electric Service | 380,753 | 42,602 | 11% | 65,609 | 17% |
| PECO Gas-Only Service | 3,503 | 1,133 | 32% | 1,406 | 40% |
| PECO Heating Service | 606,219 | 98,073 | 16% | 138,361 | 23% |
| PECO Non-Heating Service | 992,953 | 194,840 | 20% | 273,181 | 28% |
| **All Households** | **1,683,831** | **328,228** | **19%** | **456,245** | **27%** |

Table III-2A presents data on income-eligible households by county. The county with the most eligible households and with the highest eligibility rate for both CAP and LIURP is Philadelphia County. There are 166,559 households that are income-eligible for CAP in Philadelphia (31%) and 219,432 that are income-eligible for LIURP (41%). The county with the least eligible households and with the lowest eligibility rate for both programs is Chester County.

Table III-2A
CAP and LIURP Income Eligibility Rate
By County

| County | PECO Residential Service | CAP Income-Eligible Households (150% of FPL) | | LIURP Income-Eligible Households (200% of FPL) | |
|---|---|---|---|---|---|
| | Number | Number | Percent | Number | Percent |
| Bucks | 225,387 | 23,457 | 10% | 36,788 | 16% |
| Chester | 180,016 | 15,824 | 9% | 24,869 | 14% |
| Delaware | 195,709 | 30,643 | 16% | 43,853 | 22% |
| Montgomery | 296,237 | 31,635 | 11% | 48,375 | 16% |
| Philadelphia | 539,462 | 166,599 | 31% | 219,432 | 41% |
| York | 162,361 | 24,755 | 15% | 38,225 | 24% |
| **Total Service Territory** | **1,599,172** | **292,913** | **18%** | **411,542** | **26%** |

Table II-2B shows that there has been an increase in the total number of households in PECO's service territory, but a decrease the number of CAP income-eligible households, and in the percent of households that are income-eligible for CAP in the service territory. The number of income-eligible households declined from 312,391 in the 2012-2014 analysis to 301,838 in the 2013-2015 analysis, to 292,913 in the 2014-2016 analysis. The percent of households who were income-eligible declined from 20 percent to 19 percent to 18 percent. The number eligible in Philadelphia County declined from 175,599 in the 2012-2014 analysis to 166,599 in the 2014-2016 analysis.

Table III-2B
CAP Income Eligibility Rate
By County

| County | 2014-2016 ACS | | | 2013-2015 ACS | | | 2012-2014 ACS | | |
|---|---|---|---|---|---|---|---|---|---|
| | PECO Residential Service | CAP Income-Eligible Households | | PECO Residential Service | CAP Income-Eligible Households | | PECO Residential Service | CAP Income-Eligible Households | |
| | # | # | % | # | # | % | # | # | % |
| Bucks | 225,387 | 23,457 | 10% | 225,281 | 24,635 | 11% | 224,671 | 24,543 | 11% |
| Chester | 180,016 | 15,824 | 9% | 179,485 | 17,542 | 10% | 177,700 | 19,344 | 11% |
| Delaware | 195,709 | 30,643 | 16% | 194,401 | 31,080 | 16% | 193,250 | 33,256 | 17% |
| Montgomery | 296,237 | 31,635 | 11% | 294,093 | 32,883 | 11% | 293,928 | 32,762 | 11% |
| Philadelphia | 539,462 | 166,599 | 31% | 540,732 | 170,450 | 32% | 537,746 | 175,599 | 33% |

| County | 2014-2016 ACS | | | 2013-2015 ACS | | | 2012-2014 ACS | | |
|---|---|---|---|---|---|---|---|---|---|
| | PECO Residential Service | CAP Income-Eligible Households | | PECO Residential Service | CAP Income-Eligible Households | | PECO Residential Service | CAP Income-Eligible Households | |
| | # | # | % | # | # | % | # | # | % |
| York | 162,361 | 24,755 | 15% | 160,751 | 25,248 | 16% | 162,548 | 26,887 | 17% |
| **Total** | **1,599,172** | **292,913** | **18%** | **1,594,742** | **301,838** | **19%** | **1,589,843** | **312,391** | **20%** |

Table III-3 provides a breakdown of the income-eligible population receiving PECO residential service by poverty level and service type. While 72 percent of the LIURP income-eligible electric only households have income at or below 150 percent of poverty and are income-eligible for CAP, 64 percent of the LIURP income-eligible combination households are income-eligible for CAP.

Table III-3
Distribution of Households
By Service Type and Poverty Group

| Poverty Group | Electric-Only | | | Combination | | | Gas-Only | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent | | Number | Percent | | Number | Percent | |
| | | Of CAP | OF LIURP | | Of CAP | OF LIURP | | Of CAP | OF LIURP |
| **CAP & LIURP Eligible** | | | | | | | | | |
| 0% -25% | 44,098 | 18% | 13% | 5,612 | 13% | 9% | 300 | 27% | 21% |
| 26% -50% | 23,024 | 9% | 7% | 3,289 | 8% | 5% | 62 | 5% | 4% |
| 51% -75% | 41,241 | 17% | 12% | 5,491 | 13% | 8% | 7 | 1% | 1% |
| 76%-100% | 49,490 | 20% | 14% | 7,372 | 17% | 11% | 291 | 26% | 21% |
| 101%-125% | 48,796 | 20% | 14% | 10,124 | 24% | 15% | 307 | 27% | 22% |
| 126% - 150% | 42,528 | 17% | 12% | 10,715 | 25% | 16% | 166 | 15% | 12% |
| **Total CAP Eligible** | **249,178** | **100%** | **72%** | **42,602** | **100%** | **64%** | **1,133** | **100%** | **81%** |
| **LIURP Eligible** | | | | | | | | | |
| 151%-175% | 49,436 | - | 14% | 11,549 | - | 18% | 181 | - | 13% |
| 176%-200% | 45,913 | - | 13% | 11,458 | - | 17% | 91 | - | 7% |
| **Total LIURP Eligible** | **344,528** | **-** | **100%** | **65,609** | **-** | **100%** | **1,406** | **-** | **100%** |

Table III-4 provides a breakdown of the income-eligible population receiving PECO electric service by poverty level. While 28 percent of CAP income-eligible households are below 50 percent of the poverty level, 35 percent are between 51 and 100 percent, and 38 percent are between 101 and 150 percent.

Table III-4
Distribution of Households with Electric Service
By Poverty Group

| Poverty Group | Households With Electric Service | | |
|---|---|---|---|
| | Number | Percent | |
| | | Of CAP | OF LIURP |
| **CAP & LIURP Eligible** | | | |
| 0% -25% | 49,710 | 17% | 12% |
| 26% -50% | 26,313 | 9% | 6% |
| 51% -75% | 46,732 | 16% | 11% |
| 76%-100% | 56,862 | 19% | 14% |
| 101%-125% | 58,920 | 20% | 14% |
| 126% - 150% | 53,243 | 18% | 13% |
| **Total CAP Eligible** | **291,780** | **100%** | **70%** |
| **LIURP Eligible** | | | |
| 151%-175% | 60,985 | - | 15% |
| 176%-200% | 57,371 | - | 14% |
| **Total LIURP Eligible** | **410,136** | **-** | **100%** |

**Table III-5 and Table III-6 provide a breakdown of the CAP and LIURP income-eligible population receiving PECO electric service by poverty level and county. The county with the highest number and percentage income-eligible households with income below 100% of the Federal Poverty Guidelines is Philadelphia County.**

Table III-5
Distribution of CAP Income-Eligible Households with Electric Service
By Poverty Group and County

| Poverty Group | County | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bucks | | Chester | | Delaware | | Montgomery | | Philadelphia | | York | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| 0% -25% | 3,283 | 14% | 2,289 | 15% | 4,366 | 14% | 4,960 | 16% | 32,063 | 19% | 2,748 | 11% |
| 26% -50% | 1,952 | 8% | 1,025 | 7% | 2,999 | 10% | 2,089 | 7% | 16,704 | 10% | 1,544 | 6% |
| 51% -75% | 2,912 | 12% | 2,688 | 17% | 4,902 | 16% | 3,506 | 11% | 29,309 | 18% | 3,415 | 14% |
| 76%-100% | 4,622 | 20% | 2,968 | 19% | 5,327 | 18% | 6,208 | 20% | 33,574 | 20% | 4,163 | 17% |
| 101%-125% | 5,534 | 24% | 3,470 | 22% | 6,273 | 21% | 7,037 | 22% | 30,600 | 18% | 6,007 | 25% |
| 126% - 150% | 5,154 | 22% | 3,186 | 20% | 6,459 | 21% | 7,678 | 24% | 24,349 | 15% | 6,418 | 26% |
| **Total CAP Eligible** | **23,457** | **100%** | **15,626** | **100%** | **30,326** | **100%** | **31,477** | **100%** | **166,599** | **100%** | **24,294** | **100%** |

Table III-6
Distribution of LIURP Income-Eligible Households with Electric Service
By Poverty Group and County

| Poverty Group | County | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bucks | | Chester | | Delaware | | Montgomery | | Philadelphia | | York | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| 0% -25% | 3,283 | 9% | 2,289 | 9% | 4,366 | 10% | 4,960 | 10% | 32,063 | 15% | 2,748 | 7% |
| 26% -50% | 1,952 | 5% | 1,025 | 4% | 2,999 | 7% | 2,089 | 4% | 16,704 | 8% | 1,544 | 4% |
| 51% -75% | 2,912 | 8% | 2,688 | 11% | 4,902 | 11% | 3,506 | 7% | 29,309 | 13% | 3,415 | 9% |
| 76%-100% | 4,622 | 13% | 2,968 | 12% | 5,327 | 12% | 6,208 | 13% | 33,574 | 15% | 4,163 | 11% |
| 101%-125% | 5,534 | 15% | 3,470 | 14% | 6,273 | 14% | 7,037 | 15% | 30,600 | 14% | 6,007 | 16% |
| 126% - 150% | 5,154 | 14% | 3,186 | 13% | 6,459 | 15% | 7,678 | 16% | 24,349 | 11% | 6,418 | 17% |
| 151%-175% | 5,921 | 16% | 4,507 | 18% | 7,460 | 17% | 7,613 | 16% | 28,183 | 13% | 7,302 | 19% |
| 176%-200% | 7,352 | 20% | 4,517 | 18% | 5,750 | 13% | 9,051 | 19% | 24,650 | 11% | 6,051 | 16% |
| **Total LIURP Eligible** | **36,730** | **100%** | **24,651** | **100%** | **43,536** | **100%** | **48,141** | **100%** | **219,432** | **100%** | **37,647** | **100%** |

Table III-7 provides a breakdown of the income-eligible population receiving PECO gas service by poverty level. While 20 percent of CAP income-eligible households are below 50 percent of the poverty level, 31 percent are between 51 and 100 percent, and 49 percent are between 101 and 150 percent.

Table III-7
Distribution of Households with Gas Service
By Poverty Group

| Poverty Group | Households With Gas Service | | |
|---|---|---|---|
| | Number | Percent | |
| | | Of CAP | OF LIURP |
| **CAP & LIURP Eligible** | | | |
| 0% -25% | 5,912 | 14% | 9% |
| 26% -50% | 3,351 | 8% | 5% |
| 51% -75% | 5,498 | 13% | 8% |
| 76%-100% | 7,662 | 18% | 11% |
| 101%-125% | 10,431 | 24% | 16% |
| 126% - 150% | 10,881 | 25% | 16% |
| **Total CAP Eligible** | **43,735** | **100%** | **65%** |
| **LIURP Eligible** | | | |
| 151%-175% | 11,730 | - | 18% |
| 176%-200% | 11,549 | - | 17% |
| **Total LIURP Eligible** | **67,015** | **-** | **100%** |

**Table III-8 and Table III-9 provide a breakdown of the CAP and LIURP income-eligible population receiving PECO gas service by poverty level and county. No households in Philadelphia County receive PECO gas service. The county with the highest number of income-eligible households with income below 100% of the Federal Poverty Guidelines is York County. The county with the highest percentage of income-eligible households with income below 100% of the Federal Poverty Guidelines is Delaware County, where 59 percent of the households have income at or below that level.**

Table III-8
Distribution of CAP Income-Eligible Households with Gas Service
By Poverty Group and County

| Poverty Group | County | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bucks | | Chester | | Delaware | | Montgomery | | Philadelphia | | York | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| 0% -25% | 628 | 10% | 897 | 17% | 1,372 | 17% | 1,241 | 17% | - | - | 1,775 | 11% |
| 26% -50% | 513 | 9% | 325 | 6% | 821 | 10% | 528 | 7% | - | - | 1,163 | 7% |
| 51% -75% | 964 | 16% | 800 | 15% | 1,110 | 14% | 709 | 10% | - | - | 1,915 | 11% |
| 76%-100% | 1,167 | 19% | 911 | 17% | 1,432 | 18% | 1,265 | 17% | - | - | 2,887 | 17% |
| 101%-125% | 1,148 | 19% | 1,393 | 26% | 1,848 | 23% | 1,720 | 23% | - | - | 4,321 | 26% |
| 126% - 150% | 1,591 | 26% | 1,097 | 20% | 1,479 | 18% | 1,866 | 25% | - | - | 4,848 | 29% |
| **Total CAP Eligible** | **6,010** | **100%** | **5,425** | **100%** | **8,061** | **100%** | **7,330** | **100%** | **-** | **-** | **16,909** | **100%** |

Table III-9
Distribution of LIURP Income-Eligible Households with Gas Service
By Poverty Group and County

| Poverty Group | County | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bucks | | Chester | | Delaware | | Montgomery | | Philadelphia | | York | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| 0% -25% | 628 | 7% | 897 | 11% | 1,372 | 11% | 1,241 | 10% | - | - | 1,775 | 7% |
| 26% -50% | 513 | 6% | 325 | 4% | 821 | 7% | 528 | 4% | - | - | 1,163 | 5% |
| 51% -75% | 964 | 11% | 800 | 10% | 1,110 | 9% | 709 | 6% | - | - | 1,915 | 8% |
| 76%-100% | 1,167 | 13% | 911 | 11% | 1,432 | 12% | 1,265 | 10% | - | - | 2,887 | 12% |
| 101%-125% | 1,148 | 13% | 1,393 | 17% | 1,848 | 15% | 1,720 | 14% | - | - | 4,321 | 17% |
| 126% - 150% | 1,591 | 18% | 1,097 | 13% | 1,479 | 12% | 1,866 | 15% | - | - | 4,848 | 19% |
| 151%-175% | 1,287 | 14% | 1,592 | 19% | 2,239 | 18% | 2,110 | 17% | - | - | 4,502 | 18% |
| 176%-200% | 1,588 | 18% | 1,377 | 16% | 2,083 | 17% | 2,842 | 23% | - | - | 3,659 | 15% |
| **Total LIURP Eligible** | **8,885** | **100%** | **8,394** | **100%** | **12,383** | **100%** | **12,282** | **100%** | **-** | **-** | **25,070** | **100%** |

## IV. CAP Participation Rates

Table IV-1 displays the participation rate for Program Year 2015. The table shows that an estimated 56 percent of the income-eligible population participated in the CAP.

Table IV-1
**Participation Rate for 2015**
**By Poverty Level**

| Poverty Level | CAP Participants | CAP Eligible PECO Residential Households | Participation Rates |
|---|---|---|---|
| 0% -50% | 36,335 | 76,385 | 48% |
| 51% -100% | 75,904 | 103,892 | 73% |
| 101% -150% | 53,044 | 112,636 | 47% |
| **Total** | **165,283** | **292,913** | **56%** |

## V. Summary

This memo provided a profile of income-eligible households in the PECO service territory using data from the American Community Survey (ACS). Key findings from the analysis are provided below.

- There are approximately 1,683,831 households in the PECO service territory and about 1,599,172 have direct PECO bill payment.
- While 18 percent of all households with PECO residential service are income-eligible for CAP, 26 percent are income-eligible for LIURP.
- The number of CAP income-eligible households declined from 312,391 in the 2012-2014 analysis to 301,838 in the 2013-2015 analysis, to 292,913 in the 2014-2016 analysis. The percent of households who were income-eligible for CAP declined from 20 percent to 19 percent to 18 percent.
- An estimated 56 percent of the income-eligible population participated in CAP during Program Year 2015.

Pennsylvania Public Utility Commission
v.
PECO Energy Company – Gas Division

Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-15

Please indicate for each year for the past five years, and to date in 2020:

a. Whether PECO Gas exhausted its LIURP budget;

b. The total amount of budgeted LIURP dollars;

c. The total amount of spent LIURP dollars;

d. If PECO Gas's LIURP budget was exhausted, the number of LIURP applicants that did not receive LIURP services despite having been found to be LIURP eligible.

RESPONSE:

Please refer to Attachment CAUSE-PA-I-15(a). By agreement of counsel, PECO is not providing data for 2016 and 2017.

Responsible Witness: Kelly Colarelli

Attachment CAUSE-PA-I-15(a)


| Years | a. Budget Notes | b. Budget | c. Spend | d. Eligible Customers Not Receiving Service | Note |
|---|---|---|---|---|---|
| 2018 | Budget Exhausted | $2,250,000.00 | $2,250,000.04 | 0 | LIURP Call Center is primarily outbound; LIURP does not maintain a wait list. All eligible in-bound contacts are provided appointments. |
| 2019 | Budget Exhausted | $2,250,000.00 | $2,249,999.91 | 0 | |
| 2020 | Through November 2020 | $2,250,000.00 | $843,687.86 | | Pandemic has impacted spend, year is not complete |

Pennsylvania Public Utility Commission
v.
PECO Energy Company – Gas Division

Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-16

If PECO does not fully expend its LIURP budget, does it carry over unspent funds and add those funds to its LIURP budget for the following year?

RESPONSE:

Historically, PECO does not carry over unspent LIURP funds. The entire budget is spent each year. Due to the pandemic, PECO will not expend its LIURP budget in 2020. PECO does plan to carry over unspent funds and add it to subsequent year(s) budgets.
As stated in the 2016-2018 Universal Service and Energy Conservation Plan, "All of PECO's budgeted, non-incremental LIURP funding unspent in 2020 will be "rolled over" to increase future LIURP program spending. *Cf.* Opinion and Order, *National Fuel Gas Distribution Corporation's Universal Service and Energy Conservation Plan for 2017-2020 Submitted in Compliance with 52 Pa. Code s 62.4,* Docket No. M-2016-2573847 (Order entered March 1, 2018), p. 59 ("Additionally, the LIURP regulations do not expressly require that a company rollover unspent LIURP funds from one program year to the next, but many companies choose to do so."). In light of continuing COVID-related limitations and vendor capacity, PECO is planning to allocate unspent 2020 funds to support LIURP spending above budgeted amounts in both 2021 and 2022."

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
v.
PECO Energy Company – Gas Division

Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-17

What is the average annual income of PECO Gas's currently identified confirmed low income customers?

RESPONSE:

As of October 30, 2020, the average annual income of PECO Gas's currently identified confirmed low-income customers is $15,647.24.

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
v.
PECO Energy Company – Gas Division

Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-18

What is the average annual income of PECO Gas's currently enrolled CAP customers?

RESPONSE:

As of October 30, 2020, the average annual income of PECO Gas's currently enrolled CAP customers is $14,004.22.

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-19

For the years 2016, 2017, 2018, 2019, and to date in 2020, how many customers were terminated for nonpayment each month, disaggregated by:

a. All residential customers

b. Residential customers, excluding confirmed low income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-19(a). By agreement of counsel, PECO is not providing data for 2016 and 2017. The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also, due to the Company's response to COVID, PECO has not been removing customers from CAP for failure to recertify.

The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers exclude CAP customers as requested in this Interrogatory.

Responsible Witness: Kelly Colarelli

Attachment CAUSE-PA-I-19(a)
Page 1 of 1

| a. | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 9 | - | 3 |
| Feb | 21 | 6 | 13 |
| Mar | 63 | 5 | 15 |
| Apr | 2,857 | 3,001 | - |
| May | 4,102 | 2,919 | - |
| Jun | 3,390 | 4,395 | - |
| Jul | 2,868 | 2,902 | - |
| Aug | 1,799 | 3,880 | - |
| Sep | 553 | 1,482 | - |
| Oct | 3,238 | 1,762 | - |
| Nov | 1,926 | 2,293 | |
| Dec | - | - | |

| b. | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 9 | - | 3 |
| Feb | 21 | 6 | 13 |
| Mar | 63 | 5 | 15 |
| Apr | 2,273 | 2,397 | - |
| May | 3,209 | 2,152 | - |
| Jun | 2,529 | 3,376 | - |
| Jul | 2,150 | 2,172 | - |
| Aug | 1,334 | 2,961 | - |
| Sep | 340 | 1,188 | - |
| Oct | 2,428 | 1,342 | - |
| Nov | 1,469 | 1,782 | |
| Dec | - | - | |

| c. | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | - | - | - |
| Feb | - | - | - |
| Mar | - | - | - |
| Apr | 244 | 227 | - |
| May | 298 | 301 | - |
| Jun | 225 | 295 | - |
| Jul | 197 | 214 | - |
| Aug | 114 | 287 | - |
| Sep | 76 | 87 | - |
| Oct | 240 | 130 | - |
| Nov | 155 | 143 | |
| Dec | - | - | |

| d. | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | - | - | - |
| Feb | - | - | - |
| Mar | - | - | - |
| Apr | 340 | 377 | - |
| May | 595 | 466 | - |
| Jun | 636 | 724 | - |
| Jul | 521 | 516 | - |
| Aug | 351 | 632 | - |
| Sep | 137 | 207 | - |
| Oct | 570 | 290 | - |
| Nov | 302 | 368 | |
| Dec | - | - | |

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CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-20

For 2016, 2017, 2018, 2019, and to date in 2020, please provide the number of payment troubled customers, disaggregated by month, for:

a. All residential customers

b. Residential customers, excluding confirmed low income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-20(a). By agreement of counsel, PECO is not providing data for 2016 and 2017. PECO defined payment troubled as any customer with an active payment agreement or in debt without a payment agreement. This answer is the sum of CAUSE-PA-I- 21 and CAUSE-PA-I- 22.

The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also, due to the Company's response to COVID, PECO has not been removing customers from CAP for failure to recertify.

The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers exclude CAP customers as requested in this Interrogatory.

Responsible Witness: Kelly Colarelli

Attachment CAUSE-PA-I-20(a)
Page 1 of 1

| a. Residential Gas customers | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 87,845 | 81,371 | 81,903 |
| Feb | 93,260 | 80,143 | 80,190 |
| Mar | 91,290 | 81,125 | 85,683 |
| Apr | 78,820 | 83,515 | 84,925 |
| May | 85,700 | 85,611 | 82,965 |
| Jun | 79,924 | 79,130 | 78,505 |
| Jul | 76,903 | 77,163 | 78,932 |
| Aug | 84,156 | 84,803 | 82,667 |
| Sep | 85,241 | 81,387 | 85,934 |
| Oct | 85,330 | 76,116 | 91,710 |
| Nov | 89,350 | 82,659 | |
| Dec | 82,306 | 84,885 | |

| b. Residential Gas customers excl CAP & confirmed low-income | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 70,004 | 66,651 | 67,065 |
| Feb | 74,668 | 65,984 | 66,423 |
| Mar | 72,612 | 66,959 | 71,691 |
| Apr | 63,070 | 69,007 | 70,875 |
| May | 68,844 | 70,496 | 69,179 |
| Jun | 63,762 | 64,807 | 64,855 |
| Jul | 60,877 | 62,708 | 65,196 |
| Aug | 67,556 | 69,595 | 68,543 |
| Sep | 68,671 | 66,557 | 71,657 |
| Oct | 70,656 | 62,133 | 75,687 |
| Nov | 74,667 | 68,290 | |
| Dec | 67,859 | 70,376 | |

| c. Confirmed low-income excl CAP | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 2,757 | 4,421 | 5,022 |
| Feb | 2,807 | 4,359 | 4,438 |
| Mar | 2,787 | 4,354 | 4,517 |
| Apr | 2,686 | 4,367 | 4,334 |
| May | 2,764 | 4,344 | 4,083 |
| Jun | 2,679 | 4,094 | 3,892 |
| Jul | 2,643 | 4,166 | 3,788 |
| Aug | 2,752 | 4,374 | 3,790 |
| Sep | 2,748 | 4,285 | 3,751 |
| Oct | 3,940 | 4,216 | 2,570 |
| Nov | 4,008 | 4,328 | |
| Dec | 4,189 | 4,542 | |

| d. CAP Customers | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 15,084 | 10,299 | 9,816 |
| Feb | 15,785 | 9,800 | 9,329 |
| Mar | 15,891 | 9,812 | 9,475 |
| Apr | 13,064 | 10,141 | 9,716 |
| May | 14,092 | 10,771 | 9,703 |
| Jun | 13,483 | 10,229 | 9,758 |
| Jul | 13,383 | 10,289 | 9,948 |
| Aug | 13,848 | 10,834 | 10,334 |
| Sep | 13,822 | 10,545 | 10,526 |
| Oct | 10,734 | 9,767 | 13,453 |
| Nov | 10,675 | 10,041 | |
| Dec | 10,258 | 9,967 | |

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
To Interrogatories of the
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CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-21

For 2016, 2017, 2018, 2019, and thus far in 2020, disaggregated by month, please provide the number of customers with an active payment arrangement for each of the following customer segments:

a. All residential customers

b. Residential customers, excluding confirmed low income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-21(a). By agreement of counsel, PECO is not providing data for 2016 and 2017. The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also, due to the Company's response to COVID, PECO has not been removing customers from CAP for failure to recertify.

The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers exclude CAP customers as requested in this Interrogatory.

Responsible Witness: Kelly Colarelli

Attachment CAUSE-PA-I-21(a)
Page 1 of 1

| a. Residential Gas customers | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 6,053 | 7,062 | 7,580 |
| Feb | 6,175 | 7,118 | 7,696 |
| Mar | 6,755 | 7,716 | 7,649 |
| Apr | 7,423 | 8,469 | 9,183 |
| May | 8,271 | 9,865 | 9,802 |
| Jun | 8,772 | 10,239 | 10,603 |
| Jul | 8,571 | 10,078 | 11,295 |
| Aug | 8,615 | 10,032 | 11,627 |
| Sep | 8,527 | 9,829 | 12,727 |
| Oct | 8,225 | 9,212 | 13,072 |
| Nov | 8,880 | 8,930 | |
| Dec | 7,410 | 7,975 | |

| b. Residential Gas customers excl CAP & confirmed low-income | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 3,848 | 4,085 | 3,641 |
| Feb | 4,039 | 4,252 | 4,313 |
| Mar | 4,330 | 4,521 | 4,283 |
| Apr | 4,567 | 4,782 | 4,954 |
| May | 4,761 | 5,188 | 5,065 |
| Jun | 4,959 | 5,247 | 5,277 |
| Jul | 4,772 | 5,136 | 5,514 |
| Aug | 4,705 | 5,066 | 5,540 |
| Sep | 4,677 | 4,988 | 6,242 |
| Oct | 4,500 | 4,697 | 6,501 |
| Nov | 4,552 | 4,609 | |
| Dec | 3,954 | 4,255 | |

| c. Confirmed low-income excl CAP | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 542 | 608 | 1,274 |
| Feb | 544 | 618 | 815 |
| Mar | 562 | 612 | 850 |
| Apr | 683 | 750 | 980 |
| May | 790 | 879 | 977 |
| Jun | 834 | 957 | 1,063 |
| Jul | 872 | 1,024 | 1,148 |
| Aug | 859 | 1,036 | 1,160 |
| Sep | 836 | 1,039 | 1,212 |
| Oct | 769 | 967 | 1,184 |
| Nov | 819 | 970 | |
| Dec | 686 | 837 | |

| d. CAP Customers | | | |
|---|---|---|---|
| Month | 2018 | 2019 | 2020 |
| Jan | 1,663 | 2,369 | 2,665 |
| Feb | 1,592 | 2,248 | 2,568 |
| Mar | 1,863 | 2,583 | 2,516 |
| Apr | 2,173 | 2,937 | 3,249 |
| May | 2,720 | 3,798 | 3,760 |
| Jun | 2,979 | 4,035 | 4,263 |
| Jul | 2,927 | 3,918 | 4,633 |
| Aug | 3,051 | 3,930 | 4,927 |
| Sep | 3,014 | 3,802 | 5,273 |
| Oct | 2,956 | 3,548 | 5,387 |
| Nov | 3,509 | 3,351 | |
| Dec | 2,770 | 2,883 | |

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Response Date: 12/11/2020

CAUSE-PA-I-22

For 2016, 2017, 2018, 2019, and thus far in 2020, disaggregated by month, please provide the number of customers in debt without an active payment arrangement for each of the following customer segments:

a. All residential customers

b. Residential customers, excluding confirmed low income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-22(a). By agreement of Counsel, data for 2016 and 2017 is not being provided. The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also due to the Company's response to COVID, the Company has not been removing customers from CAP for failure to recertify.

The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers exclude CAP customers as requested in this Interrogatory.

Responsible Witness: Kelly Colarelli

| a. Residential Gas customers | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 81,792 | 74,309 | 74,323 |
| Feb | 87,085 | 73,025 | 72,494 |
| Mar | 84,535 | 73,409 | 78,034 |
| Apr | 71,397 | 75,046 | 75,742 |
| May | 77,429 | 75,746 | 73,163 |
| Jun | 71,152 | 68,891 | 67,902 |
| Jul | 68,332 | 67,085 | 67,637 |
| Aug | 75,541 | 74,771 | 71,040 |
| Sep | 76,714 | 71,558 | 73,207 |
| Oct | 77,105 | 66,904 | 78,638 |
| Nov | 80,470 | 73,729 | |
| Dec | 74,896 | 76,910 | |

| b. Residential Gas customers excl CAP & confirmed low-income | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 66,156 | 62,566 | 63,424 |
| Feb | 70,629 | 61,732 | 62,110 |
| Mar | 68,282 | 62,438 | 67,408 |
| Apr | 58,503 | 64,225 | 65,921 |
| May | 64,083 | 65,308 | 64,114 |
| Jun | 58,803 | 59,560 | 59,578 |
| Jul | 56,105 | 57,572 | 59,682 |
| Aug | 62,851 | 64,529 | 63,003 |
| Sep | 63,994 | 61,569 | 65,415 |
| Oct | 66,156 | 57,436 | 69,186 |
| Nov | 70,115 | 63,681 | |
| Dec | 63,905 | 66,121 | |

| c. Confirmed low-income excl CAP | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 2,215 | 3,813 | 3,748 |
| Feb | 2,263 | 3,741 | 3,623 |
| Mar | 2,225 | 3,742 | 3,667 |
| Apr | 2,003 | 3,617 | 3,354 |
| May | 1,974 | 3,465 | 3,106 |
| Jun | 1,845 | 3,137 | 2,829 |
| Jul | 1,771 | 3,142 | 2,640 |
| Aug | 1,893 | 3,338 | 2,630 |
| Sep | 1,912 | 3,246 | 2,539 |
| Oct | 3,171 | 3,249 | 1,386 |
| Nov | 3,189 | 3,358 | |
| Dec | 3,503 | 3,705 | |

| d. CAP Customers | | | |
|---|---|---|---|
| **Month** | **2018** | **2019** | **2020** |
| Jan | 13,421 | 7,930 | 7,151 |
| Feb | 14,193 | 7,552 | 6,761 |
| Mar | 14,028 | 7,229 | 6,959 |
| Apr | 10,891 | 7,204 | 6,467 |
| May | 11,372 | 6,973 | 5,943 |
| Jun | 10,504 | 6,194 | 5,495 |
| Jul | 10,456 | 6,371 | 5,315 |
| Aug | 10,797 | 6,904 | 5,407 |
| Sep | 10,808 | 6,743 | 5,253 |
| Oct | 7,778 | 6,219 | 8,066 |
| Nov | 7,166 | 6,690 | |
| Dec | 7,488 | 7,084 | |

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
To Interrogatories of the
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and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-23

For 2016, 2017, 2018, 2019, and thus far in 2020, disaggregated by month, please provide the total dollars in debt and the average arrearage level for the following customer segments:

a. All residential customers

b. Residential customers, excluding confirmed low-income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-23(a). By agreement of counsel, PECO is not providing data for 2016 and 2017. When a customer receives both electric and gas service from PECO, arrears are not separated by commodity. Therefore, these answers have a 15% allocation to gas; this allocation factor is used to assign administrative and general costs (A&G) between electric and gas utility services. PECO uses the 15% allocation factor in its annual PUC Universal Services Reporting Requirements.

Responsible Witness: Kelly Colarelli

| a. All Residential Gas Customers - Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 4,667,411 | $ 4,228,394 | $ 4,074,962 |
| Feb | $ 4,843,773 | $ 4,594,482 | $ 4,758,299 |
| Mar | $ 5,337,832 | $ 4,821,764 | $ 4,351,618 |
| Apr | $ 5,502,071 | $ 4,520,707 | $ 3,752,667 |
| May | $ 5,582,006 | $ 3,838,086 | $ 3,555,396 |
| Jun | $ 5,249,302 | $ 3,248,963 | $ 3,029,794 |
| Jul | $ 5,300,860 | $ 3,256,609 | $ 3,002,573 |
| Aug | $ 5,829,703 | $ 3,716,225 | $ 3,390,114 |
| Sep | $ 6,157,349 | $ 3,522,273 | $ 3,482,821 |
| Oct | $ 6,590,430 | $ 3,261,523 | $ 3,302,331 |
| Nov | | $ 3,343,990 | $ 3,304,604 |
| Dec | | $ 4,132,387 | $ 3,662,742 |

| b. Residential customers, excluding confirmed low income customers and CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 3,396,924 | $ 3,048,650 | $ 2,955,007 |
| Feb | $ 3,495,929 | $ 3,301,175 | $ 3,431,250 |
| Mar | $ 3,929,922 | $ 3,475,226 | $ 3,012,925 |
| Apr | $ 4,114,971 | $ 3,282,768 | $ 2,564,637 |
| May | $ 4,204,382 | $ 2,772,892 | $ 2,492,718 |
| Jun | $ 3,982,506 | $ 2,329,807 | $ 2,067,081 |
| Jul | $ 4,080,504 | $ 2,341,190 | $ 2,049,215 |
| Aug | $ 4,553,632 | $ 2,761,489 | $ 2,425,921 |
| Sep | $ 4,864,341 | $ 2,595,977 | $ 2,493,722 |
| Oct | $ 4,958,542 | $ 2,340,297 | $ 2,482,721 |
| Nov | | $ 2,384,351 | $ 2,501,905 |
| Dec | | $ 3,036,644 | $ 2,704,185 |

| a. All Residential Gas Customers - Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 63 | $ 57 | $ 50 |
| Feb | $ 67 | $ 63 | $ 55 |
| Mar | $ 68 | $ 66 | $ 51 |
| Apr | $ 73 | $ 60 | $ 53 |
| May | $ 76 | $ 51 | $ 46 |
| Jun | $ 77 | $ 47 | $ 43 |
| Jul | $ 78 | $ 49 | $ 44 |
| Aug | $ 82 | $ 50 | $ 45 |
| Sep | $ 84 | $ 49 | $ 45 |
| Oct | $ 84 | $ 49 | $ 43 |
| Nov | | $ 45 | $ 41 |
| Dec | | $ 54 | $ 49 |

| b. Residential customers, excluding confirmed low income customers and CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 54 | $ 49 | $ 45 |
| Feb | $ 56 | $ 53 | $ 49 |
| Mar | $ 58 | $ 56 | $ 44 |
| Apr | $ 62 | $ 51 | $ 44 |
| May | $ 66 | $ 42 | $ 39 |
| Jun | $ 67 | $ 39 | $ 35 |
| Jul | $ 68 | $ 41 | $ 37 |
| Aug | $ 72 | $ 43 | $ 39 |
| Sep | $ 74 | $ 42 | $ 39 |
| Oct | $ 72 | $ 41 | $ 38 |
| Nov | | $ 37 | $ 36 |
| Dec | | $ 46 | $ 42 |

| c. Confirmed low income customers, excluding CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 607,297 | $ 499,267 | $ 250,956 |
| Feb | $ 646,092 | $ 551,092 | $ 298,875 |
| Mar | $ 679,069 | $ 597,730 | $ 307,104 |
| Apr | $ 673,025 | $ 556,585 | $ 274,449 |
| May | $ 677,016 | $ 510,424 | $ 250,789 |
| Jun | $ 629,982 | $ 455,076 | $ 239,756 |
| Jul | $ 615,296 | $ 443,631 | $ 225,972 |
| Aug | $ 634,452 | $ 469,768 | $ 231,397 |
| Sep | $ 644,752 | $ 453,518 | $ 233,026 |
| Oct | $ 443,265 | $ 463,382 | $ 308,849 |
| Nov | | $ 473,260 | $ 319,304 |
| Dec | | $ 530,118 | $ 396,582 |

| d. CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 663,190 | $ 680,477 | $ 868,999 |
| Feb | $ 701,752 | $ 742,216 | $ 1,028,175 |
| Mar | $ 728,840 | $ 748,808 | $ 1,031,588 |
| Apr | $ 714,074 | $ 681,354 | $ 913,581 |
| May | $ 700,608 | $ 554,770 | $ 811,889 |
| Jun | $ 636,813 | $ 464,080 | $ 722,957 |
| Jul | $ 605,060 | $ 471,788 | $ 727,386 |
| Aug | $ 641,619 | $ 484,968 | $ 732,795 |
| Sep | $ 648,256 | $ 472,778 | $ 756,073 |
| Oct | $ 1,188,623 | $ 457,843 | $ 510,761 |
| Nov | | $ 486,378 | $ 483,396 |
| Dec | | $ 565,625 | $ 561,975 |

| c. Confirmed low income customers, excluding CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 162 | $ 131 | $ 113 |
| Feb | $ 178 | $ 147 | $ 132 |
| Mar | $ 185 | $ 160 | $ 138 |
| Apr | $ 201 | $ 154 | $ 137 |
| May | $ 218 | $ 147 | $ 127 |
| Jun | $ 223 | $ 145 | $ 130 |
| Jul | $ 233 | $ 141 | $ 128 |
| Aug | $ 241 | $ 141 | $ 122 |
| Sep | $ 254 | $ 140 | $ 122 |
| Oct | $ 320 | $ 143 | $ 97 |
| Nov | | $ 141 | $ 100 |
| Dec | | $ 143 | $ 113 |

| d. CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 93 | $ 86 | $ 65 |
| Feb | $ 104 | $ 98 | $ 72 |
| Mar | $ 105 | $ 104 | $ 74 |
| Apr | $ 110 | $ 95 | $ 84 |
| May | $ 118 | $ 80 | $ 71 |
| Jun | $ 116 | $ 75 | $ 69 |
| Jul | $ 114 | $ 74 | $ 70 |
| Aug | $ 119 | $ 70 | $ 68 |
| Sep | $ 123 | $ 70 | $ 70 |
| Oct | $ 147 | $ 74 | $ 66 |
| Nov | | $ 73 | $ 67 |
| Dec | | $ 80 | $ 75 |

Pennsylvania Public Utility Commission
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PECO Energy Company – Gas Division

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Response of PECO Energy Company
To Interrogatories of the
Office of Consumer Advocate
OCA Set III

Response Date: 11/18/2020

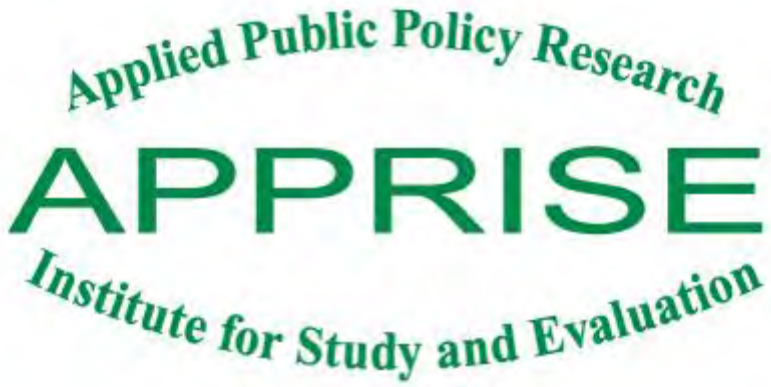
OCA-III-1

Please provide, in an active Excel spreadsheet with all formulae intact, a copy of the reports or, if not in report form, the data, submitted to the PUC Bureau of Consumer Services in compliance with Universal Services reporting requirements since January 2017.

RESPONSE:

Please see Attachment OCA-III-1(a) for the annual USRR Reports.
Please see Attachment OCA-III-1(b) for the 2015 LIURP Evaluation Report.
Please see Attachment OCA-III-1(c) for the 2016 LIURP Evaluation Report.
Please see Attachment OCA-III-1(d) for the 2017 LIURP Evaluation Report.
Please see Attachment OCA-III-1(e) for the 2018 LIURP Evaluation Report.
Please see Attachment OCA-III-1(f) for the 2016 CAP Maximum Credit Filing.
Please see Attachment OCA-III-1(g) for the 2017 CAP Maximum Credit Filing.
Please see Attachment OCA-III-1(h) for the 2018 CAP Maximum Credit Filing.
Please see Attachment OCA-III-1(i) for the 2019 CAP Maximum Credit Filing.
Please see Attachment OCA-III-1(j) for the 2019 Universal Services Six Year Evaluation Report.
Please see Attachment OCA-III-1(k) for the Company's proposed 2019-2024 Universal Services Energy and Conservation Plan.

Responsible Witness: Kelly A. Colarelli




# PECO Energy
# 2018 LIURP Evaluation
# Final Report

**April 2020**

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# Executive Summary

This report presents the findings from the Evaluation of PECO's 2018 Low Income Usage Reduction Program (LIURP). LIURP provides energy efficiency services and energy education to PECO's low-income customers to help them reduce their energy usage and increase the affordability of their energy bills. The Program addresses both electric and gas energy usage. This report describes the LIURP services and analyzes the impact of the Program on customers' energy usage, energy bills, and payments.

## *Evaluation*

The goals of the evaluation were to analyze the LIURP services provided and the impacts of the services on participating customers. The following activities were undertaken.

- *Process Evaluation:* We reviewed and updated the LIURP description.
- *Program Database Analysis:* We conducted analysis of 2018 LIURP services, homes, and customer characteristics.
- *Program Impacts Analysis:* We conducted analysis of LIURP's impact on energy usage, energy costs, and bill payment.

## ***PECO's LIURP***

The Low Income Usage Reduction Program (LIURP) provides education, conservation, and weatherization measures to reduce electric and gas usage. Customers must meet the following usage and income eligibility criteria for program participation.

- Household usage levels at or above 600 kWh per month for electric baseload, 1,400 kWh average seasonal heating usage for electric heat, or 150 ccf average seasonal heating usage for gas heat.
- Residential customers with household income at or below 150 percent of the federal poverty level (FPL), or special needs residential customers with an arrearage and household income between 151 percent and 200 percent of the FPL.

CAP customers are targeted for Program services, but participation in CAP is not required for LIURP services. The CAP rate definition of high usage is 500 kWh. CAP customers are required to participate in LIURP if they are identified as high users.

The number of customers who receive LIURP services each year is largely determined by the annual program budget established in the settlement agreement of PECO's electric restructuring case (PUC Docket Numbers R-00973953 and P-00971265). The annual budget

for 2018 was $5.6 million for electric and $2.25 million for gas. In 2018, 7,301 customers received LIURP services.[1]

PECO contracts with CMC Energy Services to administer LIURP. PECO provides CMC with a list of potentially eligible customers and their energy usage data. CMC recruits these households in descending order based on highest usage and largest arrearages. CMC also contacts households who are directly referred from external organizations, including social and governmental agencies. CMC conducts an energy audit to determine the behavioral changes and program measures required for usage reduction. Following the audit, CMC technicians and CMC subcontractors schedule appointments to install measures. For one year after LIURP services have been provided, PECO and CMC monitor the customer's monthly energy usage. CMC mails monthly progress letters to customers to highlight any changes in monthly usage, as compared to the customer's individual goal.

## *Program Statistics*

In 2018, 28,286 customers were evaluated for LIURP services. There were 20,702 customers who were cancelled and 283 customers who were ineligible for the program. The cancellations were primarily due to customers' lack of response to contact attempts, refusals, and moves.[2] In total, 7,301 customers received LIURP services in 2018, though 230 customers received only education services and no measures, as there were no LIURP opportunities in these homes.

Table ES-1 displays how program funds were expended in 2018. In total $7.52 million were spent. Approximately 63 percent was for weatherization measures, 33 percent was for audit and education, and four percent was for program administration.

**Table ES-1**
**2018 LIURP Expenditures**
**By Category**

| Category | Amount Spent | Percent of Funds |
|---|---|---|
| Weatherization Measures | $4,766,811 | 63% |
| Audit/Education | $2,451,071 | 33% |
| PECO Administration | $301,388 | 4% |
| TOTAL | $7,519,270 | 100% |

Table ES-2 displays the distribution of 2018 LIURP jobs by job type, for both electric and gas accounts. The table shows that 65 percent of jobs were classified as baseload, meaning that measures primarily address electric baseload usage. However, the baseload jobs have lower job costs and represent only 32 percent of total costs. The average cost for measures

[1] 230 customers did not receive measures. These customers only received education.
[2] See Table III-3.

on these jobs was $306. Gas heating jobs represented 19 percent of jobs and 43 percent of costs, averaging $1,467 in measure costs per home. Electric heating jobs averaged $1,351 per home.

**Table ES-2**
**2018 LIURP Service Delivery and Expenditures**
**By Job Type**

| Job Type | # of Jobs | % of Jobs | Total Cost | % of Costs | Average Job Cost |
|---|---|---|---|---|---|
| Baseload | 4,782 | 65% | $1,464,016 | 32% | $306 |
| Electric Heating | 695 | 10% | $939,224 | 20% | $1,351 |
| Gas Heating | 1,359 | 19% | $1,993,609 | 43% | $1,467 |
| Low Usage | 178 | 2% | $181,165 | 4% | $1,018 |
| Electric Heat Low Use | 57 | 1% | $10,790 | <1% | $189 |
| No LIURP Measure Costs* | 230 | 3% | $0 | 0% | $0 |
| TOTAL | 7,301 | 100% | $4,588,804 | 100% | $629 |

*There were 230 accounts that received education only.

## *Participant Characteristics*

PECO's LIURP database allows for extensive analysis of home and participant characteristics. Some of the important findings from this analysis include the following.

- *Supplemental heating*: Overall, 33 percent of customers who were treated by LIURP used supplemental heat. Thirty-five percent of the customers who had baseload LIURP services used electric supplemental heat.

- *Health and safety:* Over 5,500 smoke detectors were provided in 2,521 homes. Carbon monoxide detectors were provided in 2,317 homes.

- *LED bulbs:* LEDs were provided to 89 percent of the homes serviced. On average, 12.2 bulbs were provided to each home serviced.

- *Refrigerator replacement:* Refrigerators were replaced in 1,397 homes.

- *Air conditioner replacement:* Window air conditioners were replaced in 917 homes.

- *Aerators and showerheads:* A total of 1,102 aerators were provided in 672 homes, and 796 showerheads were provided in 673 homes.

- *Water heaters:* Electric water heater timers were provided in 58 homes, and water heater replacements were provided in 140 homes.

- *Air sealing:* Air sealing was provided in 645 homes. However, only 424 received a blower door test.

- *Insulation:* Insulation was provided in 337 homes.

- *Door Sweep/Weatherstripping:* Door sweeping/weatherstripping was provided in 1,972 homes.

- *Heat system repair:* Heating system repair work was provided to 467 homes.

- *Heating system replacement:* Heat pumps were replaced in 33 homes, furnaces in 86 homes, and boilers in 96 homes.

## *Usage Impacts*

Energy usage was analyzed for the year prior to the LIURP visit and for the year after service delivery was completed. The analysis included as close to a full year of data pre- and post-treatment as possible. Data were available for approximately 49 to 89 percent of the treated households, depending on the job type.

Energy usage data were weather-normalized in the pre- and the post-usage periods to ensure that changes in energy usage were due to changes in usage patterns, rather than due to changes in weather. We used a degree-day normalization process to conduct this analysis.

Table ES-3 summarizes the overall usage impact results.

- *Baseload jobs* had average annual savings of approximately 674 kWh, or 6.7 percent of pre-treatment usage.

- *Electric heat* jobs had average annual savings of approximately 977 kWh, or 6.1 percent of pre-treatment usage.

- *Gas heat* jobs had savings of 16 ccf, or 1.8 percent of pre-treatment usage.

**Table ES-3**
**Average Annual Usage and Savings**

| | # | Total Savings | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | |
| Non-Normalized | 3,800 | 9,736 | 9,339 | 397 | 4.1% | 220 | 2.3% | 177 | 1.8% |
| Degree Day Normalized | 3,800 | 10,010 | 9,336 | 674 | 6.7% | 497 | 5.0% | 177 | 1.8% |
| **Electric Heat (kWh)** | | | | | | | | | |
| Non-Normalized | 384 | 15,325 | 14,912 | 413 | 2.7% | 261 | 1.7% | 152 | 1.0% |
| Degree Day Normalized | 384 | 16,041 | 15,064 | 977 | 6.1% | 825 | 5.1% | 152 | 0.9% |
| **Gas Heat (ccf)** | | | | | | | | | |
| Non-Normalized | 667 | 910 | 890 | 21 | 2.3% | 21 | 2.3% | 0 | 0.0% |
| Degree Day Normalized | 667 | 904 | 888 | 16 | 1.8% | 16 | 1.8% | 0 | 0.0% |

We compared the usage impact results to historical savings results.[3]

- Electric Baseload Jobs: The 2018 jobs had savings that were lower than the 1999-2017 average savings. Savings were 6.7 percent in 2018 compared to the historical average of 8.4 percent.

- Electric Heating Jobs: The 2018 jobs had savings that were lower than the 1999-2017 average. Savings were 6.1 percent in 2018 compared to the historical average of 7.5 percent.

- Gas Heating Jobs: The 2018 gas heating jobs saved 1.8 percent of pre-treatment usage, compared to average savings of 8.2 percent from 1999-2017.

## *Measure Savings*

The analysis also estimated the impact of specific LIURP measures on kWh and ccf savings. Table ES-4 displays results from this analysis. Savings were computed by running a regression model that predicted savings based on the measures provided. Costs are not listed for LEDs, because this measure was funded through Act 129.

[3] Tables IV-3A, 3B, and 3C provide the historical comparison of energy savings by job type.

**Table ES-4**
**Measure Savings Estimates**

| | Savings | Cost/Home | $/Unit Saved | Measure Life | $/Unit Saved Over Lifetime |
|---|---|---|---|---|---|
| **Electric Baseload (kWh)** | | | | | |
| LED Only[1] | 563 (±127) | $335[2] | $0.60 | 5 | $0.14 |
| LED | 15 (±9) | -- | -- | 5 | -- |
| Refrigerator | 726 (±181) | $801 | $1.10 | 12 | $0.12 |
| **Gas Heat (ccf)** | | | | | |
| Gas Furnace | 51 (±66) | $3,047 | $59.28 | 15 | $5.71 |
| Boiler | 159 (±79) | $3,774 | $23.69 | 15 | $2.28 |
| Blower Door Air Sealing and Insulation | 61 (±50) | $1,754 | $28.61 | 15 | $2.76 |
| **Electric Heat (kWh)** | | | | | |
| Blower Door Air Sealing and Insulation | 1,239 (±1,193) | $1,754 | $1.42 | 15 | $0.14 |

[1]The average number of LEDs provided to these customers was 11.9, for an average savings of 47 kWh per LED.
[2]This is the cost for the audit and education of customers who only received LEDs. The cost for the LEDs is paid for by the Act 129 Program.

## *LIURP Cost Effectiveness*

We also analyzed the cost-effectiveness of LIURP by job type. Table ES-5 estimates the cost per unit saved based on different assumptions about measure life. These costs should be compared to retail rates to evaluate the cost-effectiveness of the program at different measure lives. The most reasonable assumption for electric baseload reduction is a five to seven-year measure life. This table shows that the electric baseload investments were cost-effective at current retail rates if the measures have a life of at least ten years.

Gas heat savings have a 15-year measure life. Under the 15-year measure life assumption, the cost per ccf saved is $4.99, which is not cost-effective with current gas prices. The cost to save a ccf of gas would need to be lower than the price for a ccf for the program to be cost-effective. Since the current cost per ccf of gas is approximately $.86 per ccf, the cost of services would need to be significantly lower or savings would need to be significantly greater for the program to be cost-effective. To increase cost-effectiveness, the program would need to reduce spending on gas heating measures and/or increase the savings that were obtained from the measures that were installed.

**Table ES-5**
**Cost Per Unit Saved**
**By Measure Life Assumption**

| | # | Average Savings | Average Total Cost | Cost Per Unit Saved | 5-Year Measure Life | 10-Year Measure Life | 15-Year Measure Life |
|---|---|---|---|---|---|---|---|
| **Electric Baseload** | | | | | | | |
| Electric (kWh) | 3,800 | 674 | $593 | $0.88 | $0.20 | $0.11 | $0.08 |
| Electric Heat | | | | | | | |
| Electric (kWh) | 384 | 977 | $1,134 | $1.16 | $0.27 | $0.15 | $0.11 |
| Gas Heat | | | | | | | |
| Electric (kWh) | 636 | 571 | $215 | $0.38 | $0.09 | $0.05 | $0.04 |
| Gas (ccf) | 667 | 16 | $828 | $51.78 | $11.96 | $6.71 | $4.99 |

## *Bill and Payment Impacts*

The evaluation also included an analysis of the charges and payments made by customers in the pre- and post-treatment periods. Table ES-6 summarizes the results of this analysis. While total bills and charges declined by $66, total payments and credits increased by $16 from the pre to post period. The total bill coverage rate increased by 9.4 percentage points.[4] Customers were paying an average of 98.5 percent of their bills prior to LIURP treatment and an average of 107.8 percent of their bills following LIURP treatment.

**Table ES-6**
**Bills, Payments, and Coverage Rates**
**Pre and Post-LIURP Treatment**

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Total Bills and Charges | 3,415 | $899 | $808 | -$91*** | -10.2% |
| Total Payments and Credits | | $852 | $844 | -$9 | -1.0% |
| Total Coverage Rate | | 98.5% | 109.1% | 10.6%*** | 10.7% |
| **Electric Heat** | | | | | |
| Total Bills and Charges | 278 | $1,326 | $1,267 | -$60** | -4.5% |
| Total Payments and Credits | | $1,264 | $1,302 | $38 | 3.0% |
| Total Coverage Rate | | 103.0% | 105.1% | 2.1% | 2.0% |

[4] The total coverage rate is the total of all customer payments, customer assistance, and other credits divided by the bill.

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Gas Heat** | | | | | |
| Total Bills and Charges | 559 | $1,442 | $1,543 | $101*** | 7.0% |
| Total Payments and Credits | | $1,380 | $1,546 | $166*** | 12.1% |
| Total Coverage Rate | | 96.7% | 101.2% | 4.4%*** | 4.6% |
| **Education Only** | | | | | |
| Total Bills and Charges | 175 | $927 | $809 | -$118*** | -12.7% |
| Total Payments and Credits | | $863 | $829 | -$34 | -3.9% |
| Total Coverage Rate | | 95.6% | 109.3% | 13.7%*** | 14.3% |
| **All Job Types** | | | | | |
| Total Bills and Charges | 4,427 | $996 | $929 | -$66*** | -6.6% |
| Total Payments and Credits | | $945 | $961 | $16** | 1.6% |
| Total Coverage Rate | | 98.5% | 107.8% | 9.4%*** | 9.5% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

## *Key Findings and Recommendations*

PECO's LIURP delivered usage reduction services and energy education to over seven thousand customers in 2018, many of whom had vulnerable household members. Savings from electric baseload jobs and electric heating jobs increased from 2017 but declined as compared to the historical average. Savings from gas heating jobs declined from 2017 and declined as compared to the historical average.

We have the following recommendations to improve energy savings.

- *Outreach:* CMC is not able to reach 62 percent of targeted customers because these customers make no response to contact attempts. CMC's current procedure is to make at least three phone calls and send a follow-up letter.[5] They should increase the number of calls to potential customers and pilot additional methods including outreach to targeted neighbors when they are in the field and leaving door hangers when they are in the neighborhood where additional customers are targeted. PECO is working with CMC to expand and improve their outreach and is also considering rebranding LIURP to a name that would be better recognized by customers.

- *Previously Treated Customers:* PECO allows customers who were treated more than two years ago to be re-treated by LIURP. Customers in the same home who were treated within the past five years are unlikely to have significant energy-saving opportunities. PECO should consider expanding the length of time before CMC can return to the home to deliver LIURP again.

[5] This is PECO's minimum standard for the number of contact attempts.

- *Audits:* In May and June 2019, APPRISE staff conducted eleven days of observation of CMC audits and observed 49 audits conducted by the eight CMC staff members who conduct PECO LIURP audits. Most of the auditors did an excellent job establishing a connection with the customer and conducted a general discussion of how energy was used in the home with a focus on occupants and appliances. However, there were several areas where the audit could be improved.

  - Program Description: Auditors did not explain LIURP or mention the Program by name.

  - Audit Comprehensiveness: At times the audits were not comprehensive because there was not enough time scheduled in the home.

  - Lighting: Auditors did not carefully assess the potential cost-effectiveness of LED replacements. They did not ask how many hours lights were used and sometimes replaced bulbs that the customer said were infrequently used or without asking about use at all. LEDs were installed in fixtures that were previously empty and in fixtures that had CFLs. Replaced bulbs were left with the customer when LEDs were installed.

  - Action Plan: The auditor did not develop a written action plan that summarized the actions discussed with the greatest potential that the customer agreed to take.

  - Materials Review: Most audits did not include a review of the education packet. Auditors sometimes handed the packet to the customer and sometimes just placed it on a table in the home without mentioning it. None of the auditors provided a review of all of the materials in the education packet.

  We have the following recommendations based on the audit observation findings.

  - Provide an LED at the beginning of the visit. The observers often noted that the customers became more accepting of the process after the auditor provided a free item, such as LEDs, aerators, or batteries for the smoke detector. One customer provided access to areas of the home that she previously said the auditor could not enter. Providing one free LED right at the beginning of the audit and talking about the benefits of the LED may create more buy-in for the rest of the audit.

  - Train CMC on CAP. The auditors frequently refer to CAP, so they should have a basic understanding of the revised Program. One auditor told a customer that CAP provided a discount that was based on income, which is not the current Program.

  - Specify audit requirements for CMC. Several of the expected elements of the audit were included in half or fewer of the observations. We recommend that the audit should always include the following elements and PECO should ensure that CMC allocates enough time for each audit to include these elements. While some of these elements are included in CMC's statement of work (SOW), some are not explicitly

included and we recommend that they are added. Below we note which elements are not specifically included in the SOW.

- ✓ LIURP Explanation: Discussion of the Program's goals and benefits.
- ✓ Partnership: Development of a partnership with the customer, including a discussion of the auditor's responsibility and the customer's responsibility. (Not included in SOW)
- ✓ Energy Bills: Review of the PECO energy bills. (Not included in SOW)
- ✓ Health and Safety: Discussion of applicable health and safety issues. (Not included in SOW)
- ✓ Comfort: Discussion of comfort in the winter and summer. Even if the customer does not have the heating fuel supplied by PECO, discomfort in the winter can result in high electric space heating usage and bills. (Not included in SOW)
- ✓ Walkthrough: Encouraging all customers who are able to accompany the auditor on the walkthrough. Require auditors to inspect every room of the home unless the customer objects. (Not included in SOW)
- ✓ Lighting: Require CMC to ask about hours of use prior to replacing bulbs. Only one of the seven observed auditors did so for most of the bulbs that were replaced. Specify that only incandescent bulbs should be replaced with LEDs as opposed to CFLs and unused fixtures. (Not included in SOW)
- ✓ Refrigerator Metering: Auditors should be required to meter refrigerators and freezers that are considered for replacement. (Not included in SOW)

- o Use customer's energy bills to supplement recommendations. Not all auditors reviewed PECO energy bills with the customer during the audit, and some auditors only vaguely referenced the customer's usage. Showing the customer how their energy behavior is impacting their energy bills may encourage customers to follow through on any energy saving actions discussed during the audit.
- o Require the auditor to review the education materials. At a minimum, the auditor should review what is included in the folder and show the customer where to locate CMC contact information, referral information, and education tips.
- o Require an individualized written action plan for each customer. The auditor should summarize the actions that were identified during the walkthrough, discuss which ones have the potential for saving the most energy with the customer, discuss which ones the customer is willing to undertake, and obtain a customer commitment to take a set of actions. These actions should then be provided to the customer on a written document that the customer signs.

- Lengthen the time between LIURP participation. Many of the customers had recently received a LIURP audit and there were few opportunities for saving energy that remained in the home.

- Conduct periodic observations of LIURP services. PECO should periodically observe audits and installations to ensure that high-quality, comprehensive services are delivered.

- *Quality Control:* Pure Energy conducted quality control visits in 2016 through 2018. This role has transitioned to Performance System Development (PSD). PECO should make sure to review findings with CMC and have them report on how they have improved services in response to recommendations. Some of the important recommendations from the 2018 Pure Energy Visits were as follows.

  - Number of Audits: Reduce the number of audits scheduled per day from three to a maximum of two.

  - Audit Testing: Require auditors to test the hot water temperature.

  - Thermal and Pressure Boundaries: Improve the assessment of these boundaries to identify and implement shell measures to have the greatest impact on energy usage.

  - Documentation: Improve documentation of completed measures.

  The 2019 PSD reviews also found several areas for improvement. The most common areas were as follows.

  - Under-sized air conditioners.

  - Missed air sealing opportunities and weather stripping that was missing caulk.

  - Invoiced items not found.

  - Inadequate education including lack of a visit introduction, not asking for questions at the end of the visit, and no assessment of satisfaction with the LEDs.

- *CMC Inspections*: CMC aims to inspect all comprehensive jobs and five percent of other jobs. The comprehensive inspections are expected to include blower door testing, zonal pressure diagnostics, combustion appliance zone testing, combustion testing on all appliances in the home, visual inspections for health and safety issues, and infrared cameras to look at moisture levels and if there were missed thermal opportunities, and also may include the use of gas sniffers and moisture meters. Inspections also include customer communication and education. Inspectors reported that these inspections take 30 to 60 minutes to complete, and that these tests are not always conducted. PECO should re-assess whether the time allocated for CMC inspections is adequate and consider

utilizing a third-party for these reviews, especially given the trend toward more measure installations being done by CMC staff instead of subcontractors.

- *Measure Opportunities:* Installation of major measures declined in 2018 electric heating jobs and 2018 gas heating jobs. Electric heating jobs with a blower door test declined from 30 percent in 2016 to 24 percent in 2017, and further declined to 18 percent in 2018. Insulation rates have similarly declined, from 32 percent in 2016 to 18 percent in 2017 and 17 percent in 2018. Insulation in gas heating jobs declined from 19 percent in 2017 to 14 percent in 2018, and weatherization declined from 18 percent in 2017 to 11 percent in 2018. PECO should ensure that CMC is pursuing all cost-effective energy-saving opportunities on all job types.

- *Health and Safety Measures:* The percentage of homes that received smoke detectors increased from 24 percent in 2017 to 35 percent in 2018. The percentage of homes that received carbon monoxide detectors also increased, from eight percent in 2017 to 32 percent in 2018. PECO implemented a health and safety pilot beginning in 2019. PECO should investigate whether a small amount spent on additional health and safety measures leads to additional cost-effective energy efficiency measure installations.

# I. Introduction

This report presents the findings from the 2018 PECO LIURP evaluation. PECO's LIURP provides energy efficiency services and energy education to low-income households to help them reduce their energy usage and increase the affordability of their energy bills. This report describes the Program services and analyzes the impact of the Program on customers' energy usage, energy bills, and payments.

## *A. Background*

PECO Energy has implemented a set of Universal Services Programs to meet requirements set by Pennsylvania's electric and gas restructuring legislation and various Public Utility Commission orders and agreements. The Universal Service goals are as follows.

- To protect consumers' health and safety by helping low-income customers maintain affordable utility service.
- To provide affordable utility service by making available payment assistance to low-income customers.
- To help low-income customers conserve energy and reduce residential utility bills.
- To ensure utilities operate universal service and energy conservation programs in a cost-effective and efficient manner.

The Universal Services Programs include the following four initiatives.

- A CAP payment assistance Program that is designed to make energy bills more affordable by furnishing payment subsidies.
- A LIURP Program that is designed to make energy bills more affordable by helping to reduce usage.
- A CARES Program that is designed to assist households in developing appropriate strategies for maintaining energy service.
- A MEAF hardship fund Program that is designed to furnish emergency payments to households that cannot pay their energy bills.

## *B. Evaluation Objectives and Activities*

The goals of the evaluation were to analyze the LIURP services provided and the impacts of the services on participating customers. Three key activities were undertaken as part of this evaluation.

- *Process Evaluation:* We updated the LIURP program description.

- *Program Database Analysis:* We conducted analysis of the 2018 LIURP Program database, which included data on services delivered, homes serviced, and customers served.

- *Program Impacts Analysis:* We analyzed billing and transactions data to estimate the impact of the Program on energy usage, energy costs, and bill payment.

## *C. Organization of the Report*

Five sections follow this introduction.

- Section II – Low Income Usage Reduction Program: This section describes PECO's LIURP design and implementation.

- Section III – Program and Participant Statistics: This section provides descriptive statistics on LIURP services delivered in 2018 and the customers who received these services.

- Section IV – Usage Impacts: This section analyzes the impacts of LIURP on customers' electric and gas usage.

- Section V – Payment Impacts: This section analyzes changes in customers' bills, payments, and arrearages after receiving Program services.

- Section VI – Summary of Findings and Recommendations: This section provides a summary of the key findings and furnishes recommendations for PECO's LIURP based on the analyses in this report.

APPRISE prepared this report under contract to PECO. PECO facilitated this research by furnishing Program data to APPRISE. Any errors or omissions in this report are the responsibility of APPRISE. Further, the statements, findings, conclusions, and recommendations are solely those of analysts from APPRISE and do not necessarily reflect the views of PECO.

# II. Low Income Usage Reduction Program

PECO has implemented a set of Universal Service Programs to comply with Public Utility Commission Regulations. The Programs are designed for low-income, residential customers. One of these Programs is the Low-Income Usage Reduction Program (LIURP).

The Pennsylvania Public Utility Commission (PUC) requires that all electric and gas utilities in the state offer a Low-Income Usage Reduction Program (LIURP) to their customers. PECO has contracted with CMC Energy Services (CMC) to administer LIURP since the implementation of the Program in 1991. PECO and CMC worked together to create Program procedures that complied with Chapter 58 guidelines and continue to work together to design and implement Program changes when necessary. CMC subcontracts with seven subcontractors to install major Program measures and an additional subcontractor to deliver energy efficient refrigerators.

The total 2018 LIURP budget was $7.85 million with $5.6 million for electric usage reduction and $2.25 million for gas usage reduction.

## *A. Program Management and Administration*

The following CMC staff members are responsible for the Program implementation.

- The Senior Program Manager is responsible for PECO LIURP Program delivery, spending, savings and targets. He has worked in this capacity for approximately five years.

- The Program Manager is responsible for the day-to-day operation of LIURP. He is responsible for meeting the audit goals and the spending goals. Responsibilities include oversight of Program staff, budget management, production goals, monthly reporting, contract/regulatory compliance, subcontractor performance, customer satisfaction and staff training. He is responsible for responding to all escalated inquiries about LIURP customers, in consultation with the Senior Program Manager. He is also responsible for reviewing all measures and activities weekly and monthly before submission to PECO. He was an Associate Program Manager for approximately two years and began as a Full Program Manager in April 2019.

- The Quality Control and Training Manager is responsible for managing subcontractors and field inspectors, providing technical assistance to inspectors and customer service representatives, resolving customer inquiries, and monitoring quality control procedures. He is responsible for all technical compliance and ensuring that subcontractors complete work within the allotted timeline. He presents a quarterly safety meeting and holds a weekly auditor meeting.

- The Field Services Supervisor is responsible for oversight of the energy auditors, training, and technical support. The Field Services Supervisor is also responsible for

ensuring that Program measures are installed as recommended by the energy auditor and the energy auditor's analysis is in compliance with the LIURP guidelines. He reviews the electronic audit results, validates the data, and approves recommendations. In some cases, he submits requests, through the Program Manager, to PECO for work that is outside of the normal guidelines.

- The Data Support Supervisor is responsible for ensuring that subcontractors are in compliance with fitness for duty and insurance requirements, managing access to PECO data, and providing support and ordering Program brochures.

- The Data Support Technicians perform another data validation check after the Field Supervisor verifies the data using reports available in CMC's system. This is the final check to ensure that the data are correct. Following this check, the data are submitted to CMC's finance department.

- CMC's three Field Quality Control Inspectors are responsible for monitoring the work performed by subcontractors and conducting on-site observations and post-treatment inspections.

- The nine BPI-Certified Energy Auditors perform audits for LIURP. Additionally, a lead auditor assists the field supervisor.

- The Customer Care Manager is responsible for performing the analytics of the phone system, making sure the phone system equipment is running, monitoring calls, and running metrics on the call center.

- The Customer Care Center Supervisor is responsible for the completeness and accuracy of the customer demographic data collected during the appointment scheduling process, and coaching Customer Care Representatives.

- The ten Customer Care Representatives are responsible for taking incoming calls and scheduling energy audits and inspections.

CMC meets with PECO monthly for performance reviews. PECO conducts monthly visits to CMC offices and has regular telephone and/or e-mail contact with CMC.

CMC staff conduct the LIURP audit and develop a work order for additional measures to be installed on subsequent visit(s) by the Program subcontractors who assist in the implementation of LIURP. Additionally, one of the changes that was made in the middle of 2015 was that CMC began doing minor air sealing measures during the audit visit including door sweeps, weather stripping, plumbing access air sealing, and attic hatch air sealing. They have also gradually expanded the direct installs that the auditor can perform to include certain types of insulation. CMC technicians also perform minor HVAC services, such as furnace clean and tunes and minor health and safety repairs. CMC staff do not blow insulation, perform heating system replacements, or perform electrical work.

CMC has a total of eight subcontractors responsible for the installation of residential air sealing, insulation, house heating, and water heating system repair and replacement, water heater timers, line voltage thermostats, energy efficient refrigerators and room air conditioners. CMC's subcontractors are required to submit invoices weekly and obtain all required permits for municipal county inspections.

- John Kinkaid & Sons, Apex Heating and Cooling, Black Horse Heating and Plumbing, and Alek Air perform HVAC work.
- Custom Weatherization and Premier Contractors perform weatherization work.
- Colonial Electrical installs water heater timers, performs minor electrical repairs, and installs line voltage thermostats.
- Lowes delivers energy efficient refrigerators and Energy Star Freezers (the change from General Electric to Lowes was made in August 2015).

CMC provides oversight and support to the subcontractors. When there is a customer who is not satisfied with the scope of work that is called for based on the energy-saving opportunities, CMC will speak with the customer and visit the job site if needed.

CMC conducted a complete analysis of the technical specifications required for each subcontractor depending on the measures they were responsible for. CMC updated all technical specifications to ensure they met all Program guidelines as a minimum. They also looked at the following requirements.

- Types of materials used.
- Methods for installation.
- Guidelines for how to install the measures.

CMC changed from General Electric to Lowes for refrigerators in 2015 because of frequent customer complaints that were encountered with General Electric and problems with the timeliness of the refrigerator installation. The Lowes delivery service communicates with CMC about issues in the home, and they do what is needed to remove the old unit and get the new one installed properly and safely. Customer complaints dropped significantly after this change.

## *B. LIURP Eligibility and Benefits*

PECO customers must meet the following criteria to participate in the Program.

- Residential customer who is not planning to move in the next 12 months
- Income at or below 200 percent of the Federal Poverty Level (FPL)[6]
- Usage requirements
  - At least 500 kWh average monthly usage for CAP customers

[6] Since 1998, LIURP regulations have permitted companies to spend up to 20 percent of their annual Program budgets on customers with income between 150 and 200 percent of the FPL.

- At least 600 kWh average monthly usage for baseload customers
- At least 1,400 kWh average seasonal heating usage for electric heating customers
- At least 150 ccf average seasonal heating usage for gas heating customers

LIURP provides weatherization and conservation measures to promote usage reduction. Energy education tailored to the individual household's energy use is also provided to facilitate usage reduction.

The following measures may be provided.

- Insulation
- Air sealing
- Heating system repair or replacement
- Air conditioner replacement
- Refrigerator replacement
- Freezer replacement (pilot)[7]
- Water heater timer installation
- Water heater and pipe wraps
- Line voltage thermostats
- Faucet aerators
- Showerheads
- Smoke detectors
- Carbon monoxide detectors
- LED bulbs (CMC retired the use of CFL bulbs on June 1, 2016. All lighting installations are paid for as part of Act 129 funding.)

PECO and the PUC have pre-approved all of the LIURP measures. They have placed no cap on the amount of money spent per home. Smoke detectors and LEDs are much more commonly provided than some of the more costly measures.

## *C. Qualification of Leads*

PECO sends a quarterly download of high usage, low-income customers to CMC. Customers are also referred to LIURP through the following mechanisms.

- PECO Universal Services staff
- CAP call center
- Community Based Organizations (CBOs)
- Government agencies
- Prior Program recipients
- Universal Services Cares Unit

[7] PECO began provider freezer replacement at full scale in 2016.

The electronic file downloaded from PECO contains high energy users who are also LIHEAP recipients, Customer Assistance Program (CAP) participants, payment-troubled customers, or customers with multiple payment agreements. CMC reviews the lists and eliminates customers who have received LIURP within the past two years, refused Program services, or moved within the past six months. Typically, after these removals, the remaining customers on the downloaded file are eligible for and receive services from LIURP.

CMC screens all referrals from other sources to determine Program eligibility. If income and usage history are available and the customer is determined to be eligible, CMC enrolls the customer immediately. If income eligibility cannot be determined from PECO's system, CMC mails income documentation forms to the customer. Typically, 25 to 30 percent of customers referred through other sources are determined to be eligible for and receive services from LIURP.

Referred customers may not receive LIURP services because of one of the following reasons.

- Refusal of LIURP services
- Insufficient usage history[8]
- Inactive account
- Income over the eligibility limit
- Non-responsive to CMC contacts
- Recently moved or is planning to move within one year
- Deceased
- Usage below the required level[9]
- Tenant with a landlord who will not provide consent

CMC is required to obtain consent from the landlord to provide services to a tenant. A landlord may not provide approval because he or she wants to choose Program measures, is evicting the tenant, or is concerned about potential housing code violations.[10] Some landlords never respond to CMC inquiries. CMC is able to obtain landlord consent for more than 50 percent of renters.

Approximately 90 percent of customers who receive LIURP services are identified through the downloaded list, and about ten percent through other referrals.

## *D. Customer Outreach*

CMC's customer service representatives contact potential Program participants by telephone to explain Program services, obtain customer information, and confirm or determine eligibility.

**8** This may be the case if the customer recently moved into the home.
**9** There are some hardship cases where PECO makes exceptions to the usage requirement.
**10** Landlords are not required to contribute to the cost of LIURP services.

If the customer is eligible, an appointment is scheduled for the energy audit. CMC will attempt to make this contact three times by telephone and a minimum of one time by mail over a 90-day period.[11] Information collected during this contact includes the following.

- Name of person responsible for bill payment
- Age of each household member
- Income sources for each household member
- Income amounts for each household member
- Property status and, if applicable, landlord contact information
- Housing type
- Occupation
- Employment status, marital status and level of education

CMC assigned technical resources to the customer service desk to provide assistance on technical questions and a resource for customer care representatives. CMC also provided regular trainings with some elements of building science, reinforced Program guidelines, and retrained on what to do in particular situations.

One of the most challenging responsibilities the customer care representatives have is convincing the customer to allow a stranger to enter their home. CMC feels that their call center representatives do a good job of preparing the customer and making sure that the auditor will have access to all areas of the home.

## *E. Job Types*

There are two different LIURP job types: Baseload and Heating. Baseload jobs focus on a household's lighting and appliances. Heating jobs include weatherization, insulation, and heating system repair or replacement. Both heating and baseload issues in a household are addressed when necessary. Renters do not receive appliance replacement through LIURP, but they do through Act 129.

## *F. Service Delivery*

CMC prioritizes CAP participants for LIURP service delivery. All CAP participants with monthly usage at or above 500 kWh are considered for LIURP. Those with the lowest income and the greatest CAP benefits receive the highest priority. CMC prioritizes remaining LIURP participants by energy use and income.

The first step in direct service delivery is the Program audit, performed by CMC staff. The auditor verifies the previously reported household characteristics, including income, number of household occupants, age of home, and years of occupancy. He or she also calculates the average household energy use per day, the energy use for each household appliance,

[11]This is PECO's minimum standard for the number of contact attempts.

temperature settings, and water temperature. Based on this information, the auditor may wrap the water heater and pipes, and install aerators, smoke detectors, showerheads, and LEDs during this initial audit visit.

CMC provided additional training to their audit staff to increase the thoroughness of directions given to subcontractors, and to provide more documentation for each appointment. CMC started requiring the auditors to provide additional notes, documentation, and photos (if the customer agreed). Because they began using tablets in the field, it became easier to take photos and attach them to the work orders. This provided subcontractors with better information to address each home.

CMC schedules the appropriate subcontractors to complete any necessary major measures, such as insulation, heating system repair or replacement, or new appliances. A work order is sent to the subcontractor to communicate the work that is needed. CMC requires that measures be installed within 30 days of the initial audit.

CMC instituted a process where the subcontractors could talk to a quality control supervisor in a timely fashion about any questions they had on the work orders. Additionally, the work orders were improved because every work order was vetted at the supervisor level to look for missing information and needed documentation or photos. CMC makes sure that the auditor provides notes to help the subcontractor do a better job.

PECO's program review found that there were time delays from when the auditor submitted the work order to the time that the customer was contacted by the subcontractor. PECO worked with CMC to identify processes to reduce the amount of time for this contact and for job completion. CMC hired additional subcontractors and identified more measures that CMC could install with in-house technicians beginning in 2015. CMC began to perform minor air sealing and minor insulation work with their in-house technicians beginning in August 2016.

CMC developed requirements for the timing of when the subcontractor had to schedule an appointment with the customer and when the subcontractor was required to invoice for the work performed. CMC recommends that all work orders are contacted on the day that they are received. This has been successful with the subcontractors that are able to do so. When the customer is contacted within days of their audit, the work is fresh in the customer's mind and they are excited to have it done. This makes it more likely that the subcontractor will get back into the home. They have greater success getting appointments and improved customer satisfaction.

The subcontractors are required to make three contact attempts within two weeks and have the customer's work scheduled within two weeks. They are required to invoice within 30 days. This has helped to speed up the process. Beginning in the last quarter of 2016, CMC sends a report to subcontractors every three weeks with a list of all open jobs. The subcontractors report back on whether the job is scheduled, the number of contact attempts they have made, or if the job has been cancelled because the phone number is not valid or there was a customer refusal.

## *G. Energy Education*

PECO and CMC designed the energy education portion of LIURP to facilitate customers' clear understanding of the reasons for high energy use, and to communicate how their behaviors contribute to energy use and energy bills. The auditor provides the primary LIURP energy education session during the initial audit visit. This session lasts at least 30 minutes. Further education is often provided by subcontractors when measures are installed, and by other CMC quality control inspectors during quality control inspections and follow-up telephone calls.

During the initial education session, the auditor reviews the customer's audit results and identifies ways that the customer can modify the behaviors of household members to save energy and money. The auditor and the customer set a monthly usage and bill reduction goal for the household. The auditor also provides the customer with an education package, which includes the following materials.

- Tips for saving energy
- An energy calculator
- 'Hazards of Space Heating' pamphlet
- A brochure on LEDs that includes information on how to safely dispose of them
- Energy Savers calendar
- Energy cost estimate form
- Energy saving recommendations list based on the household's energy use
- 'Does Your Money Run Out' booklet
- Referrals to CAP rate and other programs that the customer may be eligible for

PECO also developed additional education materials that began to be used in 2016.

The auditor reviews these educational materials with the customer, and compares the household's energy cost estimate form to the household's actual energy bill. Additionally, the auditor refers the customer to programs and agencies that might help him or her meet household needs, and answers any questions the customer may have about the Program or the education session. The auditor reviews the measures that have been installed and those that will be installed by subcontractors. In addition, the auditor reviews the LIURP follow-up procedures that the customer can expect.

For one year after LIURP services have been provided, PECO and CMC monitor the customer's monthly energy usage. CMC mails monthly progress letters to customers to highlight any changes in monthly usage, as compared to the customer's individual goal. Each quarter CMC revises the letters to emphasize energy saving tips that are specific to the current season. CMC provides an additional telephone energy education session to customers who do not meet their monthly average usage goal (MAU) after they receive LIURP services. On rare occasions, an auditor is sent back to the home for reinforcement.

## *H. Quality Control*

Three methods are primarily used for LIURP quality control.

- An annual evaluation, conducted by an independent program evaluator.
- Customer satisfaction surveys administered by CMC.
- Inspections by the CMC Quality Control Manager and a third-party inspector.

Third-Party Inspections and Observations

From 2016 through 2019, PECO hired Pure Energy to conduct quality control inspections and observations of service delivery on a sample of jobs. Performance System Development (PSD) took on this role in April 2019. They performed 56 inspections and ten observations in 2019.

Table II-1 provides a summary of PSD's findings. While 75 percent of the inspections received a straight pass, 23 percent had an action required and one inspection passed with comments. Two of the ten observations found areas that needed improvement.

**Table II-1**
**Inspection and Observation Summary**

| Inspections | | |
|---|---|---|
| **Assessment** | **Number** | **Percent** |
| Passed | 42 | 75% |
| Passed with Action Required | 13 | 23% |
| Passed with Comments | 1 | 2% |
| Total | 56 | 100% |

| Observations | | |
|---|---|---|
| **Assessment** | **Number** | **Percent** |
| Good | 8 | 80% |
| Fair | 1 | 10% |
| Poor | 1 | 10% |
| Total | 10 | 100% |

Table II-2 provides a summary of issues noted during the inspections and observations. On average 0.6 areas were not completed effectively on the inspections and 6.7 areas were completed effectively. On average 1.2 items were not completed effectively on the observations and 3.8 items were completed effectively on the observations. Overall, 91 percent of the areas assessed were completed effectively.

**Table II-2**
**Inspection and Observation Findings**

| Statistic | Inspections | Observations | Total |
|---|---|---|---|
| Number of Audits | 56 | 10 | 66 |
| Mean # Items Passed | 6.7 | 3.8 | 6.3 |
| Mean # Items Missed | 0.6 | 1.2 | 0.7 |
| Mean % Items Passed | 92% | 84% | 91% |

Table II-3 displays the frequency of specific findings made during the inspections. While 34 inspections, or 61 percent of the completed inspections, had no findings, there were several areas noted for improvement. The most common areas were under-sized air conditioners, weather stripping that was missing caulk, missed air sealing opportunities, gas leaks, invoiced items not found, and baseload measures removed by the customer due to inadequate education.

**Table II-3**
**Inspection Findings**

| Item | # of Inspections | % of Inspections |
|---|---|---|
| Under-Sized A/C | 6 | 11% |
| Weather Stripping Missing Caulk | 5 | 9% |
| Missed Air Sealing Opportunity | 4 | 7% |
| Gas Leak | 3 | 5% |
| Invoiced Item Not Found | 3 | 5% |
| Baseload Measures Removed by Customer | 3 | 5% |
| Missed Heat Installation Opportunity | 2 | 4% |
| Customer Dissatisfied | 2 | 4% |
| Noisy A/C | 1 | 2% |
| Thermostat Not Working Properly | 1 | 2% |
| Property Damage | 1 | 2% |
| No DHW Timer Suggested | 1 | 2% |
| Installed A/C Not Working Properly | 1 | 2% |
| Missed Electric Space Heater Reduction Opportunity | 1 | 2% |
| Air Sealing Performed With Unvented Dryer | 1 | 2% |
| Incorrectly Installed Sink Basins | 1 | 2% |
| No Items Missed | 34 | 61% |

* Some inspections missed multiple items.

Table II-4 displays the frequency of specific findings made during the observations. While 60 percent of the completed observations had no findings, there were several areas noted for improvement. The most common areas were that no introduction was made, the staff member arrived late, the staff member did not ask the customer if he/she had questions at the conclusion of the visit, and there was no assessment made of whether the customer was satisfied with the LEDs.

**Table II-4**
**Observation Findings**

| Item | # of Observations | % of Observations |
|---|---|---|
| No Introduction | 3 | 30% |
| Arrived Late | 2 | 20% |
| Did Not Ask For Questions At Conclusion | 2 | 20% |
| No Assessment Of Satisfaction With LEDs | 2 | 20% |
| Proposed Incorrect Work Scope | 1 | 10% |
| Improper Gas Leak Investigation | 1 | 10% |
| Improper Blower Door Test | 1 | 10% |
| No Items Missed | 6 | 60% |

* Some inspections missed multiple items.

CMC Quality Control

CMC conducts customer satisfaction surveys during post-delivery site inspections, by telephone, and by mail. CMC reported that the surveys show customers increased their knowledge of energy conservation through Program participation. Customers reported that they were satisfied with LIURP and with the new appliances that the Program provided.

CMC inspects a minimum of five percent of the baseload jobs and tries to inspect all of the heating jobs. It can be challenging to persuade the customer to permit another visit once the installation work has been completed. PECO has worked with CMC to try to reduce the lag time between job completion and inspection to try to increase customer acceptance of the inspection visit.

The inspector works from an inspection checklist, and has the customer satisfaction survey, the home's audit results, and the completed work order to assist in the inspection. The inspector also conducts blower door, heating, and carbon monoxide testing, and confirms the presence of all invoiced measures. In addition to post-completion inspections, the inspector sometimes accompanies CMC staff on audits, and subcontractor staff on installations. CMC has access to the subcontractors' schedules, so if the inspectors have cancelled appointments, they go to observe the work of a subcontractor.

When the inspector finds missed opportunities or small mistakes, they fix the problem and provide feedback to the individual who performed the work. For larger mistakes, or discrepancies in quantities invoiced and quantities received, the inspector fails the job and allows CMC or subcontractor staff ten business days to fix the problems and send written confirmation of resolution to the inspector. Depending on the nature of the problem, the inspector may return to the site to re-inspect.

CMC developed a monthly scorecard for the subcontractors beginning in August 2016. The scorecard assesses the subcontractors based on the quality of the work, the job turnaround time, accuracy of invoices, response time to change orders and inquiries, and

communication. It is based mostly from the post-job inspection review, but in-progress inspections also contributed to the scorecard. CMC found that the subcontractors appreciated the feedback contained in the scorecard and requested information on how they could improve. The scorecards opened the lines of communication about what the subcontractors can do better.

PECO Quality Control
The PECO LIURP manager validates LIURP invoices. She will be selecting random homes for site visits to further assess the invoices.

PECO worked with CMC to improve customer satisfaction. CMC started to trend their customer service problems by attaching codes to every call. For example, a call may be coded as a work order inquiry. CMC can see the time from the audit to when the customer called. CMC has codes for every type of call that comes in, such as an air conditioner service required or a refrigerator service required. They can report on the number of each type of problem and see if it is increasing or decreasing. CMC tracks the issues that arise and works to root out the problems.

PECO also worked with CMC to provide additional training to call center staff on handling customer disputes and dealing with difficult customers. CMC monitors call center representatives each month to assess the quality of their interactions.

## *I. Data and Reporting*

LIURP databases contain the following information.

- Personal and household demographics
- Landlord contact information
- Audit results
- Quantity and costs of installed measures
- Referrals made to other programs
- Post treatment follow-up outreach results
- Completion dates and usage history
- Performance scorecard

CMC and PECO check the database for completeness and accuracy. These data are used to generate regular reports, including the following.

- Completed audits compared to projected audits
- Completed jobs compared to projected jobs
- Program costs by category
- Average cost per job
- Completed jobs by type
- Outreach call volume
- Customer demographics

CMC uses tablets in the field to improve the accuracy of data collection. There are checks programmed into the data entry fields and there is also additional post-entry data validation that is conducted.

CMC and PECO monitor Program data monthly and the independent evaluator monitors Program data annually. In addition to this report, CMC and PECO produce an annual report to the PUC.

## *J. LIURP Training*

PECO states in their contract with CMC that they require LIURP staff members to be adequately trained. CMC's Quality Control Manager assesses the training needs of the CMC field and sub-contractor staff. The CMC Office Manager assesses the training needs of the CMC administrative staff. CMC provides full training to each LIURP staff member at the time of hire, and additional training as needed.

CMC provides LIURP technical staff with diagnostic training through the Pennsylvania College of Technology, state certification, and auditor certification. CMC also sends staff members to the Home Performance Conferences and provides field technicians with BPI training. PECO provides LIURP staff with training on mainframe connection and procedures, the Universal Services Programs, customer service procedures, and safety hazards. PECO also provides LIURP staff with the opportunity to attend conferences.

CMC does vetting of potential subcontractors and ensures that they have the proper certifications to perform the work. After the subcontractor is approved, CMC has an Onboarding Process to ensure that the subcontractor understands the process, inspections, work orders, line items, and invoicing.

CMC issues the new subcontractor a handful of jobs and is on the job with the new subcontractor for a minimum of four jobs, to take questions in the field and make sure that the staff are comfortable with testing requirements, clear on all instructions, and that there is no confusion about the work order language.

As long as the first four jobs go well, the subcontractor moves forward with more work. CMC will not have an inspector on site with every job, but they do a regular amount of in-progress inspection. This is used as a training/mentoring opportunity to field questions, make sure that the technician is comfortable doing the work, and confirm that the technician communicates properly with the customer.

One of the final pieces of CMC's contractor mentoring and training process is the regular meeting where CMC will ask one of the subcontractors to perform a demonstration in the field or will ask the subcontractor to meet with the auditors at CMC's Monday morning meeting. This step gives the contractors the opportunity to report on their field experiences and provide the auditors with some feedback. For example, subcontractors may ask for

more notes or better photos in certain situations. Auditors can also ask for feedback from the subcontractors about what they feel is needed to get the jobs done well.

CMC also has field demonstrations where one of the subcontractors will do a demonstration for CMC out in the field. Both auditors and subcontractors benefit from the demonstrations because it shows the subcontractors that their work is valuable and it makes subcontractors feel more appreciated.

CMC provides call center staff with training on LIURP procedures, requirements, questions that come into the call center, and sample responses. Training includes practice with sample calls. The new representatives receive a complete review of LIURP so they have a clear understanding of what to expect, and also receive information about how to prepare the customer for what to expect when participating in LIURP.

There is also ongoing training for all staff members. CMC has had training provided by an outside professional for the entire call center. They have weekly meetings where they review issues that came up during the week and how unique calls were handled. They record all calls, and they make sure that the customer care representatives follow the script and guidelines. They also provide individual coaching sessions where they review the representative's call quality, readiness to take calls, scheduled appointments, and any errors made that month.

## *K. Program Coordination*

CMC maintains a LIURP referral list consisting of other Universal Services Programs and state and county agencies that provide assistance to low-income customers. CMC staff make referrals during the initial energy audit, as well as during inspection and post-treatment follow-up calls. During the follow-up call, CMC staff members ask customers whether they were able to obtain any benefits from the referrals they were given. Additionally, the CMC auditor provides CAP and LIHEAP applications to customers at the time of the LIURP audit.

Participation in LIURP is a requirement of PECO's CAP. CAP participants who refuse LIURP receive two letters to remind them of the CAP requirements. Most customers respond to the second letter. PECO's LIURP manager sends the list of customers who do not respond to the second letter (not including tenants) to the CAP Program Manager and Supervisor for a telephone follow-up. If the customer does not respond to this outreach, the customer is removed from CAP. The LIURP refusal rate among CAP participants has declined dramatically since this process was put into place.

# III. Program and Participant Statistics

This section provides statistics on the LIURP services that were provided in 2018, as well as the characteristics of the homes and the customers who were served by the Program.

## *A. Participation*

PECO screened 28,286 customers for LIURP services in 2018. Table III-1 shows that 20,702 were cancelled, 283 customers were not eligible, and 7,301 received Program services.

**Table III-1**
**Customers Evaluated for Program Services**

| Category | Number | Percent of Total |
|---|---|---|
| Cancelled | 20,702 | 73% |
| Ineligible | 283 | 1% |
| Treated | 7,301 | 26% |
| TOTAL | 28,286 | 100% |

Table III-2 displays the reasons why customers were deemed ineligible for LIURP. While 57 percent were ineligible because they were over the income eligibility limit, 30 percent were ineligible because the scope of work was beyond the Program's guidelines, and eight percent were commercial accounts.

**Table III-2**
**Ineligible Customers**

| Category | Number | Percent of Total |
|---|---|---|
| Over Income | 160 | 57% |
| Scope of Work Beyond Guidelines | 86 | 30% |
| Commercial Account | 22 | 8% |
| Unusual Usage | 8 | 3% |
| Insufficient Usage History | 4 | 1% |
| Conversion Error | 2 | 1% |
| Usage Below Guidelines | 1 | <1% |
| TOTAL | 283 | 100% |

Table III-3 displays reasons why customers were cancelled. The largest group of customers, 84 percent, made no response to contact attempts. Seven percent refused services, and six percent had a planned move.

**Table III-3**
**Cancelled Customers**

| Category | Number | Percent of Total |
|---|---|---|
| No Response to Contact Attempts | 17,461 | 84% |
| Customer Refused | 1,419 | 7% |
| Customer Moving | 1,272 | 6% |
| Inactive Account | 240 | 1% |
| No Landlord Consent | 141 | 1% |
| Renovations in Progress | 86 | <1% |
| Do Not Contact | 65 | <1% |
| Cancelled Due to Unsafe Environment | 15 | <1% |
| Cancelled at The Door Due to Inactive Account | 3 | <1% |
| TOTAL | 20,702 | 100% |

## *B. LIURP Services*

This section describes LIURP services that were delivered in 2018. The total budget was $7.85 million with $5.6 million for electric usage reduction and $2.25 million for gas usage reduction. Ninety-six percent of the budget was spent. Table III-4 shows the distribution of this spending. Sixty-three percent was spent on weatherization measures and labor, 33 percent was spent on audits and education, and four percent was spent on PECO administration.

**Table III-4**
**2018 LIURP Expenditures**
**By Category**

| Category | Amount Spent | Percent of Funds |
|---|---|---|
| Weatherization Measures | $4,766,811 | 63% |
| Audit/Education | $2,451,071 | 33% |
| PECO Administration | $301,388 | 4% |
| TOTAL | $7,519,270 | 100% |

Table III-5A displays the distribution of LIURP jobs and expenditures by job type. Jobs are classified as baseload, electric heating, or gas heating. While 68 percent of the jobs were classified as baseload, they represented 33 percent of the total costs. The average cost for measures on these jobs was $308. Gas heating jobs represented 19 percent of jobs and 46 percent of costs, averaging $1,484 in measure costs per home. Electric heating jobs averaged $1,340 per home.

**Table III-5A**
**2018 LIURP Service Delivery and Expenditures**
**By Job Type**

| Job Type | # of Jobs | % of Jobs | Total Cost | % of Costs | Average Job Cost |
|---|---|---|---|---|---|
| Baseload | 4,934 | 68% | $1,519,762 | 33% | $308 |
| Electric Heating | 716 | 10% | $959,677 | 21% | $1,340 |
| Gas Heating | 1,421 | 19% | $2,109,366 | 46% | $1,484 |
| No LIURP Measure Costs* | 230 | 3% | $0 | 0% | $0 |
| TOTAL | 7,301 | 100% | $4,588,804 | 100% | $629 |

*There were 230 accounts that received education only.

Table III-5B displays jobs by type, but lists the low usage jobs separately, as these jobs are not included in the impact analysis.

**Table III-5B**
**2018 LIURP Service Delivery and Expenditures by Job Type**
**Low Usage Jobs Separated**

| Job Type | # of Jobs | % of Jobs | Total Cost | % of Costs | Average Job Cost |
|---|---|---|---|---|---|
| Baseload | 4,782 | 65% | $1,464,016 | 32% | $306 |
| Electric Heating | 695 | 10% | $939,224 | 20% | $1,351 |
| Gas Heating | 1,359 | 19% | $1,993,609 | 43% | $1,467 |
| Low Usage | 178 | 2% | $181,165 | 4% | $1,018 |
| Electric Heat Low Use | 57 | 1% | $10,790 | <1% | $189 |
| No LIURP Measure Costs* | 230 | 3% | $0 | 0% | $0 |
| TOTAL | 7,301 | 100% | $4,588,804 | 100% | $629 |

*There were 230 accounts that received education only.

Table III-6 provides a more detailed breakdown of the type of work done in LIURP jobs, based on CMC's classification of measure types. Many jobs received more than one type of service. Ninety-five percent of the customers received baseload services; but only 24 percent received refrigerator replacement measures, which included refrigerator replacement and freezer replacement. Eight percent received air sealing, seven percent received weatherization, and four percent received insulation. Nine percent received a heating system tune-up, and 13 percent received an air conditioner replacement.

**Table III-6**
**2018 LIURP Service Delivery and Expenditures**

| Work Type | # of Jobs | % of Jobs | Total Cost | % of Costs | Average Cost |
|---|---|---|---|---|---|
| Baseload* | 6,941 | 95% | $310,240 | 7% | $68 |
| Refrigerator Replacement† | 1,768 | 24% | $1,247,022 | 27% | $728 |
| Air Sealing | 620 | 8% | $382,823 | 8% | $617 |
| Weatherization | 535 | 7% | $144,246 | 3% | $270 |
| Insulation | 309 | 4% | $284,755 | 6% | $922 |
| Electrical | 177 | 2% | $122,620 | 3% | $693 |
| Heating System Tune Up | 623 | 9% | $250,773 | 5% | $419 |
| Heating System Replacement | 224 | 3% | $1,090,458 | 24% | $4,868 |
| Air Conditioner Replacement | 917 | 13% | $554,956 | 12% | $605 |
| Water Heater Replacement | 139 | 2% | $165,100 | 4% | $1,188 |
| Water Heater Service | 165 | 2% | $35,811 | 1% | $217 |
| TOTAL | 7,301 | 100% | $4,588,804 | 100% | $629 |

*4,583 of the 6,941 jobs with baseload measures had one or more baseload measures funded through LIURP. The other jobs had all baseload measures funded through Act 129. Average costs for the 10,624 baseload measures funded through LIURP are shown in this table.

†Measures that fall under the refrigerator replacement work type include refrigerator replacement, refrigerator removal, and freezer replacement. 1,714 of the 1,768 jobs with one of these measures had one or more of the measures funded through LIURP. The other jobs had all refrigerator replacement measures funded through Act 129. Average costs for the 1,917 refrigerator replacement measures funded through LIURP are shown in this table.

Table III-7A provides information on the frequency of individual measures installed through LIURP. Some of the key pieces of information from this table are described below.

- *Health and safety:* Over 5,500 smoke detectors were provided in 2,521 homes. Other health and safety measures, which only included carbon monoxide detectors in 2018, were provided in 2,317 homes.

- *LED bulbs:* LEDs were provided to 89 percent of the homes serviced. On average, 12.2 bulbs were provided to each home serviced.

- *Refrigerator replacement:* Refrigerators were replaced in 1,397 homes.

- *Air conditioner replacement:* Window air conditioners were replaced in 917 homes.

- *Aerators and showerheads:* A total of 1,102 aerators were provided in 672 homes, and 796 showerheads were provided in 673 homes.

- *Water heaters:* Electric water heater timers were provided in 58 homes, and water heater replacements were provided in 140 homes.

- *Air sealing:* Air sealing was provided in 645 homes. However, only 424 received a blower door test.
- *Insulation:* Insulation was provided in 337 homes.
- *Door Sweeping/Weatherstripping:* Door stripping/weatherstripping was provided in 1,972 homes.
- *Heat system repair:* Heating system repair work was provided to 467 homes.
- *Heating system replacement:* Heat pumps were replaced in 33 homes, furnaces in 86 homes, and boilers in 96 homes.

**Table III-7A**
**2018 LIURP Service Delivery and Expenditures**
**By Measure Type**

| Measure | Number of Jobs | % of Jobs | Total Number |
|---|---|---|---|
| Smoke Detector | 2,521 | 35% | 5,554 |
| Smoke Detector Battery | 441 | 6% | 777 |
| Carbon Monoxide Detectors | 2,317 | 32% | 2,350 |
| LEDs | 6,523 | 89% | 79,500 |
| Refrigerator Replacement | 1,397 | 19% | 1,397 |
| Air Conditioner Replacement | 917 | 13% | 1,780 |
| AC Maintenance | 3 | <1% | 3 |
| Power Strip | 2,133 | 29% | 3,946 |
| Freezer | 562 | 8% | 564 |
| Aerator | 672 | 9% | 1,102 |
| Showerhead | 673 | 9% | 796 |
| Water Heater Pipe Insulation | 522 | 7% | 522 |
| Electric Water Heater Timer | 58 | 1% | 58 |
| Water Heater Labor | 210 | 3% | 210 |
| Water Heater Part | 59 | 1% | 72 |
| Shower Valve | 29 | <1% | 41 |
| Electric Water Heater | 40 | 1% | 40 |
| Gas Water Heater | 100 | 1% | 100 |
| Air Sealing | 645 | 9% | 645 |
| Blower Door Test | 424 | 6% | 424 |
| Insulation | 337 | 5% | 337 |
| Weatherization | 238 | 3% | 238 |

| Measure | Number of Jobs | % of Jobs | Total Number |
|---|---|---|---|
| Duct/Pipe Insulation | 140 | 2% | 140 |
| Door Sweep/Weatherstripping | 1,972 | 27% | 4,395 |
| AC Sealing | 522 | 7% | 771 |
| Window Seal/Caulk | 162 | 2% | 1,171 |
| Dryer Venting | 74 | 1% | 92 |
| Door/Lock | 56 | 1% | 86 |
| Electric Labor | 66 | 1% | 66 |
| Electric Part | 39 | 1% | 62 |
| Line Voltage Thermostat | 111 | 2% | 363 |
| Manual Thermostat | 18 | <1% | 19 |
| Programmable Thermostat | 103 | 1% | 123 |
| Other Thermostat | 248 | 3% | 259 |
| Clean and Tune | 436 | 6% | 436 |
| Heating System Labor | 467 | 6% | 467 |
| Heating System Part | 125 | 2% | 357 |
| Electric Baseboard | 19 | <1% | 42 |
| Gas Boiler | 96 | 1% | 96 |
| Furnace | 86 | 1% | 86 |
| Furnace Filter | 2 | <1% | 2 |
| Heat Pump | 33 | <1% | 33 |

Table III-7B displays the measure installation rates by job type. The table shows that 30 percent of gas heat jobs and 28 percent of electric heat jobs received air sealing and that 14 percent of gas heat jobs and 17 percent of electric heat jobs received insulation.

**Table III-7B**
**2018 LIURP Service Delivery**
**Measure Frequency by Job Type**

| Measure | All Participants | | | Analysis Group | | |
|---|---|---|---|---|---|---|
| | Baseload | Electric Heat | Gas Heat | Baseload | Electric Heat | Gas Heat |
| Number of Customers | 4,782 | 695 | 1,359 | 3,800 | 384 | 667 |
| Smoke Detector | 35% | 32% | 40% | 35% | 31% | 39% |
| Smoke Detector Battery | 4% | 9% | 12% | 4% | 10% | 12% |
| Other Health and Safety | 30% | 19% | 50% | 33% | 21% | 46% |
| LEDs | 94% | 88% | 88% | 95% | 89% | 88% |

| Measure | All Participants | | | Analysis Group | | |
|---|---|---|---|---|---|---|
| | Baseload | Electric Heat | Gas Heat | Baseload | Electric Heat | Gas Heat |
| Refrigerator Replacement | 20% | 19% | 18% | 18% | 16% | 13% |
| Air Conditioner Replacement | 15% | 9% | 8% | 5% | 2% | 3% |
| AC Maintenance | 0% | <1% | <1% | 0% | 0% | 0% |
| Power Strip | 27% | 44% | 34% | 25% | 47% | 34% |
| Freezer | 9% | 6% | 6% | 7% | 4% | 6% |
| Aerator | 1% | 26% | 29% | 1% | 24% | 29% |
| Showerhead | 1% | 28% | 30% | 1% | 27% | 31% |
| Water Heater Pipe Insulation | 1% | 19% | 24% | 1% | 17% | 24% |
| Electric Water Heater Timer | <1% | 4% | 1% | <1% | 2% | <1% |
| Water Heater Labor | <1% | 4% | 12% | <1% | 2% | 7% |
| Water Heater Part | <1% | 2% | 3% | <1% | 1% | <1% |
| Shower Valve | <1% | 2% | 1% | 0% | 0% | 0% |
| Electric Water Heater | <1% | 3% | 1% | <1% | 1% | <1% |
| Gas Water Heater | 0% | 2% | 6% | 0% | 1% | 3% |
| Air Sealing | <1% | 28% | 30% | <1% | 16% | 13% |
| Blower Door Test | 0% | 18% | 20% | 0% | 10% | 8% |
| Insulation | 0% | 17% | 14% | 0% | 10% | 6% |
| Weatherization | 0% | 10% | 11% | 0% | 6% | 3% |
| Duct/Pipe Insulation | 0% | 5% | 8% | 0% | 3% | 3% |
| Door Sweep/Weatherstripping | 21% | 47% | 44% | 20% | 45% | 41% |
| A/C Sealing | 5% | 13% | 13% | 4% | 15% | 11% |
| Window Seal/Caulk | <1% | 8% | 7% | <1% | 6% | 3% |
| Dryer Venting | 0% | 3% | 4% | 0% | 2% | 2% |
| Door/Lock | 0% | 3% | 2% | 0% | 2% | <1% |
| Electric Labor | <1% | 6% | 1% | <1% | 3% | <1% |
| Electric Part | <1% | 3% | <1% | <1% | 2% | 0% |
| Line Voltage Thermostat | 0% | 14% | 1% | 0% | 13% | 1% |
| Manual Thermostat | 0% | <1% | 1% | 0% | <1% | <1% |
| Programmable Thermostat | 0% | 3% | 6% | 0% | <1% | 2% |
| Other Thermostat | <1% | 3% | 16% | <1% | 2% | 16% |
| Clean and Tune | 0% | 5% | 28% | 0% | 3% | 21% |
| Heating System Labor | 0% | 17% | 24% | 0% | 10% | 13% |
| Heating System Part | 0% | 1% | 8% | 0% | 0% | 3% |
| Electric Baseboard | 0% | 2% | <1% | 0% | 1% | 0% |

| Measure | All Participants | | | Analysis Group | | |
|---|---|---|---|---|---|---|
| | Baseload | Electric Heat | Gas Heat | Baseload | Electric Heat | Gas Heat |
| Gas Boiler | 0% | 2% | 6% | 0% | 0% | 2% |
| Furnace | 0% | 1% | 6% | 0% | <1% | 2% |
| Furnace Filter | 0% | 0% | <1% | 0% | 0% | <1% |
| Heat Pump | 0% | 5% | <1% | 0% | 3% | 0% |

Table III-7C displays the key measure installation rates for electric baseload jobs from 2011 through 2018. The table shows that the refrigerator replacement rate has declined since its increase in 2014, while the LED installation rate and average number of LEDs per job has increased since 2016.

**Table III-7C**
**2011-2018 LIURP Measure Frequency**
**Electric Baseload Jobs**

| Measure | Electric Baseload – All Customers | | | | | | | | Electric Baseload – Analysis Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| # Customers | 4,175 | 5,475 | 6,163 | 6,159 | 6,688 | 5,029 | 5,639 | 4,782 | 2,440 | 3,982 | 4,781 | 4,798 | 4,971 | 3,876 | 4,787 | 3,800 |
| Refrig. Remove | <1% | <1% | <1% | <1% | 0% | <1% | <1% | 0% | <1% | <1% | <1% | <1% | 0% | <1% | <1% | 0% |
| Refrig. Replace | 11% | 9% | 15% | 27% | 26% | 22% | 21% | 20% | 12% | 10% | 16% | 25% | 16% | 18% | 18% | 18% |
| LEDs | 88% | 86% | 85% | 79% | 71% | 79% | 93% | 94% | 87% | 86% | 84% | 79% | 73% | 81% | 94% | 95% |
| Avg. # LEDs | 8.0 | 7.0 | 4.7 | 6.6 | 4.4 | 6.3 | 10.5 | 11.9 | 7.9 | 7.1 | 4.6 | 6.6 | 4.6 | 6.2 | 10.7 | 12.1 |

Table III-7D shows that electric heating jobs with a blower door test declined from 30 percent in 2016 to 24 percent in 2017, and further declined to 18 percent in 2018. Insulation rates have similarly declined, from 32 percent in 2016 to 18 percent in 2017 and 17 percent in 2018.

**Table III-7D**
**2011-2018 LIURP Measure Frequency**
**Electric Heating Jobs**

| Measure | Electric Heating – All Customers | | | | | | | | Electric Heating – Analysis Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| # of Customers | 265 | 494 | 743 | 981 | 777 | 710 | 782 | 695 | 134 | 309 | 485 | 593 | 373 | 367 | 501 | 384 |
| LEDs | 68% | 82% | 71% | 67% | 64% | 59% | 81% | 88% | 65% | 84% | 71% | 64% | 67% | 54% | 82% | 89% |
| Refrig. Remove | 0% | 0% | 0% | 0% | 0% | <1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | <1% | 0% | 0% |
| Refrig. Replace | 12% | 6% | 11% | 21% | 22% | 19% | 20% | 19% | 14% | 7% | 11% | 19% | 12% | 16% | 17% | 16% |

| Measure | Electric Heating – All Customers | | | | | | | | Electric Heating – Analysis Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| Blower Door | 40% | 32% | 30% | 27% | 20% | 30% | 24% | 18% | 48% | 34% | 30% | 28% | 10% | 19% | 16% | 10% |
| Air Sealing* | 49% | 48% | 42% | 45% | 45% | 56% | 45% | 28% | 54% | 49% | 41% | 44% | 31% | 41% | 36% | 16% |
| Duct/Pipe Insul. | 3% | 3% | 4% | 5% | 2% | 3% | 2% | 5% | 3% | 4% | 4% | 6% | 1% | 1% | 1% | 3% |
| Weatherization | 28% | 24% | 21% | 21% | 17% | 26% | 14% | 10% | 26% | 22% | 19% | 21% | 8% | 16% | 7% | 6% |
| Insulation | 39% | 37% | 29% | 31% | 23% | 32% | 18% | 17% | 44% | 37% | 27% | 32% | 9% | 23% | 14% | 10% |
| LV Therm. | 36% | 30% | 29% | 29% | 33% | 25% | 16% | 14% | 33% | 28% | 27% | 25% | 24% | 22% | 15% | 13% |
| Heat. Labor | 19% | 10% | 9% | 12% | 16% | 19% | 23% | 17% | 23% | 12% | 8% | 11% | 10% | 13% | 18% | 10% |
| Heat. Sys. Part | 2% | 2% | 1% | 2% | 1% | 1% | 1% | 1% | 1% | 2% | 1% | 2% | 0% | 0% | <1% | 0% |
| Elec. Baseboard | 7% | 9% | 10% | 5% | 5% | 2% | 1% | 2% | 8% | 8% | 9% | 4% | 3% | 2% | 1% | 1% |
| Heat Pump | 7% | 3% | 4% | 3% | 3% | 3% | 4% | 5% | 7% | 4% | 4% | 3% | 1% | 1% | 2% | 3% |

*In 2018, the air sealing measure classification was updated to exclude certain non-air sealing measure descriptions. AC Sealing, Door Sweep/Weatherstripping, Window Seal/Caulk and Door/Lock were counted as air sealing in previous years but not in 2018. This explains the decline in air sealing measure frequency between 2017 and 2018.

Table III-7E shows that gas heating job installation rates also declined in 2018. Insulation declined from 19 percent in 2017 to 14 percent in 2018, and weatherization declined from 18 percent in 2017 to 11 percent in 2018.

**Table III-7E**
**2011-2018 LIURP Measure Frequency**
**Gas Heating Jobs**

| Measure | Gas Heating – All Participants | | | | | | | | Gas Heating – Analysis Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| # of Customers | 1,668 | 1,282 | 1,623 | 1,222 | 1,303 | 1,624 | 1,188 | 1,359 | 1,211 | 833 | 1,170 | 845 | 551 | 577 | 728 | 667 |
| Blower Door Test | 60% | 60% | 41% | 40% | 35% | 35% | 28% | 20% | 60% | 59% | 38% | 39% | 25% | 21% | 20% | 8% |
| Air Sealing* | 76% | 74% | 57% | 61% | 64% | 65% | 51% | 30% | 76% | 74% | 55% | 58% | 51% | 50% | 43% | 13% |
| Duct/Pipe Insul. | 12% | 15% | 13% | 15% | 12% | 8% | 5% | 8% | 12% | 15% | 13% | 12% | 7% | 4% | 4% | 3% |
| Weatherization | 45% | 41% | 31% | 32% | 28% | 29% | 18% | 11% | 45% | 42% | 30% | 30% | 15% | 14% | 13% | 3% |
| Insulation | 54% | 46% | 30% | 35% | 27% | 26% | 19% | 14% | 54% | 45% | 30% | 33% | 15% | 17% | 16% | 6% |
| Heating Labor | 30% | 23% | 17% | 23% | 28% | 28% | 23% | 24% | 31% | 22% | 15% | 17% | 19% | 18% | 14% | 13% |
| Heating Part | 25% | 20% | 13% | 12% | 8% | 9% | 8% | 8% | 25% | 21% | 11% | 7% | 5% | 5% | 3% | 3% |
| Furnace | 14% | 10% | 4% | 4% | 5% | 5% | 5% | 6% | 14% | 10% | 3% | 3% | 3% | 2% | 2% | 2% |
| Gas Boiler | 13% | 7% | 5% | 4% | 5% | 7% | 5% | 6% | 13% | 6% | 4% | 3% | 2% | 2% | 2% | 2% |

*In 2018, the air sealing measure classification was updated to exclude certain non-air sealing measure descriptions. AC Sealing, Door Sweep/Weatherstripping, Window Seal/Caulk and Door/Lock were counted as air sealing in previous years but not in 2018. This explains the decline in air sealing measure frequency between 2017 and 2018.

Table III-7F displays the number of major measures installed in electric and gas heating jobs from 2011 through 2018. Electric major measures include refrigerator replacement, freezer replacement, air conditioner replacement, water heater replacement, heat pumps, electric baseboards, insulation, and blower door guided air sealing. Gas major measures include furnace replacement, water heater replacement, insulation, and blower door guided air sealing. The table shows that the percentage of electric heating jobs with no major measures increased from 64 percent in 2017 to 68 percent in 2018 and the percent of gas heating jobs with no major measures increased from 73 percent in 2017 to 84 percent in 2018.

**Table III-7F**
**2011-2018 Number of Major Measures Installed**

| | Electric Heating Jobs | | | | | | | | | Gas Heating Jobs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| Obs. | 134 | 309 | 485 | 593 | 373 | 367 | 501 | 384 | Obs. | 1,211 | 833 | 1,170 | 845 | 552 | 577 | 728 | 667 |
| **# Maj. Meas.** | | | | | | | | | **# Maj. Meas.** | | | | | | | | |
| 0 | 37% | 49% | 51% | 50% | 73% | 59% | 64% | 68% | 0 | 17% | 27% | 49% | 49% | 67% | 68% | 73% | 84% |
| 1 | 17% | 17% | 23% | 21% | 17% | 21% | 22% | 20% | 1 | 28% | 29% | 25% | 23% | 18% | 17% | 15% | 10% |
| 2 | 35% | 27% | 18% | 23% | 8% | 17% | 10% | 9% | 2+ | 54% | 44% | 26% | 28% | 15% | 15% | 12% | 6% |
| 3+ | 11% | 8% | 8% | 6% | 1% | 4% | 4% | 3% | | | | | | | | | |
| **Total** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | **Total** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## *C. Home Characteristics*

CMC collects detailed information on customers who receive LIURP services, which allows for an in-depth analysis of the homes treated by the Program. We first examine the weather-normalized pre-treatment usage of customers who received LIURP treatments. Table III-8A shows that customers who received baseload services had average usage of 9,983 kWh, electric heating customers had average usage of 15,968 kWh, and gas heating customers had average gas usage of 904 ccf.

**Table III-8A**
**Pre-Treatment Weather Normalized Usage**

| Job Type | Number of Jobs | Jobs with Usage Data | Electric Use (kWh) | Gas Use (ccf) |
|---|---|---|---|---|
| Baseload | 4,934 | 3,888 | 9,983 | 488[1] |
| Electric Heating | 716 | 387 | 15,968 | 969[2] |
| Gas Heating | 1,421 | 690 | 8,262[3] | 904 |
| Total Excluding Those Without LIURP Measures | 7,071 | 4,965 | 10,223 | 898 |

| Job Type | Number of Jobs | Jobs with Usage Data | Electric Use (kWh) | Gas Use (ccf) |
|---|---|---|---|---|
| No LIURP Measures | 230 | 204 | 10,931 | 732 |
| Total Including Those Without LIURP Measures | 7,301 | 5,169 | 10,251 | 895 |

[1]There are only 16 baseload jobs with gas usage. [2]There are only 34 electric heating jobs with gas usage. [3]There are only 659 gas heating jobs with electric usage.

Table III-8B lists jobs with low usage separately.

**Table III-8B**
**Pre-Treatment Weather Normalized Usage**
**Low Usage and Prior Year Jobs Separated**

| Job Type | Number of Jobs | Jobs with Usage Data | Electric Use (kWh) | Gas Use (ccf) |
|---|---|---|---|---|
| Baseload | 4,782 | 3,800 | 10,010 | 488[1] |
| Electric Heating | 695 | 384 | 16,041 | 969[2] |
| Gas Heating | 1,359 | 667 | 8,385[3] | 904 |
| Low Usage | 178 | 66 | 5,255 | 851[4] |
| Electric Heat Low Use | 57 | 48 | 11,706 | -- |
| Total Excluding Those Without LIURP Measures | 7,071 | 4,965 | 10,223 | 898 |
| No LIURP Measures | 230 | 204 | 10,931[5] | 732[6] |
| Total Including Those Without LIURP Measures | 7,301 | 5,169 | 10,251 | 895 |

[1]There are only 16 baseload jobs with gas usage. [2]There are only 34 electric heating jobs with gas usage. [3]There are only 636 gas heating jobs with electric usage. [4]There are only 11 low usage jobs with gas usage. [5]There are only 203 no LIURP measures jobs with electric usage. [6]There are only 13 no LIURP measures jobs with gas usage.

Table III-9 displays the primary heating source for LIURP jobs by job type and overall. Approximately 83 percent of all homes served had utility gas as their primary heating source. Eight percent used fuel oil and nine had electric heat. Baseload jobs were distributed similarly, though less than one percent had electric heat.

**Table III-9**
**Primary Heating Source**

| Primary Heating Source | Baseload | | Electric Heat | | Gas Heat | | Low Use | | All Jobs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs |
| Gas | 4,385 | 88% | 155 | 22% | 1,356 | 99% | 179 | 72% | 6,075 | 83% |
| Fuel Oil | 533 | 11% | 3 | <1% | 2 | <1% | 18 | 7% | 556 | 8% |
| Electric | 20 | <1% | 551 | 77% | 16 | 1% | 49 | 20% | 636 | 9% |
| Other | 27 | 1% | 5 | 1% | 0 | 0% | 1 | <1% | 33 | <1% |

| Primary Heating Source | Baseload | | Electric Heat | | Gas Heat | | Low Use | | All Jobs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs |
| TOTAL | 4,966[1] | 100% | 714 | 100% | 1,374 | 100% | 247 | 100% | 7,301 | 100% |

[1]One baseload job was missing primary heating source information

Table III-10 describes the use of supplemental heating by job type. Overall, 33 percent of the customers who were treated by LIURP used supplemental heat, virtually all of whom used electric supplemental heat. Thirty-five percent of the customers who had baseload services used electric supplemental heat.

**Table III-10**
**Supplemental Heating**

| Supp. Heating Source | Baseload | | Electric Heat | | Gas Heat | | Low Use[1] | | All Jobs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs | # of Jobs | % of Jobs |
| None Used | 3,177 | 64% | 468 | 66% | 1,011 | 74% | 193 | 78% | 4,849 | 66% |
| Electric | 1,762 | 35% | 229 | 32% | 327 | 24% | 50 | 20% | 2,368 | 32% |
| Other | 27 | 1% | 17 | 2% | 36 | 3% | 4 | 2% | 84 | 1% |
| TOTAL | 4,966 | 100% | 714 | 100% | 1,374 | 100% | 247 | 100% | 7,301 | 100% |

[1]Sixty-six of the jobs in this group had electric heating.

Table III-11 displays the type of air conditioning that LIURP recipients used. The most common type, with 62 percent, was a window unit. Twenty-two percent had central air conditioning.

**Table III-11**
**Air Conditioning**

| Air Conditioning | Number of Jobs | % of Jobs |
|---|---|---|
| Window Unit | 4,509 | 62% |
| Central | 1,635 | 22% |
| Wall Unit | 544 | 7% |
| Central Heat Pump | 173 | 2% |
| Portable Unit | 151 | 2% |
| None Used | 289 | 4% |
| TOTAL | 7,301 | 100% |

Table III-12 shows the home ownership characteristics of LIURP recipients. This table shows that 17 percent of the LIURP recipients were renters. Renters are not eligible for refrigerator replacement, air conditioner replacement, or furnace replacement.

**Table III-12**
**Home Ownership**

| | Number of Jobs | % of Jobs |
|---|---|---|
| Own | 6,037 | 83% |
| Rent | 1,264 | 17% |

Homes treated by LIURP were fairly old. The average age of homes treated was 80 years, and 66 percent were more than 75 years old.

**Table III-13**
**Home Age**

| | Number of Jobs | % of Jobs |
|---|---|---|
| ≤ 25 Years | 239 | 3% |
| 26 – 50 Years | 602 | 8% |
| 51 – 75 Years | 1,663 | 23% |
| 76 Years or Older | 4,797 | 66% |
| Mean | 80 | |

Table III-14A displays the dwelling type for the homes served under LIURP. The most common type was a row home, with 78 percent of homes served. Thirteen percent lived in other types of single-family homes, and seven percent lived in multi-family homes.

**Table III-14A**
**Dwelling Type**

| | Number of Jobs | % of Jobs |
|---|---|---|
| Row | 5,727 | 78% |
| Other Single Family | 924 | 13% |
| Multi | 488 | 7% |
| Mobile | 78 | 1% |
| Duplex | 70 | 1% |
| Other | 14 | <1% |
| TOTAL | 7,301 | 100% |

Table III-14B displays the housing structure type for the homes served under LIURP. The most common type was wood with a full basement and an open joist attic.

**Table III-14B**
**Type of Housing Structure**

| | Number of Jobs | % of Jobs |
|---|---|---|
| Wood, full basement, open joist attic | 6,234 | 85% |
| Wood, slab foundation, open joist attic | 231 | 3% |
| Wood, crawl space/basement, open joist attic | 190 | 3% |
| Block, concrete or log, slab foundation | 106 | 1% |
| Wood, crawl space, open joist attic | 96 | 1% |
| Mobile home, post foundation | 78 | 1% |
| Wood, full basement, knee wall attic | 65 | 1% |
| Other | 301 | 4% |
| TOTAL | 7,301 | 100% |

Table III-15 describes the heated square footage of the homes treated by LIURP. Homes averaged 1,264 square feet. Forty-four percent of the homes were greater than 1,200 square feet.

**Table III-15**
**Heated Square Footage**

| | Number of Jobs | % of Jobs |
|---|---|---|
| ≤ 800 | 677 | 9% |
| 801 - 1,000 | 1,083 | 15% |
| 1,001 - 1,200 | 2,360 | 32% |
| 1,201 or More | 3,181 | 44% |
| Mean | 1,264 | |

## *D. Participant Characteristics*

The Program also captures detailed information on the characteristics of participating households. Table III-16 shows that 77 percent of the households were female-headed, 38 percent contained at least one child, and 38 percent contained at least one elderly member.

**Table III-16**
**Household Composition**

| | Number of Jobs | % of Jobs |
|---|---|---|
| Female Household Head | 5,631 | 77% |
| Male Household Head | 1,669 | 23% |

| | Number of Jobs | % of Jobs |
|---|---|---|
| Child in Household (<18) | 2,788 | 38% |
| Elderly in Household (>62) | 2,743 | 38% |

*One customer was missing information about gender.

Table III-17 shows that the mean annual household income level was $11,396. Approximately 49 percent of the households served had annual income at or below $10,000. Only 11 percent had gross annual income above $20,000.

**Table III-17**
**Annual Income**

| | Number of Jobs | % of Jobs |
|---|---|---|
| ≤ $5,000 | 1,192 | 16% |
| $5,001 - $10,000 | 2,409 | 33% |
| $10,001 - $15,000 | 2,000 | 27% |
| $15,001 - $20,000 | 900 | 12% |
| $20,001 or More | 799 | 11% |
| Mean | $11,396 | |

*One customer was missing income information.

Table III-18 displays the household poverty level. Approximately 32 percent of the households had income below 50 percent of the Federal Poverty Level (FPL) and approximately three percent had income above 150 percent of the FPL.

**Table III-18**
**Poverty Level**

| | Number of Jobs | % of Jobs |
|---|---|---|
| ≤ 25% | 1,189 | 16% |
| 26% - 50% | 1,152 | 16% |
| 51% - 100% | 3,491 | 48% |
| 101% - 150% | 1,284 | 18% |
| 151% - 175% | 114 | 2% |
| >175% | 70 | 1% |
| Mean | 67% | |

*One customer was missing income information.

Table III-19 describes the account type of households who participated in the Program. Approximately 86 percent were CAP participants and six percent were Customer Choice participants.

**Table III-19**
**Account Type**

| | Number of Jobs | % of Jobs |
|---|---|---|
| CAP | 6,290 | 86% |
| Customer Choice | 409 | 6% |

Table III-20 displays the education level of the head of household. The majority of participants, 71 percent, had a high school education. Six percent had some high school, ten percent had some college, and nine percent had a college degree.

**Table III-20**
**Education Level**

| | Number of Jobs | % of Jobs |
|---|---|---|
| No Formal Education | 100 | 1% |
| Some Grade School | 36 | <1% |
| Grade School | 47 | 1% |
| Some High School | 469 | 6% |
| High School | 5,188 | 71% |
| Some College | 718 | 10% |
| College Degree | 678 | 9% |
| Some Graduate Work | 13 | <1% |
| Graduate Degree | 49 | 1% |

*Three customers were missing education level information.

Table III-21 displays the primary income source for the LIURP participants. The table shows that the most common sources of income were public assistance, pension or retirement, and work. Thirty-nine percent had public assistance as their primary source of income, 16 percent had a pension and/or retirement, 13 percent had full-time work, 11 percent were dependent on another, and ten percent had part-time work.

**Table III-21**
**Income Source**

| | Number of Jobs | % of Jobs |
|---|---|---|
| Public Assistance | 2,859 | 39% |
| Pension/Retirement | 1,200 | 16% |
| Full Time | 969 | 13% |
| Dependent on Another | 792 | 11% |
| Part-Time Work | 726 | 10% |

| | Number of Jobs | % of Jobs |
|---|---|---|
| Self-Employment | 61 | 1% |
| Seasonal Employment | 11 | <1% |
| Other | 682 | 9% |

*One customer was missing income source information.

# IV. Usage Impacts

This section of the report provides analysis of the impacts of LIURP on participants' annual electric and gas usage. The section describes the methodology for the analysis, the results for all participants by job type, and the results by type of service. We then provide estimates of the impacts of individual measures and the cost-effectiveness of LIURP.

## *A. Methodology*

Customers who received LIURP services in 2018 were treated as the analysis group for this evaluation. We focus on the electric impacts for customers who were treated as electric baseload and electric heating jobs, and the gas impacts for customers who were treated as gas heating jobs.

Energy usage was analyzed for the year prior to the LIURP audit visit and the year after service delivery was completed. The analysis included as close to a full year of data pre- and post-treatment as possible. Table IV-1 displays the attrition statistics for the usage analysis. Customers were included in the analysis if their pre- and post-usage data each spanned between 270 and 390 days. Some additional customers were removed from the analysis if their usage was below 1,200 kWh or 300 ccf, or if their change in usage was greater than 65 percent. After these eliminations, we included 49 to 89 percent of the treated population in the usage analysis, depending on the job type. A lower percentage of the heating participants were available for inclusion in the analysis, primarily due to a lack of pre-treatment usage data.

**Table IV-1**
**Usage Impact Data Attrition**

| | Electric Baseload | Electric Heating | Gas Heating | Education Only (kWh) | Education Only (ccf) |
|---|---|---|---|---|---|
| Original Population* | 4,781 | 694 | 1,357 | 229 | 22 |
| Not Enough Pre-Treatment Days | 684 | 232 | 546 | 6 | 0 |
| Not Enough Post-Treatment Days | 169 | 51 | 56 | 15 | 3 |
| All Estimated Reads in Pre or Post | 0 | 0 | 0 | 0 | 0 |
| Pre-Usage Below 1200 kWh or 300 ccf | 5 | 0 | 30 | 0 | 5 |
| Post-Usage Below 1200 kWh or 300 ccf | 7 | 0 | 17 | 0 | 0 |
| Change in Total Usage>65% | 110 | 26 | 38 | 3 | 0 |
| Additional Outliers | 6 | 1 | 3 | 2 | 1 |
| Final Sample | 3,800 | 384 | 667 | 203 | 13 |
| % Included in Analysis | 79% | 55% | 49% | 89% | 59% |

*As Program data did not furnish rate types (electric or gas), only the customers with usage data were included in the number of original population for Education Only groups.

Energy usage data were weather normalized in the pre- and the post-usage period to ensure that changes in energy usage were due to changes in usage patterns, rather than due to changes in weather. We used a degree-day normalization process to conduct this analysis. This process involved the following steps.

1. Calculate the heating and cooling degree-days that are included in each usage period.

2. Determine whether periods should be classified as baseload periods, heating periods, or cooling periods, based on the number of usage and heating and cooling degree-days in the period.

3. Calculate the total baseload period usage, heating period usage, and cooling period usage.

4. Calculate the relationship between heating usage minus baseload usage and degree-days. Use that slope and the average long-term heating degree-days to calculate normalized heating period usage.

5. Follow the same method to calculate normalized cooling period usage.

6. Add up the baseload usage, heating period usage, and cooling period usage to obtain the normalized annual usage.

For comparison, we also produced weather normalized results using PRISM analysis. The degree-day normalized results were very similar to the PRISM analysis results; but the degree-day approach allowed for a higher percentage of cases to be included, due to fewer restrictions on data availability and the fact that cases did not need to be removed because the model did not run or the model had a poor fit.

While the PUC does not require that baseload usage is normalized, we conducted the normalization process on the baseload usage as well as the heating and cooling usage. Baseload usage may vary with weather because of the use of air conditioning, the gas furnace's electric fan, the refrigerator, and use of electric space heaters.

## *B. Energy Savings Impacts*

This section of the report provides the average weather-normalized usage for the pre- and post-treatment periods and the average energy savings. Table IV-2 displays these results by job type.

The table shows the following degree-day normalized savings.

- Baseload jobs had average annual savings of approximately 674 kWh, or 6.7 percent of pre-treatment usage.

- Electric heat jobs had average annual savings of approximately 977 kWh, or 6.1 percent of pre-treatment usage.

- Gas heat jobs had savings of 16 ccf, or 1.8 percent of pre-treatment usage. Gas heat jobs also had electric savings of 571 kWh, or 6.8 percent of pre-treatment usage.

- Education only jobs had average savings of 586 kWh, or 5.4 percent of pre-treatment usage.

**Table IV-2**
**Average Annual Usage and Savings**

| | # | Total Savings | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | |
| Non-Normalized | 3,800 | 9,736 | 9,339 | 397 | 4.1% | 220 | 2.3% | 177 | 1.8% |
| Degree Day Normalized | 3,800 | 10,010 | 9,336 | 674 | 6.7% | 497 | 5.0% | 177 | 1.8% |
| Degree Day-PRISM cases | 3,766 | 10,015 | 9,334 | 681 | 6.8% | 504 | 5.0% | 177 | 1.8% |
| PRISM Normalized | 3,766 | 9,814 | 9,178 | 637 | 6.5% | 460 | 4.7% | 177 | 1.8% |
| **Electric Heat (kWh)** | | | | | | | | | |
| Non-Normalized | 384 | 15,325 | 14,912 | 413 | 2.7% | 261 | 1.7% | 152 | 1.0% |
| Degree Day Normalized | 384 | 16,041 | 15,064 | 977 | 6.1% | 825 | 5.1% | 152 | 0.9% |
| Degree Day-PRISM cases | 380 | 16,012 | 15,101 | 911 | 5.7% | 759 | 4.7% | 152 | 1.0% |
| PRISM Normalized | 380 | 15,700 | 14,794 | 905 | 5.8% | 753 | 4.8% | 152 | 1.0% |
| **Gas Heat (ccf)** | | | | | | | | | |
| Non-Normalized | 667 | 910 | 890 | 21 | 2.3% | 21 | 2.3% | 0 | 0.0% |
| Degree Day Normalized | 667 | 904 | 888 | 16 | 1.8% | 16 | 1.8% | 0 | 0.0% |
| PRISM Normalized | 667 | 890 | 873 | 17 | 1.9% | 17 | 1.9% | 0 | 0.0% |
| **Gas Heat (kWh)** | | | | | | | | | |
| Non-Normalized | 636 | 8,155 | 7,829 | 326 | 4.0% | 141 | 1.7% | 185 | 2.3% |
| Degree Day Normalized | 636 | 8,385 | 7,814 | 571 | 6.8% | 386 | 4.6% | 185 | 2.2% |
| Degree Day-PRISM cases | 628 | 8,402 | 7,838 | 565 | 6.7% | 380 | 4.5% | 185 | 2.2% |
| PRISM Normalized | 628 | 8,275 | 7,758 | 517 | 6.2% | 332 | 4.0% | 185 | 2.2% |
| **Education Only (kWh)** | | | | | | | | | |
| Non-Normalized | 203 | 10,610 | 10,331 | 279 | 2.6% | 279 | 2.6% | 0 | 0.0% |
| Degree Day Normalized | 203 | 10,931 | 10,345 | 586 | 5.4% | 586 | 5.4% | 0 | 0.0% |
| Degree Day-PRISM cases | 198 | 10,861 | 10,242 | 619 | 5.7% | 619 | 5.7% | 0 | 0.0% |
| PRISM Normalized | 198 | 10,538 | 10,046 | 491 | 4.7% | 491 | 4.7% | 0 | 0.0% |

| | # | Total Savings | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | |
| **Education Only (ccf)** | | | | | | | | | |
| Non-Normalized | 13 | 727 | 752 | -25 | -3.4% | -25 | -3.4% | 0 | 0.0% |
| Degree Day Normalized | 13 | 732 | 736 | -3 | -0.5% | -3 | -0.5% | 0 | 0.0% |
| PRISM Normalized | 13 | 719 | 726 | -7 | -0.9% | -7 | -0.9% | 0 | 0.00% |

Note: All Gas Heat (ccf) and Education Only (ccf) accounts survived PRISM attrition, so the results for "Degree Day-PRISM cases" are the same as the results listed in the Degree Day Normalized rows.

Table IV-2A displays average heating and cooling degree days in the pre- and post-treatment usage periods for the 2018 LIURP participants, compared to the 20-year average that was used in the normalization process. The table shows that the post-treatment heating degree days were 13 percent higher than the pre-treatment heating degree days for the electric heating jobs and five percent higher for the gas heating jobs. The colder winter in the post-treatment year resulted in increased heating usage after LIURP services, and a non-normalized saving estimate that underestimated the savings from LIURP. This led to a weather-normalization adjustment to savings for the heating jobs. There was also an increase in the number of cooling degree days from the pre to post period, which lead to a small adjustment upward in the savings estimate for baseload jobs.

**Table IV-2A**
**Average Heating and Cooling Degree Days**
**Relative to 20-year Average**

| Job Type | # | Pre-CDD | Post-CDD | CDD Difference | | Pre-HDD | Post-HDD | HDD Difference | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | # | % | | | # | % |
| Electric Baseload | 3,800 | 746 | 825 | 79 | 11% | 3,896 | 4,084 | 188 | 5% |
| Electric Heat | 384 | 760 | 850 | 90 | 12% | 3,566 | 4,084 | 481 | 13% |
| Gas Heat | 667 | 701 | 817 | 116 | 17% | 3,933 | 4,119 | 186 | 5% |
| Education Only (kWh) | 203 | 782 | 844 | 62 | 8% | 3,785 | 3,997 | 213 | 6% |
| Education Only (ccf) | 13 | 743 | 771 | 28 | 4% | 4,062 | 4,214 | 152 | 4% |
| 20-Year Average (2000-2019) | | 810 | | | | 4,414 | | | |

Another important factor in estimating energy savings is the degree to which the final analysis group, with enough usage data to include in the results, is comparable to the full population of treated households. The previous section showed that the customers in the analysis group were less likely to have major measures installed than the overall treatment group. This can bias the savings results downward.

While a later section in the report provides a detailed analysis of savings by several population subgroups, this section includes an analysis of how differential attrition provides a downward bias to the savings estimates. This should be taken into account when assessing the overall savings results.

Table IV-2B shows that electric baseload customers with major measures are underrepresented in the analysis group. While 34 percent of all electric baseload jobs had a major measure, only 25 percent of the electric baseload analysis group had a major measure. When accounting for this difference, the savings estimate increases from 673 kWh or 6.8 percent to 725 kWh or 7.3 percent.

**Table IV-2B**
**Electric Baseload Savings**
**By Level of Service**

| | All Customers | | Analysis Group | | Savings | | Unweighted Savings | | Weighted Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | kWh | % | kWh | % | kWh | % |
| Basic | 3,141 | 66% | 2,840 | 75% | 529 | 5.3% | 673 | 6.8% | 725 | 7.3% |
| Major | 1,641 | 34% | 960 | 25% | 1,100 | 11.2% | | | | |

Table IV-2C shows that electric heating customers with major measures are underrepresented in the analysis group. While 24 percent of all electric heating jobs had one major measure and 23 percent had two or more major measures, only 20 percent of the electric heating analysis group had one major measure and only 12 percent had two or more major measures. When accounting for this difference, the savings estimate increases from 977 kWh or 5.9 percent to 1,149 kWh or 6.7 percent.

**Table IV-2C**
**Electric Heating Customers Savings**
**By Number of Major Measures**

| Number of Major Measures | All Customers | | Analysis Group | | Savings | | Unweighted Savings | | Weighted Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | kWh | % | kWh | % | kWh | % |
| 0 | 370 | 53% | 261 | 68% | 664 | 4.4% | 977 | 5.9% | 1,149 | 6.7% |
| 1 | 165 | 24% | 77 | 20% | 1,445 | 8.2% | | | | |
| 2 or More | 160 | 23% | 46 | 12% | 1,966 | 10.3% | | | | |

Table IV-2D shows that gas heating customers with major measures are underrepresented in the analysis group. While 20 percent of all gas heating jobs had one major measure and 15 percent had two or more major measures, only ten percent of the gas heating analysis group had one major measure and only six percent had two or more major measures. Accounting

for this change increases the savings estimate from 16 ccf or 1.8 percent to 25 ccf or 2.8 percent.

**Table IV-2D**
**Gas Heating Customers Savings**
**By Number of Major Measures**

| Number of Major Measures | All Customers | | Analysis Group | | Savings | | Unweighted Savings | | Weighted Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | ccf | % | ccf | % | ccf | % |
| 0 | 881 | 65% | 563 | 84% | 9 | 1.0% | | | | |
| 1 | 278 | 20% | 64 | 10% | 39 | 4.1% | 16 | 1.8% | 25 | 2.8% |
| 2 or More | 200 | 15% | 40 | 6% | 78 | 9.0% | | | | |

The rest of the report focuses on the degree day normalized savings. Tables IV-3A, 3B, and 3C provide the historical comparison of energy savings by job type.

Table IV-3A displays historical savings of electric baseload jobs. The table shows that the 2018 jobs had savings that were lower than the 1999-2017 average savings. Savings were 6.7 percent in 2018 compared to the historical average of 8.4 percent. The 2018 jobs had pre-treatment usage that was five percent lower than the historical average and spending that was seven percent higher than the historical average.

**Table IV-3A**
**Time-Series Comparison of Annual Usage and Savings**
**Electric Baseload Jobs**

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| **2018** | **10,010** | **9,336** | **674** | **6.7%** | **$223** |
| **1999-2017 Average** | **10,586** | **9,705** | **880** | **8.4%** | **$209** |
| 2017 | 10,508 | 9,888 | 620 | 5.9% | $184 |
| 2016 | 10,557 | 9,885 | 673 | 6.4% | $213 |
| 2015 | 10,035 | 9,226 | 809 | 8.1% | $173 |
| 2014 | 9,969 | 9,120 | 849 | 8.5% | $161 |
| 2013 | 10,707 | 9,877 | 830 | 7.7% | $182 |
| 2012 | 11,461 | 10,911 | 550 | 4.8% | $161 |
| 2011 | 10,758 | 10,148 | 610 | 5.7% | $258 |
| 2010 | 11,370 | 10,147 | 1,223 | 10.8% | $201 |
| 2009 | 12,144 | 11,090 | 1,054 | 8.7% | $186 |
| 2008 | 10,990 | 10,276 | 714 | 6.5% | $191 |
| 2007 | 10,919 | 10,032 | 887 | 8.1% | $240 |

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| 2006 | 10,695 | 9,953 | 742 | 6.9% | $214 |
| 2005 | 11,188 | 10,073 | 1,115 | 10.0% | $208 |
| 2004 | 9,309 | 8,384 | 925 | 9.9% | $215 |
| 2003 | 10,040 | 8,679 | 1,361 | 13.6% | $214 |
| 2002 | 10,591 | 9,687 | 904 | 8.5% | $192 |
| 2001 | 10,821 | 9,722 | 1,099 | 10.2% | $296 |
| 2000 | 9,741 | 8,843 | 898 | 9.2% | $268 |
| 1999 | 9,324 | 8,460 | 864 | 9.3% | $206 |

Table IV-3B displays historical savings of electric heating jobs. The table shows that the 2018 jobs had savings that were lower than the 1999-2017 average. Savings were 6.1 percent in 2018 compared to the historical average of 7.5 percent. The electric heating pre-treatment usage was lower than in the past, averaging 16,041 kWh, compared to the historical average of 20,470 kWh. Additionally, the cost of measures was only about 48 percent of the historical average.

**Table IV-3B**
**Time-Series Comparison of Annual Usage and Savings**
**Electric Heating Jobs**

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| **2018** | **16,041** | **15,064** | **977** | **6.1%** | **$772** |
| **1999-2017 Average** | **20,470** | **18,920** | **1,550** | **7.5%** | **$1,618** |
| 2017 | 15,920 | 15,152 | 767 | 4.8% | $831 |
| 2016 | 17,180 | 16,182 | 998 | 5.8% | $991 |
| 2015 | 14,760 | 13,653 | 1,106 | 7.5% | $622 |
| 2014 | 16,263 | 15,150 | 1,113 | 6.8% | $1,301 |
| 2013 | 21,350 | 19,416 | 1,934 | 9.1% | $1,310 |
| 2012 | 20,700 | 19,465 | 1,235 | 6.0% | $1,430 |
| 2011 | 19,402 | 17,899 | 1,503 | 7.7% | $1,798 |
| 2010 | 19,662 | 18,534 | 1,128 | 5.7% | $2,094 |
| 2009 | 23,179 | 21,493 | 1,686 | 7.3% | $2,514 |
| 2008 | 20,786 | 18,614 | 2,172 | 10.4% | $2,332 |
| 2007 | 21,017 | 19,888 | 1,129 | 5.4% | $1,735 |
| 2006 | 21,890 | 20,458 | 1,433 | 6.5% | $1,643 |
| 2005 | 21,956 | 20,326 | 1,629 | 7.4% | $1,824 |
| 2004 | 23,449 | 21,148 | 2,301 | 9.8% | $1,782 |

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| 2003 | 22,510 | 20,220 | 2,290 | 10.2% | $1,646 |
| 2002 | 22,745 | 21,441 | 1,304 | 5.7% | $1,753 |
| 2001 | 22,825 | 20,469 | 2,356 | 10.3% | $2,234 |
| 2000 | 21,368 | 19,724 | 1,644 | 7.7% | $1,521 |
| 1999 | 21,970 | 20,251 | 1,719 | 7.8% | $1,377 |

Table IV-3C displays historical savings of gas heating jobs. The 2018 gas heating jobs saved an average of 16 ccf, compared to average savings of 94 ccf from 1999-2017. Pre-treatment usage in 2018 was about 18 percent lower than the historical average, and spending in 2018 was only about 41 percent of the historical average. The 2018 gas heating jobs were less likely to have a blower door test, weatherization, and insulation than in previous years.

**Table IV-3C**
**Time-Series Comparison of Annual Usage and Savings**
**Gas Heating Jobs**

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| **2018** | **904** | **888** | **16** | **1.8%** | **$666** |
| **1999-2017 Average** | **1,102** | **1,008** | **94** | **8.2%** | **$1,630** |
| 2017 | 968 | 944 | 24 | 2.5% | $912 |
| 2016 | 944 | 914 | 31 | 3.3% | $918 |
| 2015 | 977 | 946 | 31 | 3.2% | $934 |
| 2014 | 906 | 879 | 27 | 2.9% | $1,117 |
| 2013 | 1,022 | 945 | 77 | 7.5% | $1,086 |
| 2012 | 989 | 924 | 65 | 6.6% | $1,820 |
| 2011 | 1,025 | 959 | 67 | 6.5% | $2,410 |
| 2010 | 1,052 | 991 | 61 | 5.8% | $2,253 |
| 2009 | 1,090 | 998 | 92 | 8.4% | $2,100 |
| 2008 | 1,087 | 984 | 103 | 9.5% | $2,016 |
| 2007 | 1,054 | 965 | 89 | 8.4% | $1,914 |
| 2006 | 1,128 | 1,037 | 91 | 8.0% | $1,640 |
| 2005 | 1,206 | 1,039 | 168 | 13.9% | $1,643 |
| 2004 | 1,205 | 1,037 | 168 | 13.9% | $1,789 |
| 2003 | 1,227 | 1,086 | 141 | 11.5% | $1,422 |
| 2002 | 1,253 | 1,159 | 94 | 7.5% | $1,488 |
| 2001 | 1,262 | 1,097 | 165 | 13.1% | $2,003 |

| | Pre-Use | Post-Use | Savings | Percent Savings | Wx Cost |
|---|---|---|---|---|---|
| 2000 | 1,265 | 1,106 | 159 | 12.6% | $1,763 |
| 1999 | 1,273 | 1,148 | 125 | 9.8% | $1,741 |

Table IV-4 displays the seasonal analysis of energy savings by job type. The table shows that jobs achieved savings from baseload, heating, and cooling usage.

**Table IV-4**
**Seasonal Usage Analysis**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Share of Savings | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Baseload | 3,800 | 6,056 | 5,525 | 531 | 8.8% | 78.9% | 354 | 5.9% | 177 | 2.9% |
| Heating | | 1,995 | 1,866 | 129 | 6.5% | 19.2% | 129 | 6.5% | 0 | 0.0% |
| Cooling | | 1,959 | 1,946 | 13 | 0.7% | 1.9% | 13 | 0.7% | 0 | 0.0% |
| **Electric Heating (kWh)** | | | | | | | | | | |
| Baseload | 384 | 7,050 | 6,664 | 387 | 5.5% | 39.6% | 235 | 3.3% | 152 | 2.2% |
| Heating | | 7,797 | 7,229 | 568 | 7.3% | 58.2% | 568 | 7.3% | 0 | 0.0% |
| Cooling | | 1,194 | 1,172 | 22 | 1.9% | 2.3% | 22 | 1.9% | 0 | 0.0% |
| **Gas Heat (ccf)** | | | | | | | | | | |
| Baseload | 667 | 199 | 189 | 10 | 4.8% | 58.3% | 10 | 4.8% | 0 | 0.0% |
| Heating | | 706 | 699 | 7 | 1.0% | 41.7% | 7 | 1.0% | 0 | 0.0% |
| **Education Only (kWh)** | | | | | | | | | | |
| Baseload | 203 | 6,178 | 5,819 | 359 | 5.8% | 61.3% | 359 | 5.8% | 0 | 0.0% |
| Heating | | 2,780 | 2,565 | 216 | 7.8% | 36.8% | 216 | 7.8% | 0 | 0.0% |
| Cooling | | 1,972 | 1,961 | 11 | 0.6% | 1.9% | 11 | 0.6% | 0 | 0.0% |

Energy efficiency program savings are often found to correlate with the level of pre-treatment usage. This is because households with higher pre-treatment usage have greater opportunities for energy savings and often receive greater energy efficiency investments. Table IV-5 shows that the 2018 savings were generally consistent with this expectation.

- Baseload jobs with pre-treatment usage over 12,000 kWh had savings of 8.8 percent, compared to savings of 5.8 percent for baseload jobs with pre-treatment usage between 8,000 and 12,000 kWh, and savings of 5.0 percent for baseload jobs with pre-treatment usage below 8,000 kWh.

- Electric heat jobs with pre-treatment usage over 26,000 kWh had average savings of 13.6 percent, while those jobs with pre-treatment usage between 16,000 and 26,000 kWh had savings of 4.6 percent, and jobs with usage below 16,000 kWh had savings of 3.4 percent.

- Gas heat jobs with pre-treatment usage over 1,400 ccf saved an average of 38 ccf or 2.1 percent, those with pre-treatment usage between 800 and 1,400 ccf saved an average of 2.8 percent, and those with pre-treatment usage below 800 ccf did not save.

**Table IV-5**
**Change in Annual Usage**
**By Pre-Program Usage**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| < 8,000 kWh | 1,440 | 6,691 | 6,353 | 338 | 5.0% | $232 | 162 | 2.4% | 176 | 2.6% |
| 8,000 – 12,000 kWh | 1,468 | 9,746 | 9,179 | 567 | 5.8% | $218 | 391 | 4.0% | 176 | 1.8% |
| > 12,000 kWh | 892 | 15,802 | 14,411 | 1,392 | 8.8% | $215 | 1214 | 7.7% | 178 | 1.1% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| < 16,000 kWh | 223 | 10,770 | 10,406 | 363 | 3.4% | $606 | 224 | 2.1% | 139 | 1.3% |
| 16,000 – 26,000 kWh | 120 | 20,129 | 19,199 | 930 | 4.6% | $779 | 765 | 3.8% | 165 | 0.8% |
| > 26,000 kWh | 41 | 32,749 | 28,297 | 4,452 | 13.6% | $1,649 | 4262 | 13.0% | 190 | 0.6% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| < 800 ccf | 307 | 602 | 602 | 0 | -0.1% | $427 | 0 | -0.1% | 0 | 0.0% |
| 800 – 1,400 ccf | 297 | 1,035 | 1,005 | 29 | 2.8% | $614 | 29 | 2.8% | 0 | 0.0% |
| > 1,400 ccf | 63 | 1,766 | 1,728 | 38 | 2.1% | $623 | 38 | 2.1% | 0 | 0.0% |

[1]Measure costs for gas heat jobs exclude the costs for the measures targeted at reducing electric usage.

Table IV-6 displays usage impacts by job type and by whether the household participated in CAP in the pre- or post-treatment period. Electric heating savings were higher for the non-CAP participants, who had significantly higher pre-treatment usage and average measure cost than CAP participants. Gas heating and education only savings were higher for CAP participants, despite having lower average pre-treatment usage.

**Table IV-6**
**Change in Annual Usage**
**By CAP Participation**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| CAP | 3,342 | 10,050 | 9,377 | 673 | 6.7% | $212 | 493 | 4.9% | 180 | 1.8% |
| Non-CAP | 458 | 9,718 | 9,040 | 678 | 7.0% | $297 | 523 | 5.4% | 155 | 1.6% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| CAP | 344 | 15,570 | 14,655 | 915 | 5.9% | $694 | 770 | 4.9% | 145 | 0.9% |
| Non-CAP | 40 | 20,096 | 18,589 | 1,507 | 7.5% | $1,436 | 1,294 | 6.4% | 213 | 1.1% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| CAP | 562 | 891 | 873 | 18 | 2.0% | $481 | 18 | 2.0% | 0.0% | 0.0% |
| Non-CAP | 105 | 975 | 967 | 8 | 0.8% | $783 | 8 | 0.8% | 0.0% | 0.0% |
| **Education Only (kWh)** | | | | | | | | | | |
| CAP | 188 | 10,864 | 10,255 | 609 | 5.6% | -- | 609 | 5.6% | 0 | 0.0% |
| Non-CAP | 15 | 11,769 | 11,471 | 299 | 2.5% | -- | 299 | 2.5% | 0 | 0.0% |

[1]Measure costs for gas heat jobs exclude the costs for the measures targeted at reducing electric usage.

Table IV-7 displays the change in usage by whether the customer had selected an alternate supplier in the pre or post period. Only a small percentage of customers served by LIURP were Customer Choice. The gas heating non-Choice jobs had greater savings than the Customer Choice customers, who did not save.

**Table IV-7**
**Change in Annual Usage**
**By Customer Choice**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Choice | 183 | 9,408 | 8,679 | 729 | 7.8% | $307 | 570 | 6.1% | 159 | 1.7% |
| Non-Choice | 3,617 | 10,040 | 9,370 | 671 | 6.7% | $218 | 493 | 4.9% | 178 | 1.8% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| Choice | 17 | 17,496 | 16,772 | 724 | 4.1% | $585 | 549 | 3.1% | 175 | 1.0% |
| Non-Choice | 367 | 15,974 | 14,985 | 988 | 6.2% | $780 | 837 | 5.2% | 151 | 0.9% |

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| Choice | 38 | 862 | 900 | -38 | -4.5% | $338 | -38 | -4.5% | 0 | 0.0% |
| Non-Choice | 629 | 907 | 887 | 20 | 2.2% | $540 | 20 | 2.2% | 0 | 0.0% |
| **Education Only (kWh)** | | | | | | | | | | |
| Choice | 4 | 7,975 | 6,321 | 1,654 | 20.7% | -- | 1,654 | 20.7% | 0 | 0.0% |
| Non-Choice | 199 | 10,990 | 10,426 | 564 | 5.1% | -- | 564 | 5.1% | 0 | 0.0% |

[1]Measure costs for gas heat jobs exclude the costs for the measures targeted at reducing electric usage.

Table IV-8 displays the change in usage by home ownership status. Baseload job owners and renters had the same percent savings. Electric heating renters had savings that averaged 5.5 percent, compared to savings of 6.4 percent for owners. Education only renters had savings that were somewhat higher than the owners.

**Table IV-8**
**Change in Annual Usage**
**By Home Ownership**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Owner | 3,416 | 10,064 | 9,386 | 678 | 6.7% | $227 | 498 | 4.9% | 180 | 1.8% |
| Renter | 384 | 9,529 | 8,895 | 634 | 6.7% | $183 | 487 | 5.1% | 147 | 1.5% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| Owner | 219 | 17,643 | 16,510 | 1,133 | 6.4% | $1,099 | 958 | 5.4% | 175 | 1.0% |
| Renter | 165 | 13,914 | 13,146 | 769 | 5.5% | $337 | 647 | 4.6% | 122 | 0.9% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| Owner | 445 | 929 | 914 | 15 | 1.6% | $622 | 15 | 1.6% | 0 | 0.0% |
| Renter | 222 | 855 | 836 | 19 | 2.2% | $343 | 19 | 2.2% | 0 | 0.0% |
| **Education Only (kWh)** | | | | | | | | | | |
| Owner | 163 | 11,000 | 10,463 | 536 | 4.9% | -- | 536 | 4.9% | 0 | 0.0% |
| Renter | 40 | 10,649 | 9,862 | 787 | 7.4% | -- | 787 | 7.4% | 0 | 0.0% |

[1]Measure costs for gas heat jobs exclude the costs for the measures targeted at reducing electric usage.

Table IV-9 displays energy savings by whether the customer used supplemental heat. Average savings for electric baseload customers with supplemental heat were 8.0 percent,

compared to 5.9 percent for baseload jobs without supplemental heat. Electric heating jobs with supplemental heat saved 7.0 percent, compared to savings of 5.5 percent for jobs with no supplemental heat. Electric savings for gas heating jobs with supplemental heat were higher than electric savings for those without supplemental heating.

**Table IV-9**
**Change in Annual Usage**
**By Supplemental Heat**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Supplemental Heat | 1,356 | 11,508 | 10,592 | 916 | 8.0% | $233 | 739 | 6.4% | 177 | 1.5% |
| No Supp Heat | 2,444 | 9,179 | 8,640 | 539 | 5.9% | $217 | 363 | 3.9% | 176 | 1.9% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| Supplemental Heat | 133 | 17,926 | 16,680 | 1,246 | 7.0% | $990 | 1,087 | 6.1% | 159 | 0.9% |
| No Supp Heat | 251 | 15,042 | 14,208 | 834 | 5.5% | $656 | 685 | 4.6% | 149 | 1.0% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| Supplemental Heat | 149 | 973 | 967 | 6 | 0.7% | $593 | 6 | 0.7% | 0 | 0.0% |
| No Supp Heat | 518 | 885 | 865 | 19 | 2.2% | $510 | 19 | 2.2% | 0 | 0.0% |
| **Gas Heat[2] (kWh)** | | | | | | | | | | |
| Supplemental Heat | 144 | 10,855 | 10,019 | 836 | 7.7% | $607 | 644 | 5.9% | 192 | 1.8% |
| No Supp Heat | 492 | 7,662 | 7,169 | 494 | 6.4% | $498 | 311 | 4.1% | 183 | 2.4% |
| **Education Only (kWh)** | | | | | | | | | | |
| Supplemental Heat | 34 | 12,641 | 12,706 | -65 | -0.5% | -- | -65 | -0.5% | 0 | 0.0% |
| No Supp Heat | 169 | 10,586 | 9,870 | 717 | 6.8% | -- | 717 | 6.8% | 0 | 0.0% |
| **Education Only (ccf)** | | | | | | | | | | |
| Supplemental Heat | 2 | 1,043 | 1,083 | -40 | -3.8% | -- | -40 | -3.8% | 0 | 0.0% |
| No Supp Heat | 11 | 676 | 673 | 3 | 0.5% | -- | 3 | 0.5% | 0 | 0.0% |

[1]Measure costs for gas heat jobs exclude the costs for the measures targeted at reducing electric usage.
[2]Measure costs for gas heat (kWh) jobs exclude the costs for the measures targeted at reducing gas usage.

## *C. Measure Specific Savings*

This section attributes savings to specific measures that were provided through LIURP. We begin by analyzing savings by whether major measures are provided. Major measures are defined as the following.

- Baseload Jobs: Major measures include refrigerator replacement, freezer replacement, air conditioner replacement, and water heater replacement.

- Electric Heat Jobs: Major measures include refrigerator replacement, freezer replacement, air conditioner replacement, water heater replacement, heat pumps, electric baseboards, insulation, and blower door guided air sealing.

- Gas Heat Jobs – Gas Measures: Major measures include furnace replacement, water heater replacement, insulation, and blower door guided air sealing.

- Gas Heat Jobs – Electric Measures: Major measures include refrigerator replacement, freezer replacement, and air conditioner replacement.

Homes that did not receive one of the major measures listed above were considered to have basic measures.

Table IV-10 displays energy savings by whether the job received one or more major measures.

- Baseload Jobs: Savings for baseload jobs with major measures averaged 11.2 percent, as compared to savings that averaged 5.3 percent for baseload jobs that did not receive major measures.

- Electric Heat Jobs: Savings for jobs that received major measures averaged 9.0 percent, compared to average savings of 4.4 percent for jobs that did not receive major measures. Spending on jobs that received major measures averaged $2,038, compared to average spending of $175 for jobs that did not receive major measures.

- Gas Heat Jobs – Gas Measures: Gas savings for jobs with major measures averaged 5.8 percent, compared to savings of 1.0 percent for jobs that did not receive major measures. Costs for gas jobs with major measures averaged $2,436 compared to average costs of $176 for jobs that did not receive major measures.

- Gas Heat Jobs – Electric Measures: Electric savings for gas heat jobs that received major electric measures were 13.0 percent compared to 5.3 percent for those who received only basic electric measures.

**Table IV-10**
**Change in Annual Usage**
**By Level of Service**

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Basic | 2,840 | 10,065 | 9,535 | 529 | 5.3% | $31 | 358 | 3.6% | 171 | 1.7% |
| Major | 960 | 9,848 | 8,748 | 1,100 | 11.2% | $790 | 907 | 9.2% | 193 | 2.0% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| Basic | 261 | 15,042 | 14,377 | 664 | 4.4% | $175 | 524 | 3.5% | 140 | 0.9% |
| Major | 123 | 18,162 | 16,522 | 1,640 | 9.0% | $2,038 | 1462 | 8.0% | 178 | 1.0% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| Basic | 563 | 901 | 891 | 9 | 1.0% | $176 | 9 | 1.0% | 0 | 0.0% |
| Major | 104 | 926 | 872 | 54 | 5.8% | $2,436 | 54 | 5.8% | 0 | 0.0% |
| **Gas Heat[2] (kWh)** | | | | | | | | | | |
| Basic | 519 | 8,249 | 7,813 | 436 | 5.3% | $5 | 255 | 3.1% | 181 | 2.2% |
| Major | 117 | 8,991 | 7,818 | 1,173 | 13.0% | $724 | 970 | 10.8% | 203 | 2.3% |

[1]Measure costs for gas heat (ccf) jobs exclude the costs for the measures targeted at reducing electric usage.
[2]Measure costs for gas heat (kWh) jobs exclude the costs for the measures targeted at reducing gas usage.

Table IV-11A displays savings for electric heat jobs by the number of major measures installed. The table shows that customers who received more major measures had higher pre-treatment usage and higher savings.

**Table IV-11A**
**Change in Annual Electric Heat Usage (kWh)**
**By Number of Major Measures**

| Major Measures | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Annual Savings | % Savings | Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| 0 | 261 | 15,042 | 14,377 | 664 | 4.4% | $175 | 524 | 3.5% | 140 | 0.9% |
| 1 | 77 | 17,622 | 16,177 | 1,445 | 8.2% | $1,473 | 1,288 | 7.3% | 157 | 0.9% |
| 2 or More | 46 | 19,065 | 17,100 | 1,966 | 10.3% | $2,985 | 1,753 | 9.2% | 213 | 1.1% |

Table IV-11B displays savings for gas heat jobs by the number of major measures installed. The table shows that customers who received two or more major measures did not have

higher pre-treatment usage than the other groups, but had savings averaging 9.0 percent, compared to much lower savings for the other groups.

**Table IV-11B**
**Change in Annual Gas Heat Usage (ccf)**
**By Number of Major Measures**

| Major Measures | # | Pre-Use | Post-Use | Savings | % Savings | Measure Cost[1] |
|---|---|---|---|---|---|---|
| 0 | 563 | 901 | 891 | 9 | 1.0% | $176 |
| 1 | 64 | 966 | 927 | 39 | 4.1% | $2,127 |
| 2 or More | 40 | 861 | 783 | 78 | 9.0% | $2,929 |

[1]Measure costs for gas heat (ccf) jobs exclude the costs for the measures targeted at reducing electric usage.

Table IV-12 displays energy savings by whether or not participants received particular measures. Some of the key findings were as follows.

- *Air Conditioner*: Baseload customers who received an air conditioner had higher savings (10.9%) than those who did not (6.5%). Gas heating customers who received an air conditioner also had higher electric savings (12.2%) than those who did not (6.7%).

- *Refrigerator*: Baseload participants who received a refrigerator had higher savings (13.2%) than those who did not (5.4%). Gas heat customers who received a refrigerator had higher electric savings (15.5%) than those who did not (5.5%).

- *Blower Door Guided Air Sealing:* Gas heating customers who received blower door guided air sealing had savings of 7.4 percent compared to savings of 1.4 percent for those who did not. Electric heating customers who received blower door guided air sealing had higher savings (12.9%) than those who did not (5.3%).

- *Insulation:* Gas heating customers who received insulation had savings of 9.8 percent compared to savings of 1.3 percent for those who did not receive insulation. Electric heating customers who received insulation had higher savings (10.1%) than those who did not (5.6%).

- *Furnace:* Gas heating customers who received a new furnace had savings of 5.3 percent compared to 1.7 percent for those who did not.

**Table IV-12**
**Change in Annual Usage**
**By Major Measures**

| | # | Total Savings | LIURP Savings | Act 129 Savings |
|---|---|---|---|---|

| | | Usage | | Savings | % Savings | Total Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Pre | Post | | | | | | | |
| **Electric Baseload (kWh)** | | | | | | | | | | |
| Air Conditioner | 194 | 10,132 | 9,029 | 1,103 | 10.9% | $937 | 908 | 9.0% | 195 | 1.9% |
| No Air Conditioner | 3,606 | 10,003 | 9,353 | 650 | 6.5% | $184 | 474 | 4.7% | 176 | 1.8% |
| Refrigerator | 679 | 9,676 | 8,402 | 1,274 | 13.2% | $932 | 1077 | 11.1% | 197 | 2.0% |
| No Refrigerator | 3,121 | 10,083 | 9,540 | 543 | 5.4% | $68 | 371 | 3.7% | 172 | 1.7% |
| Air Conditioner/ Refrigerator | 69 | 10,046 | 8,092 | 1,954 | 19.4% | $1,443 | 1722 | 17.1% | 232 | 2.3% |
| Air Conditioner/ No Refrigerator | 125 | 10,180 | 9,547 | 633 | 6.2% | $657 | 459 | 4.5% | 174 | 1.7% |
| No Air Conditioner/ Refrigerator | 610 | 9,634 | 8,437 | 1,197 | 12.4% | $875 | 1004 | 10.4% | 193 | 2.0% |
| No Air Conditioner/ No Refrigerator | 2,996 | 10,079 | 9,539 | 539 | 5.3% | $44 | 367 | 3.6% | 172 | 1.7% |
| Electric Water Heater Timer | 8 | 14,373 | 14,771 | -397 | -2.8% | $666 | -463 | -3.2% | 66 | 0.5% |
| No Electric Water Heater Timer | 3,792 | 10,001 | 9,325 | 676 | 6.8% | $222 | 499 | 5.0% | 177 | 1.8% |
| **Electric Heat (kWh)** | | | | | | | | | | |
| Refrigerator | 63 | 19,491 | 18,520 | 971 | 5.0% | $1,644 | 786 | 4.0% | 185 | 0.9% |
| No Refrigerator | 321 | 15,364 | 14,386 | 978 | 6.4% | $600 | 832 | 5.4% | 146 | 0.9% |
| Blower Door Test/Air Sealing | 39 | 16,931 | 14,740 | 2,191 | 12.9% | $2,729 | 2,009 | 11.9% | 182 | 1.1% |
| No Blower Door Test or No Air Sealing | 345 | 15,940 | 15,101 | 839 | 5.3% | $550 | 690 | 4.3% | 149 | 0.9% |
| Electric Water Heater Timer | 7 | 18,203 | 17,684 | 519 | 2.9% | $3,007 | 369 | 2.0% | 150 | 0.8% |
| No Electric Water Heater Timer | 377 | 16,001 | 15,016 | 985 | 6.2% | $730 | 833 | 5.2% | 152 | 1.0% |
| Insulation | 38 | 16,686 | 14,997 | 1,689 | 10.1% | $2,915 | 1,493 | 8.9% | 196 | 1.2% |
| No Insulation | 346 | 15,970 | 15,072 | 899 | 5.6% | $536 | 752 | 4.7% | 147 | 0.9% |
| **Gas Heat[1] (ccf)** | | | | | | | | | | |
| Blower Door Test and Air Sealing | 54 | 860 | 797 | 63 | 7.4% | $1,902 | 63 | 7.4% | 0 | 0.0% |
| No Blower Door Test or No Air Sealing | 613 | 908 | 896 | 12 | 1.4% | $408 | 12 | 1.4% | 0 | 0.0% |
| Insulation | 42 | 793 | 715 | 78 | 9.8% | $1,897 | 78 | 9.8% | 0 | 0.0% |
| No Insulation | 625 | 912 | 900 | 12 | 1.3% | $437 | 12 | 1.3% | 0 | 0.0% |
| Furnace | 15 | 1,093 | 1,035 | 58 | 5.3% | $4,144 | 58 | 5.3% | 0 | 0.0% |
| No Furnace | 652 | 900 | 885 | 15 | 1.7% | $446 | 15 | 1.7% | 0 | 0.0% |

| | # | Total Savings | | | | | LIURP Savings | | Act 129 Savings | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Usage | | Savings | % Savings | Total Measure Cost | Annual Savings | % Savings | Annual Savings | % Savings |
| | | Pre | Post | | | | | | | |
| **Gas Heat[2] (kWh)** | | | | | | | | | | |
| Refrigerator | 83 | 8,646 | 7,310 | 1,336 | 15.5% | $884 | 1127 | 13.0% | 209 | 2.4% |
| No Refrigerator | 553 | 8,346 | 7,890 | 456 | 5.5% | $25 | 275 | 3.3% | 181 | 2.2% |
| Air Conditioner | 15 | 8,220 | 7,217 | 1,003 | 12.2% | $670 | 772 | 9.4% | 231 | 2.8% |
| No Air Conditioner | 621 | 8,389 | 7,828 | 561 | 6.7% | $124 | 377 | 4.5% | 184 | 2.2% |

[1]Measure costs for gas heat (ccf) jobs exclude the costs for the measures targeted at reducing electric usage.
[2]Measure costs for gas heat (kWh) jobs exclude the costs for the measures targeted at reducing gas usage.

Table IV-13 displays measure-specific savings estimates. These savings were calculated by running a regression model that predicted savings based on the measures that were provided.

In 2018, savings averaged 563 kWh for customers who only received LEDs and no other measures. These customers received 11.9 bulbs on average. The resulting estimate of average LED savings was 47 kWh per LED. The costs for the LEDs were paid by the Act 129 Program. We estimated cost and cost-effectiveness using the audit/education costs. When using the entire education and audit cost, the cost per kWh saved over the lifetime of the bulbs was $0.14.

A regression-based estimate of LED savings was also developed, as there was variation in the number of LEDs provided to Program participants. The regression-based estimate was 15 kWh per bulb. This estimate is lower than the other estimate because it does not include the savings that accrue from education. We don't show costs for this measure because the LEDs are provided through Act 129.

The table also shows that refrigerators saved an average of 726 kWh per home. (Only a few refrigerators were funded through Act 129. The vast majority were funded through LIURP.) Insulation and blower door guided air sealing provided in electric heat homes was highly effective, saving an average of 1,239 kWh.

**Table IV-13**
**Measure Savings Estimates**

| | Savings | Cost/Home | $/Unit Saved | Measure Life | $/Unit Saved Over Lifetime |
|---|---|---|---|---|---|
| **Electric Baseload (kWh)** | | | | | |
| LED Only[1] | 563 (±127) | $335[2] | $0.60 | 5 | $0.14 |
| LED | 15 (±9) | -- | -- | 5 | -- |
| Refrigerator | 726 (±181) | $801 | $1.10 | 12 | $0.12 |
| **Gas Heat (ccf)** | | | | | |
| Gas Furnace | 51 (±66) | $3,047 | $59.28 | 15 | $5.71 |

| | Savings | Cost/Home | $/Unit Saved | Measure Life | $/Unit Saved Over Lifetime |
|---|---|---|---|---|---|
| Boiler | 159 (±79) | $3,774 | $23.69 | 15 | $2.28 |
| Blower Door Air Sealing and Insulation | 61 (±50) | $1,754 | $28.61 | 15 | $2.76 |
| **Electric Heat (kWh)** | | | | | |
| Blower Door Air Sealing and Insulation | 1,239 (±1,193) | $1,754 | $1.42 | 15 | $0.14 |

[1]The average number of LEDs provided to these customers was 11.9, for an average savings of 47 kWh per LED.
[2]This is the cost for the audit and education of customers who only received LEDs. The cost for the LEDs is paid for by the Act 129 Program.

## *D. Cost Effectiveness*

This section examines the cost-effectiveness of the Program services delivered by job type. Audit and administrative costs were assigned to electric and gas costs in the same proportion as the measure costs. Table IV-14 shows the measure costs, audit/education costs, and administrative costs by job type and electric and gas reduction. Cost per unit saved was calculated as the average total cost divided by the unit savings. The cost per kWh saved was $0.88 for baseload jobs, $1.16 for electric heat jobs, and $0.38 for gas heat jobs. The cost per ccf saved was $51.78 for gas heat jobs.

**Table IV-14**
**Cost per Unit Saved**

| | # | Average Savings | Average Measure Cost | Average Audit/ Education Cost | Average Admin Cost | Average Total Cost | Cost Per Unit Saved |
|---|---|---|---|---|---|---|---|
| **Electric Baseload** | | | | | | | |
| Electric (kWh) | 3,800 | 674 | $217 | $335 | $41 | $593 | $0.88 |
| Electric Heat | | | | | | | |
| Electric (kWh) | 384 | 977 | $757 | $336 | $41 | $1,134 | $1.16 |
| Gas Heat | | | | | | | |
| Electric (kWh) | 636 | 571 | $137 | $69 | $8 | $215 | $0.38 |
| Gas (ccf) | 667 | 16 | $529 | $267 | $33 | $828 | $51.78 |

The previous analysis displayed the total job cost divided by the total savings as an indicator of how cost-effective the services were. Table IV-15 displays the discounted present value of the job savings under 5-year, 10-year and 15-year measure life assumptions. The costs per unit saved should be compared to retail rates to evaluate the cost-effectiveness of the Program at different measure lives.

The most reasonable assumption for electric baseload reduction is a five to seven-year measure life. The current cost per kWh of electricity is approximately $.13 per kWh. This table shows that the electric baseload investments were cost-effective at current retail rates if the measures have a life of at least ten years.

Gas heat savings have a 15-year measure life. Under the 15-year measure life assumption, the cost per ccf saved is $4.99, which is not cost-effective with current gas prices. The cost to save a ccf of gas would need to be lower than the price for a ccf for the program to be cost-effective. Since the current cost per ccf of gas is approximately $.86 per ccf, the cost of services would need to be significantly lower or savings would need to be significantly greater for the program to be cost-effective. To increase cost-effectiveness, the program would need to reduce spending on gas heating measures and/or increase the savings that were obtained from the measures that were installed.

**Table IV-15**
**Cost Per Unit Saved**
**By Measure Life Assumption**

| | # | Average Savings | Average Total Cost | Cost Per Unit Saved | 5-Year Measure Life | 10-Year Measure Life | 15-Year Measure Life |
|---|---|---|---|---|---|---|---|
| **Electric Baseload** | | | | | | | |
| Electric (kWh) | 3,800 | 674 | $593 | $0.88 | $0.20 | $0.11 | $0.08 |
| Electric Heat | | | | | | | |
| Electric (kWh) | 384 | 977 | $1,134 | $1.16 | $0.27 | $0.15 | $0.11 |
| Gas Heat | | | | | | | |
| Electric (kWh) | 636 | 571 | $215 | $0.38 | $0.09 | $0.05 | $0.04 |
| Gas (ccf) | 667 | 16 | $828 | $51.78 | $11.96 | $6.71 | $4.99 |

# V. Bill and Payment Impacts

This section of the report examines the bill and payment impacts for the 2018 LIURP participants. We review the methodology used in the analysis, and then analyze the billing and payment impacts.

## *A. Methodology*

Billing and payment transactions data were used to analyze the pre- and post-treatment billing and payment statistics. Accounts were required to have between 300 and 390 days of transactions data in both the pre and post periods to be included in the analysis.

Table V-1 displays the data attrition statistics. Overall, sufficient data were available for 63 percent of Program participants. A lower percentage were available for the heating participants as many of these customers did not have sufficient data prior to the LIURP treatments.

**Table V-1**
**Payment Impact Data Attrition**

| | Electric Baseload | Electric Heating | Gas Heating | Education Only | All Jobs |
|---|---|---|---|---|---|
| Original Population | 4,780 | 694 | 1,357 | 230 | 7,061 |
| Not Enough Pre-Treatment Days | 1,031 | 335 | 706 | 18 | 2,090 |
| Not Enough Post-Treatment Days | 189 | 37 | 54 | 15 | 295 |
| Data Outliers | 145 | 44 | 38 | 22 | 249 |
| Final Sample | 3,415 | 278 | 559 | 175 | 4,427 |
| % Included in Analysis | 71% | 40% | 41% | 76% | 63% |

## *B. Billing and Payment Impacts*

Table V-2 displays the billing revenue data obtained from the usage file. These data show the changes in charges that were associated with electric and gas usage only. For example, charges related to service agreements or late payment charges would not be included in this table.

Table V-2 shows that electric revenue declined by an average of $12 for baseload jobs and declined by $31 for electric heat jobs. Gas revenue increased by $106 for gas heat jobs due to the colder winter.

## Table V-2
## Billing Revenue

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Electric Revenue | 3,415 | $754 | $742 | -$12* | -1.6% |
| Gas Revenue | | $4[1] | $5[1] | $1*** | 31.4% |
| Total Revenue | | $758 | $747 | -$11 | -1.5% |
| **Electric Heat** | | | | | |
| Electric Revenue | 278 | $1,162 | $1,131 | -$31 | -2.7% |
| Gas Revenue | | $59 | $75 | $16*** | 27.2% |
| Total Revenue | | $1,222 | $1,207 | -$15 | -1.2% |
| **Gas Heat** | | | | | |
| Electric Revenue | 559 | $723 | $761 | $38*** | 5.2% |
| Gas Revenue | | $567 | $673 | $106*** | 18.6% |
| Total Revenue | | $1,290 | $1,434 | $144*** | 11.1% |
| **Education Only** | | | | | |
| Electric Revenue | 175 | $815 | $756 | -$59* | -7.3% |
| Gas Revenue | | $28 | $35 | $6* | 22.7% |
| Total Revenue | | $844 | $791 | -$53 | -6.3% |
| **All Job Types** | | | | | |
| Electric Revenue | 4,427 | $778 | $769 | -$9 | -1.1% |
| Gas Revenue | | $79 | $95 | $15*** | 19.6% |
| Total Revenue | | $858 | $864 | $7 | 0.8% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.
[1]Only 60 Electric Baseload accounts have gas usage data.

Table V-3A displays the change in customer electric and gas bills and total charges, between the pre- and the post-treatment periods, based on analysis of the transactions file. Total charges declined by 10.2 percent for electric baseload jobs, declined by 4.5 percent for electric heat jobs, and increased by 7.0 percent for gas heat jobs.

## Table V-3A
## Bills and Total Charges

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Electric and Gas Charges | 3,415 | $885 | $794 | -$91*** | -10.3% |
| Other Charges | | $14 | $14 | < $1 | 0.6% |
| Total Charges | | $899 | $808 | -$91*** | -10.2% |
| **Electric Heat** | | | | | |
| Electric and Gas Charges | 278 | $1,314 | $1,251 | -$63** | -4.8% |
| Other Charges | | $13 | $16 | $3 | 22.6% |
| Total Charges | | $1,326 | $1,267 | -$60** | -4.5% |
| **Gas Heat** | | | | | |
| Electric and Gas Charges | 559 | $1,427 | $1,524 | $97*** | 6.8% |
| Other Charges | | $15 | $19 | $4 | 25.8% |
| Total Charges | | $1,442 | $1,543 | $101*** | 7.0% |
| **Education Only** | | | | | |
| Electric and Gas Charges | 175 | $919 | $799 | -$120*** | -13.1% |
| Other Charges | | $8 | $10 | $2 | 26.6% |
| Total Charges | | $927 | $809 | -$118*** | -12.7% |
| **All Job Types** | | | | | |
| Electric and Gas Charges | 4,427 | $982 | $915 | -$67*** | -6.8% |
| Other Charges | | $14 | $14 | $1 | 6.0% |
| Total Charges | | $996 | $929 | -$66*** | -6.6% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Table V-3B displays bills and total charges for customers who had CAP rates for the full pre-period and for the full post-treatment period. The table shows that across all job types, total charges declined by 11.2 percent for this population, compared to the 6.6 percent decline overall, as shown in the previous table.

**Table V-3B**
**Bills and Total Charges**
**Customers with CAP Rates In All Pre and Post Periods**

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Electric and Gas Charges | 2,653 | $841 | $714 | -$128*** | -15.2% |
| Other Charges | | $13 | $12 | -$1 | -4.7% |
| Total Charges | | $854 | $726 | -$128*** | -15.0% |
| **Electric Heat** | | | | | |
| Electric and Gas Charges | 218 | $1,241 | $1,125 | -$116*** | -9.3% |
| Other Charges | | $13 | $14 | <$1 | 2.4% |
| Total Charges | | $1,254 | $1,138 | -$116*** | -9.2% |
| **Gas Heat** | | | | | |
| Electric and Gas Charges | 415 | $1,367 | $1,420 | $52*** | 3.8% |
| Other Charges | | $15 | $17 | $2 | 15.6% |
| Total Charges | | $1,382 | $1,437 | $55*** | 4.0% |
| **Education Only** | | | | | |
| Electric and Gas Charges | 145 | $899 | $759 | -$140*** | -15.6% |
| Other Charges | | $7 | $8 | $1 | 21.5% |
| Total Charges | | $906 | $767 | -$139*** | -15.3% |
| **All Job Types** | | | | | |
| Electric and Gas Charges | 3,431 | $933 | $827 | -$106*** | -11.3% |
| Other Charges | | $13 | $13 | -<$1 | -0.9% |
| Total Charges | | $946 | $840 | -$106*** | -11.2% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Differences in results between the revenue analysis from the billing data (shown in Table V-2) and the billing analysis from the transactions data (shown in Table V-3A) are due to the fact that the transactions data include all charges, while the revenue data only include charges for electric and gas usage.

Table V-4 displays payment statistics for the 2018 LIURP participants. Across all job types, credits increased by about $16 from the pre-treatment year to the post-treatment year.

# Table V-4
# Annual Payments
# Pre and Post-LIURP Treatment

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| # Payments | 3,415 | 8.7 | 8.8 | 0.2*** | 2.0% |
| Cash Payments | | $799 | $801 | $2 | 0.2% |
| Assistance Payments | | $34 | $31 | -$3 | -9.2% |
| Other Credits | | $19 | $12 | -$7*** | -38.3% |
| Total Credits | | $852 | $844 | -$9 | -1.0% |
| **Electric Heat** | | | | | |
| # Payments | 278 | 8.4 | 8.4 | 0.1 | 0.9% |
| Cash Payments | | $1,094 | $1,117 | $23 | 2.1% |
| Assistance Payments | | $146 | $161 | $16 | 10.8% |
| Other Credits | | $24 | $24 | <$1 | 0.7% |
| Total Credits | | $1,264 | $1,302 | $38 | 3.0% |
| **Gas Heat** | | | | | |
| # Payments | 559 | 8.9 | 9.3 | 0.3*** | 3.8% |
| Cash Payments | | $1,222 | $1,374 | $152*** | 12.5% |
| Assistance Payments | | $140 | $156 | $16* | 11.4% |
| Other Credits | | $18 | $16 | -$2 | -9.2% |
| Total Credits | | $1,380 | $1,546 | $166*** | 12.1% |
| **Education Only** | | | | | |
| # Payments | 175 | 9.1 | 9.2 | 0.1 | 1.5% |
| Cash Payments | | $795 | $769 | -$25 | -3.2% |
| Assistance Payments | | $51 | $48 | -$3 | -6.4% |
| Other Credits | | $17 | $12 | -$5** | -30.3% |
| Total Credits | | $863 | $829 | -$34 | -3.9% |
| **All Job Types** | | | | | |
| # Payments | 4,427 | 8.7 | 8.9 | 0.2*** | 2.1% |
| Cash Payments | | $871 | $892 | $21*** | 2.4% |
| Assistance Payments | | $55 | $56 | <$1 | 0.8% |
| Other Credits | | $19 | $13 | -$6*** | -31.6% |
| Total Credits | | $945 | $961 | $16** | 1.6% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Table V-5 displays payments for CAP and Non-CAP customers in the year prior to and after receipt of LIURP. Both groups had small changes in these indicators.

**Table V-5**
**Payments for CAP Customers**
**Pre and Post-LIURP Treatment**

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **CAP Customers – All Job Types** | | | | | |
| # Payments | 3,894 | 8.7 | 8.9 | 0.2*** | 2.4% |
| Cash Payments | | $812 | $834 | $23*** | 2.8% |
| Assistance Payments | | $61 | $60 | -$1 | -1.9% |
| Other Credits | | $19 | $13 | -$6*** | -32.6% |
| Total Credits | | $892 | $907 | $15** | 1.7% |
| **Non-CAP Customers – All Job Types** | | | | | |
| # Payments | 533 | 8.9 | 8.9 | <0.1 | 0.3% |
| Cash Payments | | $1,302 | $1,310 | $8 | 0.6% |
| Assistance Payments | | $17 | $29 | $12** | 71.5% |
| Other Credits | | $17 | $13 | -$4* | -23.1% |
| Total Credits | | $1,335 | $1,352 | $17 | 1.2% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Table V-6 displays a more detailed analysis of the types of assistance payments received by the 2018 LIURP participants in the pre- and the post-treatment periods. The table shows that, overall, the assistance payments remained approximately the same from the pre-treatment year to the post-treatment year.

**Table V-6**
**Assistance Payments**
**Pre and Post-LIURP Treatment**

| | # | Pre | Post | Change | % Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| LIHEAP Cash | 3,415 | $25 | $21 | -$3** | -13.2% |
| LIHEAP Crisis | | $10 | $10 | <$1 | 1.7% |
| MEAF | | <$1 | <$1 | -<$1 | -51.9% |
| Total Assistance | | $34 | $31 | -$3 | -9.2% |
| **Electric Heat** | | | | | |
| LIHEAP Cash | 278 | $129 | $135 | $6 | 4.7% |
| LIHEAP Crisis | | $16 | $26 | $10 | 60.7% |
| MEAF | | $1 | $1 | -<$1 | -6.0% |

| | # | Pre | Post | Change | % Change |
|---|---|---|---|---|---|
| Total Assistance | | $146 | $161 | $16 | 10.8% |
| **Gas Heat** | | | | | |
| LIHEAP Cash | 559 | $123 | $127 | $4 | 3.6% |
| LIHEAP Crisis | | $15 | $29 | $14** | 90.1% |
| MEAF | | $2 | <$1 | -$2 | -<99.9% |
| Total Assistance | | $140 | $156 | $16* | 11.4% |
| **Education Only** | | | | | |
| LIHEAP Cash | 175 | $43 | $38 | -$5 | -12.5% |
| LIHEAP Crisis | | $8 | $10 | $2 | 28.1% |
| MEAF | | $0 | $0 | $0 | -- |
| Total Assistance | | $51 | $48 | -$3 | -6.4% |
| **All Job Types** | | | | | |
| LIHEAP Cash | 4,427 | $44 | $42 | -$2 | -4.0% |
| LIHEAP Crisis | | $11 | $13 | $3* | 23.5% |
| MEAF | | <$1 | <$1 | -<$1 | -74.0% |
| Total Assistance | | $55 | $56 | <$1 | 0.8% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Table V-7 displays changes in cash and total bill coverage[12] rates between the pre- and the post-treatment periods. These rates increased by approximately 9.5 percentage points following LIURP services.

**Table V-7**
**Coverage Rates**
**Pre and Post-LIURP Treatment**

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Cash Coverage Rate | 3,415 | 90.9% | 101.8% | 10.9%*** | 12.0% |
| Total Coverage Rate | | 98.5% | 109.1% | 10.6%*** | 10.7% |
| **Electric Heat** | | | | | |
| Cash Coverage Rate | 278 | 82.1% | 83.5% | 1.5% | 1.8% |
| Total Coverage Rate | | 103.0% | 105.1% | 2.1% | 2.0% |
| **Gas Heat** | | | | | |
| Cash Coverage Rate | 559 | 82.7% | 87.1% | 4.5%*** | 5.4% |
| Total Coverage Rate | | 96.7% | 101.2% | 4.4%*** | 4.6% |

[12] The cash coverage rate is the amount of cash payments made divided by the bill. The total coverage rate is the total of all customer payments, customer assistance, and other credits divided by the bill.

| | # | Pre | Post | Change | Percent Change |
|---|---|---|---|---|---|
| **Education Only** | | | | | |
| Cash Coverage Rate | 175 | 87.5% | 102.0% | 14.5%*** | 16.5% |
| Total Coverage Rate | | 95.6% | 109.3% | 13.7%*** | 14.3% |
| **All Job Types** | | | | | |
| Cash Coverage Rate | 4,427 | 89.2% | 98.8% | 9.6%*** | 10.8% |
| Total Coverage Rate | | 98.5% | 107.8% | 9.4%*** | 9.5% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

Table V-8 displays changes in customer balances. Overall, balances decreased slightly during the post-treatment period.

**Table V-8**
**Change in Customer Balance**

| | # | Start | End | Change | Percent Change |
|---|---|---|---|---|---|
| **Electric Baseload** | | | | | |
| Pre Balance | 3,415 | $80 | $130 | $50*** | 62.7% |
| Post Balance | | $124 | $82 | -$42*** | -33.7% |
| **Electric Heat** | | | | | |
| Pre Balance | 278 | $51 | $143 | $92*** | 181.5% |
| Post Balance | | $130 | $86 | -$44* | -33.7% |
| **Gas Heat** | | | | | |
| Pre Balance | 559 | $73 | $149 | $75*** | 102.8% |
| Post Balance | | $151 | $153 | $2 | 1.6% |
| **Education Only** | | | | | |
| Pre Balance | 175 | $55 | $127 | $72*** | 131.1% |
| Post Balance | | $116 | $90 | -$26 | -22.3% |
| **All Job Types** | | | | | |
| Pre Balance | 4,427 | $76 | $133 | $57*** | 74.5% |
| Post Balance | | $127 | $92 | -$36*** | -28.0% |

***Denotes significance at the 99 percent level. **Denotes significance at the 95 percent level. *Denotes significance at the 90 percent level.

# VI. Summary of Findings and Recommendations

PECO's LIURP delivered usage reduction services and energy education to over seven thousand customers in 2018, many of whom had vulnerable household members. Savings from electric baseload jobs and electric heating jobs increased from 2017 but declined as compared to the historical average. Savings from gas heating jobs declined as compared to 2017 and declined as compared to the historical average.

We have the following recommendations to improve energy savings.

- *Outreach:* CMC is not able to reach 62 percent of targeted customers because these customers make no response to contact attempts. CMC's current procedure is to make at least three phone calls and send a follow-up letter.[13] They should increase the number of calls to potential customers and pilot additional methods including outreach to targeted neighbors when they are in the field and leaving door hangers when they are in the neighborhood where additional customers are targeted. PECO is working with CMC to expand and improve their outreach and is also considering rebranding LIURP to a name that would be better recognized by customers.

- *Previously Treated Customers:* PECO allows customers who were treated more than two years ago to be re-treated by LIURP. Customers in the same home who were treated within the past five years are unlikely to have significant energy-saving opportunities. PECO should consider expanding the length of time before CMC can return to the home to deliver LIURP again.

- *Audits:* In May and June 2019, APPRISE staff conducted eleven days of observation of CMC audits and observed 49 audits conducted by the eight CMC staff members who conduct PECO LIURP audits. Most of the auditors did an excellent job establishing a connection with the customer and conducted a general discussion of how energy was used in the home with a focus on occupants and appliances. However, there were several areas where the audit could be improved.

    - Program Description: Auditors did not explain LIURP or mention the Program by name.

    - Audit Comprehensiveness: At times the audits were not comprehensive because there was not enough time scheduled in the home.

    - Lighting: Auditors did not carefully assess the potential cost-effectiveness of LED replacements. They did not ask how many hours lights were used and sometimes replaced bulbs that the customer said were infrequently used or without asking about use at all. LEDs were installed in fixtures that were previously empty and in fixtures

[13] This is PECO's minimum standard for the number of contact attempts.

that had CFLs. Replaced bulbs were left with the customer when LEDs were installed.

- Action Plan: The auditor did not develop a written action plan that summarized the actions discussed with the greatest potential that the customer agreed to take.

- Materials Review: Most audits did not include a review of the education packet. Auditors sometimes handed the packet to the customer and sometimes just placed it on a table in the home without mentioning it. None of the auditors provided a review of all of the materials in the education packet.

We made the following recommendations based on the audit observation findings.

- Provide an LED at the beginning of the visit. The observers often noted that the customers became more accepting of the process after the auditor provided a free item, such as LEDs, aerators, or batteries for the smoke detector. One customer provided access to areas of the home that she previously said the auditor could not enter. Providing one free LED right at the beginning of the audit, and talking about the benefits of the LED may create more buy-in for the rest of the audit.

- Train CMC on CAP. The auditors frequently refer to CAP, so they should have a basic understanding of the revised Program. One auditor told a customer that CAP provided a discount that was based on income, which is not the current Program.

- Specify audit requirements for CMC. Several of the expected elements of the audit were included in half or fewer of the observations. We recommend that the audit should always include the following elements and PECO should ensure that CMC allocates enough time for each audit to include these elements. While some of these elements are included in CMC's statement of work (SOW), some are not explicitly included and we recommend that they are added. Below we note which elements are not specifically included in the SOW.

  - ✓ LIURP Explanation: Discussion of the Program's goals and benefits.

  - ✓ Partnership: Development of a partnership with the customer, including a discussion of the auditor's responsibility and the customer's responsibility. (Not included in SOW)

  - ✓ Energy Bills: Review of the PECO energy bills. (Not included in SOW)

  - ✓ Health and Safety: Discussion of applicable health and safety issues. (Not included in SOW)

  - ✓ Comfort: Discussion of comfort in the winter and summer. Even if the customer does not have the heating fuel supplied by PECO, discomfort in the winter can result in high electric space heating usage and bills. (Not included in SOW)

- ✓ Walkthrough: Encouraging all customers who are able to accompany the auditor on the walkthrough. Require auditors to inspect every room of the home unless the customer objects. (Not included in SOW)

- ✓ Lighting: Require CMC to ask about hours of use prior to replacing bulbs. Only one of the seven observed auditors did so for most of the bulbs that were replaced. Specify that only incandescent bulbs should be replaced with LEDs as opposed to CFLs and unused fixtures. (Not included in SOW)

- ✓ Refrigerator Metering: Auditors should be required to meter refrigerators and freezers that are considered for replacement. (Not included in SOW)

- o Use customer's energy bills to supplement recommendations. Not all auditors reviewed PECO energy bills with the customer during the audit, and some auditors only vaguely referenced the customer's usage. Showing the customer how their energy behavior is impacting their energy bills may encourage customers to follow through on any energy saving actions discussed during the audit.

- o Require the auditor to review the education materials. At a minimum, the auditor should review what is included in the folder and show the customer where to locate CMC contact information, referral information, and education tips.

- o Require an individualized written action plan for each customer. The auditor should summarize the actions that were identified during the walkthrough, discuss which ones have the potential for saving the most energy with the customer, discuss which ones the customer is willing to undertake, and obtain a customer commitment to take a set of actions. These actions should then be provided to the customer on a written document that the customer signs.

- o Lengthen the time between LIURP participation. Many of the customers had recently received a LIURP audit and there were few opportunities for saving energy that remained in the home.

- o Require CMC to track and report critical health and safety issues. One auditor identified a critical CO leak. PECO should track these issues to highlight potentially life-saving LIURP services in the LIURP evaluation.

- o Conduct periodic observations of LIURP services. PECO should periodically observe audits and installations to ensure that high-quality, comprehensive services are delivered.

- *Quality Control:* Pure Energy conducted quality control visits in 2016 through 2018. This role has transitioned to Performance System Development. PECO should make sure to review findings with CMC and have them report on how they have improved services in response to recommendations. Some of the important recommendations from the 2018 Pure Energy Visits were as follows.

- Number of Audits: Reduce the number of audits scheduled per day from three to a maximum of two.
- Audit Testing: Require auditors to test the hot water temperature.
- Thermal and Pressure Boundaries: Improve the assessment of these boundaries to identify and implement shell measures to have the greatest impact on energy usage.
- Documentation: Improve documentation of completed measures.

The 2019 PSD reviews also found several areas for improvement. The most common areas were as follows.

- Under-sized air conditioners.
- Missed air sealing opportunities and weather stripping that was missing caulk.
- Invoiced items not found.
- Inadequate education including lack of a visit introduction, not asking for questions at the end of the visit, and no assessment of satisfaction with the LEDs.

- *CMC Inspections*: CMC aims to inspect all comprehensive jobs and five percent of other jobs. The comprehensive inspections are expected to include blower door testing, zonal pressure diagnostics, combustion appliance zone testing, combustion testing on all appliances in the home, visual inspections for health and safety issues, and infrared cameras to look at moisture levels and if there were missed thermal opportunities, and also may include the use of gas sniffers and moisture meters. Inspections also include customer communication and education. Inspectors reported that these inspections take 30 to 60 minutes to complete, and that these tests are not always conducted. PECO should re-assess whether the time allocated for CMC inspections is adequate and consider utilizing a third-party for these reviews, especially given the trend toward more measure installations being done by CMC staff instead of subcontractors.

- *Measure Opportunities:* Installation of major measures declined in 2018 electric heating jobs and 2018 gas heating jobs. Electric heating jobs with a blower door test declined from 30 percent in 2016 to 24 percent in 2017, and further declined to 18 percent in 2018. Insulation rates for electric heating jobs have similarly declined, from 32 percent in 2016 to 18 percent in 2017 to 17 percent in 2018. In gas heating jobs, insulation declined from 19 percent in 2017 to 14 percent in 2018, and weatherization declined from 18 percent in 2017 to 11 percent in 2018. PECO should ensure that CMC is pursuing all cost-effective energy-saving opportunities on all job types.

- *Health and Safety Measures:* PECO has implemented a health and safety pilot. The percentage of homes receiving smoke detectors increased from 24 percent in 2017 to 35 percent in 2018. The percentage of homes receiving carbon monoxide detectors also

increased, from eight percent in 2017 to 32 percent in 2018. PECO implemented a health and safety pilot beginning in 2019. PECO should investigate whether a small amount spent on additional health and safety measures leads to additional cost-effective energy efficiency measure installations.

Pennsylvania Public Utility Commission
v.
PECO Energy Company – Gas Division

Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
Office of Consumer Advocate
OCA Set III

Response Date: 11/18/2020

OCA-III-7

Please provide, in an active Excel spreadsheet with all formulae intact, for program years 2018 to present inclusive, the following data regarding the Company's LIHEAP recipients (disaggregated by heating and non-heating customers if reasonably available):

a. The number of customers receiving a LIHEAP basic cash grant;
b. The dollars of LIHEAP basic cash grant received;
c. The average LIHEAP basic cash grant received;
d. The number of customers receiving a LIHEAP crisis grant;
e. The dollars of LIHEAP crisis grants received;
f. The average LIHEAP crisis grant received.

RESPONSE:

Please refer to Attachment OCA-III-7(a).

Responsible Witness: Kelly A. Colarelli

| Cash Grant | Season | Date Range | 7a Count | 7b Dollars | 7c Average |
|---|---|---|---|---|---|
| | 2018 | 10/1/17 - 9/30/18 | 21,821 | $3,932,016 | $180 |
| | 2019 | 10/1/18 - 9/30/19 | 13,000 | $3,352,426 | $258 |
| | 2020 | 10/1/19 - 9/30/20 | 14,564 | $3,709,858 | $255 |
| | 2021 | 10/1/20 - 9/30/21 | 1,067 | $308,922 | $290 |

| Crisis Grant | Season | Date Range | 7d Count | 7e Dollars | 7f Average |
|---|---|---|---|---|---|
| | 2018 | 10/1/17 - 9/30/18 | 2,684 | $1,018,294 | $379 |
| | 2019 | 10/1/18 - 9/30/19 | 5,221 | $2,041,628 | $391 |
| | 2020 | 10/1/19 - 9/30/20 | 5,121 | $2,121,287 | $414 |
| | 2021 | 10/1/20 - 9/30/21 | 163 | $79,468 | $488 |

## RESIDENTIAL UTILITY DEBT AND ARREARS - NOVEMBER DATA REPORTED ON DECEMBER 15, 2020

**Pennsylvania PUC Docket No. M-2020-3019244 (Note, excludes telecommunication and some small water systems that did not submit a consistent report)**

| | 2019 - Res. Terms | 2019 Res. Arrears | 2020 Res. Terms | 2020 Res. Arrears | % Increase - Arrears | % Increase - Terms |
|---|---|---|---|---|---|---|
| Citizens' Electric | 192 | $ 43,018 | 188 | $ 80,058 | 86% | -2% |
| UGI Gas | 61,036 | $ 25,476,546 | 66,267 | $ 39,093,450 | 53% | 9% |
| UGI Electric | 6,346 | $ 4,167,880 | 6,600 | $ 5,808,854 | 39% | 4% |
| Wellsboro Electric | 226 | $ 60,249 | 242 | $ 116,826 | 94% | 7% |
| Columbia | 56,733 | $ 11,488,055 | 58,972 | $ 21,572,456 | 88% | 4% |
| NFG | 18,156 | $ 6,547,949 | 20,370 | $ 11,386,894 | 74% | 12% |
| PWSA | 5,247 | $ 4,366,863 | 10,990 | $ 7,475,862 | 71% | 109% |
| Columbia Water | 481 | $ 29,516 | 563 | $ 83,004 | 181% | 17% |
| PPL | 100,756 | $ 80,877,023 | 121,898 | $ 145,752,568 | 80% | 21% |
| Aqua | 28,320 | $ 7,656,279 | 119,678 | $ 5,015,667 | -34% | 323% |
| Suez - Bethel | 69 | $ 7,317 | 109 | $ 17,178 | 135% | 58% |
| Pa American Water | 9,572 | $ 22,583,800 | 35,284 | $ 34,071,218 | 51% | 269% |
| PGW | 130,294 | $ 42,881,185 | 149,045 | $ 71,164,815 | 66% | 14% |
| MetEd | 20,038 | $ 33,001,595 | 13,308 | $ 51,851,652 | 57% | -34% |
| Penelec | 20,036 | $ 36,431,465 | 11,478 | $ 57,705,830 | 58% | -43% |
| Penn Power | 5,312 | $ 9,373,060 | 3,217 | $ 14,080,971 | 50% | -39% |
| West Penn Power | 2,394 | $ 41,774,453 | 13,448 | $ 61,033,324 | 46% | 462% |
| PECO | 80,193 | $ 42,637,014 | 131,241 | $ 122,293,000 | 187% | 64% |
| Suez | 5,104 | $ 405,781 | 8,153 | $ 1,563,535 | 285% | 60% |
| Peoples Gas | 993 | $ 2,807,858 | 1,126 | $ 3,895,073 | 39% | 13% |
| Peoples Natural | 6,513 | $ 26,108,550 | 18,898 | $ 26,897,836 | 3% | 190% |
| Duquesne | 100,419 | $ 30,412,260 | 95,675 | $ 52,158,307 | 72% | -5% |
| York Water | 2,640 | $ 295,425 | 5,592 | $ 1,314,578 | 345% | 112% |
| Newtown Water | 2279 | $ 31,012 | 2602 | $ 86,453 | 179% | 14% |
| | | | | | | |
| TOTAL | 663349 | $ 429,464,153 | 894944 | $ 734,519,409 | 71% | 35% |

**CAUSE-PA Statement 1-SR, Mitchell Miller**

R-2020-3018929
2/17/21 JK

**BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION**

| | | |
|---|---|---|
| Pennsylvania Public Utility Commission | : | |
| | : | |
| v. | : | Docket No. R-2020-3018929 |
| | : | |
| PECO Energy Company – Gas Division | : | |

SURREBUTTAL TESTIMONY OF MITCHELL MILLER

ON BEHALF OF

THE COALITION FOR AFFORDABLE UTILITY SERVICES AND

ENERGY EFFICIENCY IN PENNSYLVANIA ("CAUSE-PA")

February 9, 2021

# PREPARED SURREBUTTAL TESTIMONY OF MITCHELL MILLER

**Q: Please state your name, occupation, and business address.**

A: Mitchell Miller. I provide consulting services regarding regulatory compliance matters and utility programming that promotes the public interest, with a focus on universal service programs that assist low-income households. My address is 60 Geisel Road, Harrisburg, PA 17112.

**Q: Did you previously submit testimony in this proceeding?**

A: Yes, I submitted direct testimony that was pre-marked as CAUSE-PA Statement 1.

**Q: What is the purpose of your Surrebuttal Testimony?**

A: My surrebuttal testimony responds to the Rebuttal Testimony of PECO witnesses Joseph A. Bisti (PECO St. 7-R) and Kelly Colarelli (PECO St. 10-R), and of OCA witness Roger Colton (OCA St. 5-R). My surrebuttal testimony is not intended to address every issue raised or otherwise discussed by these or other witnesses in this proceeding. My lack of response to any specific recommendation, argument, or position of any party's expert witness does not indicate my agreement with their testimony. Unless required for context, I will not reiterate the arguments and evidence that I provided in my Direct Testimony. To the extent an argument raised by any party in Rebuttal Testimony was already sufficiently addressed in my prior testimony, I do not intend to respond, and instead stand firmly on the evaluation, analysis, and recommendations contained in my Direct Testimony.

**Q: How is your Surrebuttal Testimony organized?**

A: My testimony is divided into four substantive sections. In section I, I respond to Mr. Bisti regarding PECO's proposal to substantially increase its fixed residential customer charge. In section II, I respond to Ms. Colarelli regarding the need for additional programming and policy changes to respond to the ongoing and unprecedented economic crisis created by the COVID-19

pandemic. In section III, I respond to Ms. Colarelli and Mr. Colton regarding the need for enhanced universal service programming to address categorically unaffordable rates, which will be exacerbated by any approved rate increase. Finally, in section IV, I respond to Ms. Colarelli regarding the appropriateness of implementing equitable cost recovery for universal service costs in the context of this proceeding.

## I. FIXED CUSTOMER CHARGE

**Q: PECO witness Joseph Bisti argues that a 36% increase in the fixed residential customer charge – from $11.75 to $16.00 – is justified because it is "well within the range of the customer charges of the other major Pennsylvania gas distribution companies." (PECO St. 7-R at 9:7-8). How do you respond?**

A: I disagree with Mr. Bisti's generalization that PECO's proposed fixed charge of $16.00 is "well within the range" of other natural gas distribution companies (NGDCs). At $16.00, PECO's proposed residential fixed customer charge would be the second highest in the state next to Columbia Gas, leaping over the fixed charges of 5 other companies. Importantly, Columbia Gas did not reach its current fixed residential customer charge in a single rate case. Rather, I am advised by counsel that Columbia Gas increased its fixed residential customer charge gradually over a series of rate cases dating back over 10 years.[1] I also advised by counsel that the fixed residential customer charge for Peoples Gas and Peoples Natural Gas were just recently increased to the current levels in 2019,[2] and the fixed residential customer charge for Philadelphia Gas Works and

[1] See Pa. PUC v. Columbia Gas of Pennsylvania, Inc., Docket Nos. R-2018-2647577; R-2016-2529660; R-2015-2468056; R-2014-2406274; R-2012-2321748; R-2010-2215623.
[2] See Pa. PUC v. Peoples Natural Gas Company, LLC, R-2018-3006818.

UGI were increased to the current levels in 2020.[3] All of these newly established fixed charges are lower than the fixed charge PECO is proposing in this proceeding.

**Q: In support of PECO's proposed $16.00 fixed residential customer charge, Mr. Bisti goes on to note that "[a]ny division of cost between fixed and volumetric components in a customer class will have relative winners and losers" and asserts that PECO's high fixed charge is reasonable because it would benefit "high-usage, low-income customers." (PECO St. 7-R at 10:6-10). Do you agree with Mr. Bisti?**

A: No, I do not agree with Mr. Bisti's rationale or his conclusion. As I explained in Direct Testimony, the Low Income Usage Reduction Program (LIURP) is designed to reduce high usage for low income customers, and is successful in achieving this goal. (CAUSE-PA St. 1 at 42:3-18).[4] Rather than increase the fixed charge component of the bill, undermining the ability of all consumers to achieve bill savings through energy efficiency and conservation, I believe a more appropriate policy solution to assist low income customers with high usage is to enhance the availability of targeted and comprehensive energy efficiency and conservation programming, coupled with direct bill assistance to help keep bills affordable for low income consumers.

## II. COVID-19 IMPACT

**Q: Did you make recommendations in your Direct Testimony regarding the appropriateness of raising rates in the midst of the COVID-19 pandemic?**

A: Yes. In my Direct Testimony, I explained that now is not an appropriate time to raise rates. Pennsylvania continues to be in the throes of an unprecedented economic and public health crisis and that it is not clear how or when Pennsylvania's economy will recover. (CAUSE-PA St. 1 at

[3] Pa. PUC v. Philadelphia Gas Works, R-2020-3017206; PA. PUC v. UGI Gas of Pennsylvania, R-2019-3015162.
[4] 52 Pa. Code § 58.1.

7:18 to 9:6, 14:1 to 16:3). I further explained that, until we can more precisely understand the far-ranging and longer-term economic impact of the pandemic, it is not appropriate to increase rates. (See id.). As such, I recommended that the Commission deny PECO's proposal to increase the cost of natural gas service, and instead recommended that the Commission order PECO to adopt a number of measures to address the economic devastation caused by COVID-19. (CAUSE-PA St. 1 at 38:1 to 41:5).

**Q: In her Rebuttal Testimony, PECO witness Kelly Colarelli argues that PECO has taken a number of steps to address the economic devastation caused by COVID-19, including additional opportunities for payment arrangements and other programming, and that additional measures are not "necessary or appropriate." (PECO St. 10-R at 3-5). How do you respond?**

A: In my estimation, the programs and policy changes PECO has implemented or otherwise sought approval to implement in response to the COVID-19 pandemic are not adequate to address the unprecedented crisis. More must be done to address the impact of the pandemic on PECO's low income customers - especially considering PECO's pre-existing affordability issues, which will be compounded by the impact of PECO's proposed increase.

Ms. Colarelli first references that PECO has provided "all residential customers the opportunity to enter into a 24-month payment agreement," which PECO has automated to allow customers to sign up via Interactive Voice Response (IVR). (PECO St. 10-R at 3:4-12). I am concerned about this automated process for payment arrangements, particularly in addressing the unique impact of the pandemic on residential consumers.[5] PECO's automated payment

[5] I recognize that the Commission has previously approved PECO to use an IVR system for payment arrangements, but I am concerned that this automated process presents unique challenges to address the unprecedented financial impact of the pandemic. See CAUSE-PA to PECO IV-12.

arrangement system does not allow PECO call center representatives to assess whether a customer is eligible for and make an appropriate referral to a universal service program that could reduce the household's debt and make their bill more affordable on an ongoing basis.[6] PECO's automated payment arrangement system also prevents PECO' call center representatives from assisting low and moderate income households to access a longer payment arrangement based on income.[7] In response to discovery, Ms. Colarelli explains that PECO's customer service representatives offer payment arrangement terms based on "the existing financial information for that customer."[8] If a payment arrangement is offered automatically through the IVR, there is no opportunity to assess the customer's current economic circumstances – which, as a result of the pandemic, very well may be dramatically different from the circumstances last provided to PECO. It is critical that struggling consumers be matched with appropriate assistance programs and, in the absence of available assistance programs, that they receive a payment arrangement that the consumer can reasonably pay. Providing automated payment arrangements through an IVR system prevents this kind of critical assessment, and further compounds the ability of consumers who fall behind on unaffordable payment arrangements to catch up in the future. When a payment arrangement is unaffordable, it sets up the customer to fail, and counts against them in the future when determining whether to offer additional payment arrangements.

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[6] See 66 Pa. C.S. § 1410.1 ("When a customer or applicant contacts a public utility to make a payment agreement as required by section 1410 (relating to complaints filed with commission), the public utility shall: (1) Provide information about the public utility's universal service programs, including a customer assistance program. (2) Refer the customer or applicant to the universal service program administrator of the public utility to determine eligibility for a program and to apply for enrollment in a program."). In its most recent Emergency Order, the Commission explained that it is "vital that utilities inform customers that they are behind in payment and at-risk of termination so that those customers can be evaluated for participation in various assistance programs, including, but not limited to, the Low Income Home Energy Assistance Program (LIHEAP), Customer Assistance Programs (CAP), Lifeline, and Hardship Funds (Assistance Programs." Public Utility Service Termination Moratorium – Modification of March 13th Emergency Order, Docket No. M-2020-3019244, at 3 (order entered Oct. 13, 2020). Without any direct contact with the consumer, this evaluation cannot occur.

[7] See CAUSE-PA to PECO IV-13 and IV-14.

[8] See CAUSE-PA to PECO IV-13.

In response to discovery, Ms. Colarelli clarified that the only change PECO has made to its payment arrangement policies since March 13, 2020, when the pandemic began, is to waive down payments for payment arrangements and to allow customers with a prior defaulted payment arrangement to receive a second 12 or 24-month payment arrangement without a down payment.[9] I will not reiterate my lengthy Direct Testimony, in which I explained the unprecedented depth of economic devastation facing residential consumers – most profoundly impacting low income communities and communities of color. (CAUSE-PA St. 1 at 14-16, 18-19). However, based on the information and data discussed in my Direct Testimony, I do not believe that PECO's adjustments to its payment arrangement standards are adequate to respond to the level of financial devastation faced by its residential customers – especially in light of PECO's proposal to further increase rates while this crisis remains ongoing.

As further support for her claim that additional COVID-19 relief programming is unnecessary, Ms. Colarelli next references PECO's recently approved proposal to increase the income eligibility threshold for its Matching Energy Assistance Fund (MEAF) from 175% of the federal poverty level (FPL) to 200% FPL. (PECO St. 10-R at 3:13-18).[10] But PECO's approved proposal did not increase its MEAF budget to serve more customers through MEAF – it simply increased the number of customers eligible for the same amount of grant assistance.[11] Without an increase in the budget to serve more customers, PECO's expanded eligibility for MEAF assistance will not address the unprecedented economic crisis that residential consumers face. Ultimately, making the limited funds available to higher income customers without increasing the budget to

[9] See CAUSE-PA to PECO IV-14 and IV-15. All cited interrogatory responses are included in Appendix A.
[10] The proposal also waived the requirement that grant recipients be at imminent risk of termination to receive a grant, and the prohibition on customers receiving grant assistance within the past two years. Petition of PECO Energy Co. to Temporarily Amend its Current 2016-2018 Universal Service and Energy Conservation Plan (2016 USECP), Secretarial Letter, Docket Nos. P-2020-3022124 & M-2015-2507139 (issued Dec. 17, 2020).
[11] See id.

serve additional consumers leaves less money available for those with the least income, for whom the program was originally intended.

Ms. Colarelli next references PECO's proposal from last summer to provide a $50 bill credit to CAP customers, to waive income documentation, and to transfer $1.5 million in unspent LIURP funds to support a summer cooling program as evidence that its COVID-19 response is sufficient. I am advised by counsel that the Commission considered PECO's proposal at the August 6, 2020 Public Meeting, but that it failed to garner a majority vote - primarily due to the lack of information and data provided in support of the Petition.[12] In response to discovery, Ms. Colarelli indicates that "PECO does not know whether the referenced Petition is still under active consideration by the Commission."[13] However, based on discussion at the August 6, 2020 Public Meeting, it is clear to me that the Commission is not actively reviewing PECO's proposal, and will not further consider PECO's proposal unless and until PECO provides additional information and support. I do not believe that PECO's proposal from last summer, which failed to garner a majority vote at the Commission, represents an adequate response to the pandemic.

Finally, as support for her conclusion that additional COVID-19 related policies and programs are unnecessary, Ms. Colarelli notes that PECO has complied with the Commission's

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[12] In support of a staff recommendation regarding PECO's proposed Petition, which failed to garner a majority vote at the Commission's August 6, 2020 public meeting, Commissioner John Coleman stated: "I agree with the staff analysis and the Vice Chairman comments on that analysis that PECO has not really provided sufficient data, supporting documentation, or the justification to support these proposals." August 6, 2020 Public Meeting, recording at 27:38, *available at* https://www.puc.pa.gov/General/pm_agendas/2020/pm080620-audio.mp3.

In response to Chairman Gladys Brown Dutrieulle's proposal to include the matter on the agenda for the next Public Meeting, Commissioner Coleman noted:

> "I think we have discussed the merits of the proposal this morning, and unless or until PECO provides additional documentation, I think the matter has concluded, and therefore I don't see the need to bring the matter before the Commission at a subsequent meeting."

Id. at 31:10. Consideration of the matter concluded with the Chairman noting that the Petition would "sit in the Secretary's Bureau." Id.

[13] CAUSE-PA to PECO IV-18.

Emergency Orders at Docket No. M-2020-3019244, including the emergency moratorium on termination and waiver of connection fees and deposits for reconnection of service. (PECO St. 10-R at 4:9-12). I do not believe that PECO's compulsory compliance with the Commission's Emergency Order is adequate to address the economic devastation that residential consumers will continue to face and which will be exacerbated by PECO's proposal to increase rates for natural gas service.

The Commission's Emergency Orders are intended to protect against a "clear and present danger to life or property,"[14] and have thus far succeeded in doing so. According to research from Duke University, moratoria on utility terminations nationwide have reduced COVID-19 infections by 4.4%, and have reduced COVID-19 mortality rates by 7.4%.[15] But the Commission's Emergency Orders were not designed to address or respond to the unprecedented level of utility debts accrued as a result of the pandemic. The Commission itself recognized the limitations of its Emergency Orders in addressing the longer-term impacts of COVID-19, noting: "Our goal is to put customer protections in place that can work for the short term. It is unknown, however, how long we are going to have to live with this pandemic or its economic consequences."[16] With the Commission's most recent Emergency Order set to expire at the end of March, thousands of PECO customers will potentially find themselves at risk of losing essential service in the midst of the pandemic.[17] While the Commission may continue to examine the impact of COVID-19 on

[14] Public Utility Service Termination Moratorium Proclamation of Disaster Emergency – COVID-19, Docket No. M-2020-3019244, at 1-2 (order entered March 13, 2020); see also 52 Pa. Code § 3.1, 3.2 (emergency relief).
[15] Kay Jowers et al., Housing Precarity & The COVID—19 Pandemic: Impacts of Utility Disconnection and Eviction Moratoria on Infections and Deaths Across US Counties, NBER Working Paper 28394, available at https://www.nber.org/system/files/working_papers/w28394/w28394.pdf?utm_campaign=PANTHEON_STRIPPED&amp%3Butm_medium=PANTHEON_STRIPPED&amp%3Butm_source=PANTHEON_STRIPPED.
[16] Public Utility Service Termination Moratorium – Modification of March 13th Emergency Order, Docket No. M-2020-3019244 (order entered Oct. 13, 2020).
[17] See CAUSE-PA St. 1 at 15 (Residential customers eligible for termination up from 80,193 in November 2019 to 131,241 in November 2020.). As of December 30, 2020, 139,890 residential customers were eligible for

residential consumers and guide broad policy on a statewide basis, I do not believe that PECO should wait for a future statewide proceeding to address the unprecedented economic impact of the pandemic on low income consumers – especially in light of its proposal to increase rates for basic natural gas service.

## III. UNIVERSAL SERIVCE PROGRAMMING

**Q: In response to concerns you raised regarding the reach of PECO's universal service programs, Ms. Colarelli argues that your analysis is inappropriately focused on the number of estimated low income customers, which she believes is too high because it relies on Census data without accounting for master metered properties. (PECO St. 10-R at 5:18-19). How do you respond?**

A: Most utilities' estimated low income customer counts (including PECO's) are not just a reiteration of the applicable U.S. Census data. During my tenure at the Bureau of Consumer Services, utilities were advised to calculate the estimated low income customer count by taking a percentage of the Census data equivalent to a percentage of the number of residential customers in each county. For example, if the Census data showed that 20,000 households in a given county were low income, and the utility's residential customers represented 50% of households in that county, the utility would estimate that it had roughly 10,000 low income customers. In PECO's currently active Universal Service and Energy Conservation Plan (USECP), the Company explains that it does not simply reiterate the Census data to provide its reported estimated low income customer count to the Commission, and that it does account for factors like master-metered properties in the estimated low income figures it reports to the Commission.[18] However, it does

termination – up 30% year over year. PECO Energy Company Temporary Reporting Requirements: At-Risk Accounts, Docket M-2020-3019244 (filed Jan. 15, 2021).

[18] PECO USECP 2016-2018 at 4, https://www.puc.pa.gov/pcdocs/1510970.pdf.

not provide a full explanation of the adjustments it makes to the census data to more accurately project its estimated customer class.[19]

As I recognized at the outset of my Direct Testimony, it is challenging to assess with precision the true number of low income customers in a given utility service territory. (CAUSE-PA St. 1 at 9). Nevertheless, regardless of the methodology used, the same conclusion rings true: PECO serves a considerable number of low income customers across its service territory, and that number has likely grown considerably since the onset of the pandemic. (See CAUSE-PA St. 1 at 9-11).

**Q: Ms. Colarelli and Mr. Colton argue that your recommendations regarding PECO's universal service programs should be addressed in the context of PECO's pending Universal Service and Energy Conservation Plan proceeding. (PECO St. 10-R at 8:16 to 10:18; OCA St. 5-R at 6:17-20). How do you respond?**

A: PECO is proposing to increase the rates for natural gas service *in this proceeding*, and in the midst of an economic crisis that is disproportionately harmful to low income communities. It is incumbent on the Commission to ensure that any rates approved as a result of this proceeding are both just and reasonable – including rates charged to low income households through CAP. As I explained in Direct Testimony, I believe it is both unjust and unreasonable to charge rates that are categorically unaffordable for low income consumers. (CAUSE-PA St. 1 at 8:12 to 9:12). PECO's current rates are already unaffordable for low income customers, even with assistance through PECO's universal service programs, and will become even more unaffordable if any rate increase is approved. Thus, I do not believe it is appropriate to defer consideration of critical universal service program reforms to address categorical rate unaffordability and to offset the

[19] PECO USECP 2016-2018 at 4, https://www.puc.pa.gov/pcdocs/1510970.pdf.

impact of any approved rate increase, as the failure to address these issues here may well result in PECO charging rates that are either unjust, unreasonable, or both.

**Q: Ms. Colarelli opposes the use of pipeline penalty credits to provide further support for its Matching Energy Assistance Fund to assist in relieving the unprecedented accrual or arrears through the pandemic because it would increase the Purchased Gas Cost ("PGC") for default service customers. (PECO St. 10-R at 4-8). How do you respond?**

A: For the period of July 1, 2019 to December 31, 2020, PECO has amassed approximately $18.2 million in pipeline penalty credits.[20] I believe that it is inherently just and reasonable to use just $2 million of these funds (roughly 10%) to provide extraordinary relief to customers facing acute financial hardship as a result of the global pandemic. As I explained in Direct Testimony, such measures have been proposed in a number of other natural gas jurisdictions across the state. (CAUSE-PA St. 1 at 38).

**Q: In response to your recommendation that PECO address current unaffordability within its CAP by adopting the Commission's energy burden standards, Mr. Colton argues that it would be confusing for PECO's dual gas and electric customers if gas CAP rates were adjusted without also adjusting electric CAP rates. (OCA St. 5-R at 7:11-12). How do you respond?**

A: Adjusting PECO's gas CAP rates without also adjusting its electric CAP rates would be no more confusing for customers than the fact that PECO is raising rates for gas service without simultaneously raising rates for electric service. I believe that dual gas and electric customers understand that the services are separate, and would be relieved to see an increase in their CAP

[20] CAUSE-PA to PECO III-3(a).

credits – even if only on the gas side. As a practical matter, PECO's CAP bill does not indicate the energy burden used to calculate the applicable CAP credit.[21] Rather, the applicable CAP credit appears on the CAP bill as a line item, without explanation of the calculation that was used to arrive at that credit. In fact, for dual bill customers, PECO's CAP credit for both gas and electric appears only as a single line item on the electric portion of the bill – which makes it even less likely customers would be confused by an increase in the gas portion of their CAP credit without a corresponding increase to the electric portion of their CAP credit. For these reasons, I disagree with Mr. Colton's conclusion that it would be confusing to adjust the gas CAP credit without a corresponding adjustment to the electric CAP credit.

**Q: Mr. Colton further argues that the cost of addressing unaffordability within CAP through implementation of the Commission's energy burden standards would create a hardship to low income customers who are not participating in CAP or who are just over the eligibility threshold for the program. (OCA St. 5-R at 7:16 to 9:20). How do you respond?**

A: I share Mr. Colton's concern for low income customers who are eligible for CAP but are not participating in the program, and for the "near poor" who are just over the eligibility for CAP who pay for universal service costs through rates. As I explained in my Direct Testimony, the Self Sufficiency standard in Pennsylvania – meaning the amount of income necessary to pay for life's basic necessities – is much higher than the eligibility threshold for CAP. (CAUSE-PA St. 1 at 12:11 to 13:14). Something must be done to further assist customers with income just above CAP, especially in light of the global pandemic, and is in part why I recommend PECO increase funding available through MEAF and improve the availability of LIURP services to high usage customers. (CAUSE-PA St. 1 at 34-38). However, the solution to address the affordability needs of non-

[21] See Appendix B, Sample PECO CAP Bills.

CAP low income customers and the "near poor" is not to continue charging CAP customers categorically unaffordable rates. The better solution is to improve CAP outreach and to ensure there is programing in place for all those in need of assistance.

With regard to the first group that Mr. Colton is concerned about, those who are eligible for but not currently participating in CAP, I believe the most appropriate solution is to ensure that all those who are income eligible for CAP are able to enroll and participate in the program. This is why I recommended in Direct Testimony that PECO be required to benchmark its CAP enrollment rates to improve the reach of its program to all eligible customers by 50% by 2025. (CAUSE-PA St. 1 at 33:3-14). Establishing clear benchmarks for CAP enrollment levels will help to drive needed improvements in PECO's CAP enrollment rates.

With regard to those customers who Mr. Colton refers to as "near poor", those just above the income eligibility threshold for CAP who cannot afford basic services, I note first that households at this income level do have access to MEAF and LIURP assistance to help address and remediate high usage and financial hardship that may cause households with slightly higher income to fall behind on their bills.[22]

Moreover, the relative scale of unaffordability is far different for those who are "near poor" compared to those who are income eligible for CAP. According to Mr. Colton's Home Energy Affordability Gap study, published most recently in April 2020, Pennsylvania households with income between 150-185% FPL have an average home energy burden of 8%, and those with income between 185-200% FPL have an average home energy burden of 7%.[23] These averages

[22] PECO USECP 2016-2018 at 14, 16 (LIURP eligibility extends up to 200% FPL, MEAF extends up to 175% FPL).

[23] Roger Colton, The Home Energy Affordability Gap: Pennsylvania 2019 (published April 2020), *available at* http://www.homeenergyaffordabilitygap.com/03a_affordabilityData.html. Attached hereto as Appendix C.

are well below the Commission's newly adopted energy burden threshold of 10% for households with income between 51-150% FPL,[24] and are substantially lower than the energy burden standards that PECO currently follows. (CAUSE-PA St. 1 at 21, T.2). In comparison, as I explained in my Direct Testimony, 31% of PECO's CAP customers exceeded PECO's currently applicable energy burden standards in 2017, and 41% exceeded those standards in 2018. (CAUSE-PA St. 1 at 22:5-7).

Finally, the projected cost to address categorical unaffordability within CAP for PECO's gas customers would have a marginal impact on the energy burden for those just over the eligibility threshold for CAP. By PECO's own estimates, the cost of reducing its energy burden standards across its gas and electric divisions is projected to add $1.26 per month to residential customer bills – or $15.12 per year.[25] The financial impact of this projected increase on the overall energy burden for households with income above 150% FPL would be minimal. The table below shows the impact of this projected increase on the energy burden for households of various sizes with income that exceeds the eligibility for CAP by one dollar – in other words, those who exceed CAP eligibility by the smallest possible margin:

| | CAP Eligibility - 150% FPL[26] | $1 Over CAP Eligibility | Impact of Increased CAP costs on Energy Burden |
|---|---|---|---|
| 1 Person Household | $19,320 | $19,321 | 0.078% |
| 2 Person Household | $26,130 | $26,131 | 0.058% |
| 3 Person Household | $32,940 | $32,941 | 0.046% |
| 4 Person Household | $39,750 | $39,751 | 0.038% |
| 5 Person Household | $46,560 | $46,561 | 0.032% |

[24] 52 Pa. Code § 69.265(2)(i).
[25] See PECO Energy Company's 2019-2024 Universal Service and Energy Conservation Plan, Amended Proposed USECP, Docket No. P-2020-3020727, at Redline Attachment page 27 (filed July 28, 2020).
[26] US Dep't of Health & Human Services, HHS Poverty Guidelines for 2021, https://aspe.hhs.gov/poverty-guidelines (click on Resources, Percentages Chart).

As the table shows, remediating unaffordability within CAP will have a marginal impact on the energy burden of households who are just over the income eligibility threshold for CAP. While any increase in rates must be carefully considered, and I do not in any way minimize the financial challenges of those who are just above the income limit for CAP, I believe the relative rate impact on those who are "near poor" should not be a deciding factor in whether to remediate categorical unaffordability within CAP by implementing the Commission's revised energy burden standards.

Finally, I note that the financial impact on the "near poor" to implement the Commission's energy burden standards could be further reduced by adopting my proposal for PECO to equitably recover the cost of universal service programs from all ratepayers. (See CAUSE-PA St. 1 at 48-53). Residential customers do not cause energy poverty, and should not bear the sole burden to address it. Nevertheless, even if the cost of universal service programming does remain inequitably borne by residential ratepayers alone, I believe the estimated cost of my recommendation to address categorical rate unaffordability within CAP is a small price to pay in return for the host of far-ranging individual and societal benefits associated with improved energy affordability to those with the lowest income. In comparison to the marginal impact of less than $1/10^{th}$ of a percentage point on the energy burdens of "near poor" customers, the improvement to household energy burden for CAP eligible households would make a tremendous difference, reducing household energy burden for the poorest customers by several percentage points. This would help ensure that PECO's most economically vulnerable consumers can reasonably access safe and affordable natural gas services to their home.

**Q: In your Direct Testimony, you recommend that PECO remediate unaffordability within CAP, and address the unprecedented impact of the pandemic on low income households, by rolling debt accrued by CAP participants through the pandemic into pre-**

**program arrearages, allowing CAP customers to earn forgiveness on those arrearages over time. (CAUSE-PA St. 1 at 40). Mr. Colton argues that your proposal should be rejected because it lacks implementation details. (OCA St. 5-R at 11-13). How do you respond?**

A: The questions Mr. Colton raises with regard to my proposal for in-program forgiveness are not insurmountable. In this instance, and given the uncertainty associated with the duration of the pandemic, I believe it would be appropriate to determine the implementation details of an in-program CAP forgiveness through a stakeholder process.

I disagree with Mr. Colton's conclusion that the record does not support providing in-program debt relief to CAP customers. To the contrary, as I explained at length in my Direct Testimony, low income communities have borne a disproportionate level of financial harm as a result of the pandemic. (See CAUSE-PA St. 1 at 14-16). It is imperative that relief be fashioned to equitably resolve the tremendous and inequitable financial burden of the pandemic that has fallen on low income customers. As Mr. Colton points out, those who are eligible for CAP but not yet enrolled in program would not need in-program arrearage forgiveness, as the entirety of their arrears would be eligible for forgiveness if they enter the program. (See OCA St. 5-R at 10). However, current CAP customers do not have a path to address arrears accrued through the pandemic – nor do they have the opportunity to access a payment arrangement from the Commission.[27] As I explained in my Direct Testimony, CAP customers were already exceeding PECO's current energy burden standards by substantial margins prior to the onset of the pandemic, (CAUSE-PA St. 1 at 22:6-7), making it even more likely that many CAP customers have been unable to keep up with their CAP bills as the pandemic has progressed. My recommendation to provide in-program arrearage forgiveness to CAP customers who accrued debt through the

[27] 66 Pa. C.S. § 1405(c).

pandemic presents a just and reasonable path forward to address the unprecedented crisis facing low income communities.

Finally, I note that the cost of my proposal to provide in-CAP arrearage forgiveness for debt accrued by CAP customers through the pandemic is minimal. As of December 2020, the total arrears accrued by CAP customers since March 13, 2020 was $1,130,514.[28] As of October 2020, the last date for which I have available data, PECO's total residential customer base was 491,475.[29] If spread only across the residential customer class, the cost of providing debt forgiveness for in-program CAP arrears, assuming CAP customers earned full forgiveness, would be approximately $2.30 over PECO's current 12-month arrearage forgiveness timeframe – or approximately $0.19 per month. Even if the total CAP arrears were to reach $2M through winter, which I believe is unlikely given the availability of LIHEAP to help offset winter heating costs, the cost would still be minimal when spread across ratepayers – adding approximately $0.34 per month to residential customer bills. Again, any increase in rates must be carefully scrutinized and weighed. I believe this modest increase is both just and reasonable to ensure that PECO's most economically vulnerable customers are able to maintain affordable natural gas service to their home.

## IV. EQUITABLE COST ALLOCATION FOR UNIVERSAL SERVICE COSTS

**Q: In response to your recommendation that PECO recover the cost of universal service programs equitably across all rate classes, Ms. Colarelli argues that PECO's gas distribution rate case is an inappropriate place to consider allocation of universal service costs, and should instead be deferred for PECO's next electric base rate proceeding, because "PECO's**

[28] CAUSE-PA to PECO IV-6. I note that PECO reported a lower total arrearage level for CAP customers compared as of December 2020 in response to other discovery questions. CAUSE-PA to PECO III-5. I have used the higher figure for the purpose of my analysis.
[29] CAUSE-PA to PECO I-5(a) & I-23(a).

**gas-only CAP population is an exceedingly small part of its total CAP population." (PECO St. 10-R at 12:12-17). How do you respond?**

A: The fact that PECO's gas CAP population "is an exceedingly small part of its total CAP population" is not a valid reason to ignore equitable universal service cost allocation proposals in the context of its gas rate case, where determinations about the allocation of PECO's gas operations (including allocation of its gas-related universal service costs) are made. PECO has the highest number of residential gas customers in the state and the third highest number of gas CAP participants.[30] The fact that PECO's gas operations are relatively smaller than PECO's electric operations does not excuse the Company from its obligation to appropriately allocate costs for its gas operations in the context of its gas rate case. The allocation of universal service costs incurred by its gas customers should be addressed here, in this proceeding, not in an electric rate case. Thus, I disagree with Ms. Colarelli's suggestion that PECO defer its consideration of cross-class recovery for its next electric base rate proceeding.

**Q: Does this conclude your surrebuttal testimony?**

A: Yes.

[30] Pa. PUC, 2019 Report on Universal Service Programs & Collections Performance, at 5, 51 (Sept. 2020), https://www.puc.pa.gov/General/publications_reports/pdf/EDC_NGDC_UniServ_Rpt2019.pdf.

# APPENDIX A
# Cited Responses to Interrogatories

## Interrogatories of CAUSE-PA to PECO

CAUSE-PA to PECO I-5
CAUSE-PA to PECO I-23(a)
CAUSE-PA to PECO III-1
CAUSE-PA to PECO III-3(a)
CAUSE-PA to PECO III-5(a)
CAUSE-PA to PECO IV-6
CAUSE-PA to PECO IV-12
CAUSE-PA to PECO IV-13
CAUSE-PA to PECO IV-14
CAUSE-PA to PECO IV-15
CAUSE-PA to PECO IV-16

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To Interrogatories of the
The Coalition for Affordable Utility Services
and Energy Efficiency in Pennsylvania
CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-5

For 2016, 2017, 2018, 2019, and to date in 2020, please identify the following, disaggregated by month:

a. The total number of residential PECO Gas customers.

b. The total number of residential PECO Gas customers, excluding confirmed low-income customers and CAP customers.

RESPONSE:

Please refer to Attachment CAUSE-PA-I-5(a). The number of confirmed low-income customers were defined as those customers with verified financial statements within the last two years. These numbers include CAP customers who were verified within the last two years.

The number of CAP customers are those who are active on CAP in each given month. Some of these CAP customers do not have verified financial statements in the last two years as some CAP customers recertify by receiving LIHEAP grants. Also due to the Company's response to COVID, customers have not been removed from CAP for failure to recertify.

Responsible Witness: Kelly Colarelli

| a. | Total Number of Residential PECO Gas Customers | | | |
|---|---|---|---|---|
| | **Month** | **2018** | **2019** | **2020** |
| | Jan | 485,837 | 481,973 | 485,333 |
| | Feb | 486,621 | 483,053 | 487,684 |
| | Mar | 478,714 | 483,662 | 487,078 |
| | Apr | 478,788 | 482,843 | 489,073 |
| | May | 478,705 | 484,032 | 489,581 |
| | Jun | 479,080 | 484,236 | 490,145 |
| | Jul | 479,209 | 484,864 | 489,669 |
| | Aug | 479,505 | 484,963 | 491,388 |
| | Sep | 477,421 | 483,876 | 492,470 |
| | Oct | 480,742 | 483,255 | 491,475 |
| | Nov | 481,385 | 484,250 | NA |
| | Dec | 482,435 | 486,613 | NA |

| b. | Total Number of Residential PECO Gas customers, excluding confirmed low income customers and CAP customers. | | | |
|---|---|---|---|---|
| | **Month** | **2018** | **2019** | **2020** |
| | Jan | 462,009 | 459,562 | 463,342 |
| | Feb | 463,053 | 460,818 | 465,555 |
| | Mar | 455,277 | 461,520 | 464,848 |
| | Apr | 455,428 | 460,609 | 466,905 |
| | May | 455,367 | 461,845 | 467,447 |
| | Jun | 455,956 | 462,054 | 467,972 |
| | Jul | 456,530 | 462,826 | 467,487 |
| | Aug | 456,881 | 462,980 | 469,228 |
| | Sep | 454,740 | 461,943 | 470,330 |
| | Oct | 458,212 | 461,505 | 469,323 |
| | Nov | 458,823 | 462,433 | NA |
| | Dec | 459,886 | 464,684 | NA |

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CAUSE-PA Set I

Response Date: 12/11/2020

CAUSE-PA-I-23

For 2016, 2017, 2018, 2019, and thus far in 2020, disaggregated by month, please provide the total dollars in debt and the average arrearage level for the following customer segments:

a. All residential customers

b. Residential customers, excluding confirmed low-income customers and CAP customers

c. Confirmed low income customers, excluding CAP customers

d. CAP customers

RESPONSE:

Please refer to Attachment CAUSE-PA-I-23(a). By agreement of counsel, PECO is not providing data for 2016 and 2017. When a customer receives both electric and gas service from PECO, arrears are not separated by commodity. Therefore, these answers have a 15% allocation to gas; this allocation factor is used to assign administrative and general costs (A&G) between electric and gas utility services. PECO uses the 15% allocation factor in its annual PUC Universal Services Reporting Requirements.

Responsible Witness: Kelly Colarelli

| a. All Residential Gas Customers - Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 4,667,411 | $ 4,228,394 | $ 4,074,962 |
| Feb | $ 4,843,773 | $ 4,594,482 | $ 4,758,299 |
| Mar | $ 5,337,832 | $ 4,821,764 | $ 4,351,618 |
| Apr | $ 5,502,071 | $ 4,520,707 | $ 3,752,667 |
| May | $ 5,582,006 | $ 3,838,086 | $ 3,555,396 |
| Jun | $ 5,249,302 | $ 3,248,963 | $ 3,029,794 |
| Jul | $ 5,300,860 | $ 3,256,609 | $ 3,002,573 |
| Aug | $ 5,829,703 | $ 3,716,225 | $ 3,390,114 |
| Sep | $ 6,157,349 | $ 3,522,273 | $ 3,482,821 |
| Oct | $ 6,590,430 | $ 3,261,523 | $ 3,302,331 |
| Nov | | $ 3,343,990 | $ 3,304,604 |
| Dec | | $ 4,132,387 | $ 3,662,742 |

| b. Residential customers, excluding confirmed low income customers and CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 3,396,924 | $ 3,048,650 | $ 2,955,007 |
| Feb | $ 3,495,929 | $ 3,301,175 | $ 3,431,250 |
| Mar | $ 3,929,922 | $ 3,475,226 | $ 3,012,925 |
| Apr | $ 4,114,971 | $ 3,282,768 | $ 2,564,637 |
| May | $ 4,204,382 | $ 2,772,892 | $ 2,492,718 |
| Jun | $ 3,982,506 | $ 2,329,807 | $ 2,067,081 |
| Jul | $ 4,080,504 | $ 2,341,190 | $ 2,049,215 |
| Aug | $ 4,553,632 | $ 2,761,489 | $ 2,425,921 |
| Sep | $ 4,864,341 | $ 2,595,977 | $ 2,493,722 |
| Oct | $ 4,958,542 | $ 2,340,297 | $ 2,482,721 |
| Nov | | $ 2,384,351 | $ 2,501,905 |
| Dec | | $ 3,036,644 | $ 2,704,185 |

| a. All Residential Gas Customers - Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 63 | $ 57 | $ 50 |
| Feb | $ 67 | $ 63 | $ 55 |
| Mar | $ 68 | $ 66 | $ 51 |
| Apr | $ 73 | $ 60 | $ 53 |
| May | $ 76 | $ 51 | $ 46 |
| Jun | $ 77 | $ 47 | $ 43 |
| Jul | $ 78 | $ 49 | $ 44 |
| Aug | $ 82 | $ 50 | $ 45 |
| Sep | $ 84 | $ 49 | $ 45 |
| Oct | $ 84 | $ 49 | $ 43 |
| Nov | | $ 45 | $ 41 |
| Dec | | $ 54 | $ 49 |

| b. Residential customers, excluding confirmed low income customers and CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 54 | $ 49 | $ 45 |
| Feb | $ 56 | $ 53 | $ 49 |
| Mar | $ 58 | $ 56 | $ 44 |
| Apr | $ 62 | $ 51 | $ 44 |
| May | $ 66 | $ 42 | $ 39 |
| Jun | $ 67 | $ 39 | $ 35 |
| Jul | $ 68 | $ 41 | $ 37 |
| Aug | $ 72 | $ 43 | $ 39 |
| Sep | $ 74 | $ 42 | $ 39 |
| Oct | $ 72 | $ 41 | $ 38 |
| Nov | | $ 37 | $ 36 |
| Dec | | $ 46 | $ 42 |

| c. Confirmed low income customers, excluding CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 607,297 | $ 499,267 | $ 250,956 |
| Feb | $ 646,092 | $ 551,092 | $ 298,875 |
| Mar | $ 679,069 | $ 597,730 | $ 307,104 |
| Apr | $ 673,025 | $ 556,585 | $ 274,449 |
| May | $ 677,016 | $ 510,424 | $ 250,789 |
| Jun | $ 629,982 | $ 455,076 | $ 239,756 |
| Jul | $ 615,296 | $ 443,631 | $ 225,972 |
| Aug | $ 634,452 | $ 469,768 | $ 231,397 |
| Sep | $ 644,752 | $ 453,518 | $ 233,026 |
| Oct | $ 443,265 | $ 463,382 | $ 308,849 |
| Nov | | $ 473,260 | $ 319,304 |
| Dec | | $ 530,118 | $ 396,582 |

| d. CAP customers, Total Dollars in Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 663,190 | $ 680,477 | $ 868,999 |
| Feb | $ 701,752 | $ 742,216 | $ 1,028,175 |
| Mar | $ 728,840 | $ 748,808 | $ 1,031,588 |
| Apr | $ 714,074 | $ 681,354 | $ 913,581 |
| May | $ 700,608 | $ 554,770 | $ 811,889 |
| Jun | $ 636,813 | $ 464,080 | $ 722,957 |
| Jul | $ 605,060 | $ 471,788 | $ 727,386 |
| Aug | $ 641,619 | $ 484,968 | $ 732,795 |
| Sep | $ 648,256 | $ 472,778 | $ 756,073 |
| Oct | $ 1,188,623 | $ 457,843 | $ 510,761 |
| Nov | | $ 486,378 | $ 483,396 |
| Dec | | $ 565,625 | $ 561,975 |

| c. Confirmed low income customers, excluding CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 162 | $ 131 | $ 113 |
| Feb | $ 178 | $ 147 | $ 132 |
| Mar | $ 185 | $ 160 | $ 138 |
| Apr | $ 201 | $ 154 | $ 137 |
| May | $ 218 | $ 147 | $ 127 |
| Jun | $ 223 | $ 145 | $ 130 |
| Jul | $ 233 | $ 141 | $ 128 |
| Aug | $ 241 | $ 141 | $ 122 |
| Sep | $ 254 | $ 140 | $ 122 |
| Oct | $ 320 | $ 143 | $ 97 |
| Nov | | $ 141 | $ 100 |
| Dec | | $ 143 | $ 113 |

| d. CAP customers, Average Debt | | | |
|---|---|---|---|
| **Month** | **2020** | **2019** | **2018** |
| Jan | $ 93 | $ 86 | $ 65 |
| Feb | $ 104 | $ 98 | $ 72 |
| Mar | $ 105 | $ 104 | $ 74 |
| Apr | $ 110 | $ 95 | $ 84 |
| May | $ 118 | $ 80 | $ 71 |
| Jun | $ 116 | $ 75 | $ 69 |
| Jul | $ 114 | $ 74 | $ 70 |
| Aug | $ 119 | $ 70 | $ 68 |
| Sep | $ 123 | $ 70 | $ 70 |
| Oct | $ 147 | $ 74 | $ 66 |
| Nov | | $ 73 | $ 67 |
| Dec | | $ 80 | $ 75 |

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& Energy Efficiency in Pennsylvania
CAUSE-PA Set III

Response Date: 01/21/2021

CAUSE-PA-III-1

Please provide a breakdown of PECO's actual, projected, and/or proposed CAP and LIURP budgets for its electric and gas divisions for 2020-2024, disaggregated by division, year, and program.

RESPONSE:

PECO's 2020 actuals and projected CAP 2021-2024 budgets for the gas division are:

| In $'Ms | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|
| **Gas CAP Shortfall** | **$ 2.6** | **$ 4.2** | **$ 5.7** | **$ 6.3** | **$ 8.8** |

PECO's actual and projected LIURP budget for its gas division for 2020-2024 will be $2.25 million per year. Per agreement of counsel, PECO is supplying a response for its gas division but not its electric division.

Responsible Witness: Kelly Colarelli

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To Interrogatories of the
The Coalition for Affordable Utility Services
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CAUSE-PA Set III

Response Date: 01/21/2021

CAUSE-PA-III-3

Please identify the amount of annual pipeline penalty credits or refunds received by PECO and explain how those funds are currently returned to customers. Please include a reference to any Commission docket where allocation of those funds is addressed.

RESPONSE:

Refer to Attachment CAUSE-PA-III-3(a), which provides the amount of the pipeline penalty credits and refunds received by PECO for the period July 1, 2019 through December 31, 2020. The table includes the Federal Energy Commission (FERC) Docket number that explains the reason for, and allocation of, the refunds.

The amount of $18,191,636.44 found at Line 15 of the attachment is being returned to customers as a decrease in cost used to derive PECO's gas commodity costs through the PGC process. The amount is calculated by adding the dollars listed in Lines 2 -14 (column A) of the Amount Received column (column E).

Note that the amount listed in Lines 7 and 10 are refunds from Texas Eastern and Transcontinental pipelines. In both cases, the amount received was derived by taking the difference between what PECO was charged by the pipelines beginning with the pipelines' Section 4 rate cases "as-filed rates"' and the rates eventually approved by FERC. Because PECO's Gas Choice program requires the Company to assign and release proportional firm pipeline transportation capacity to participating suppliers at the then-effective tariff rates, PECO

passed through a proportional share of the rate case refunds to those suppliers. The amounts refunded to the suppliers are listed at Lines 13 and 14. Those amounts are netted from Lines 2-12 to reach the total amount passed on to customers.

Responsible Witness: Kelly Colarelli

| Line | Pipeline Refunds Received from July 1, 2019 through December 31, 2020 | | | | |
|---|---|---|---|---|---|
| 1 | **Pipeline** | **Date Received** | **FERC Docket #** | **Amount Received** | **Comments** |
| 2 | Texas Eastern Transmission Company | 08/10/19 | RP19-1342-000 | $19,554.07 | OFO Penalty Sharing |
| 3 | Transcontinental Gas Pipeline Corp | 08/02/19 | RP19-1421-000 | $3,171.52 | Flow Through of Dominion Penalty Sharing - Rate Schedule GSS and LSS Refund Report |
| 4 | Transcontinental Gas Pipeline Corp | 09/26/19 | RP19-1599-000 | $2,102.41 | OFO Penalty Sharing (Rate Schedule S-2 OFO Penalty Refund) |
| 5 | Transcontinental Gas Pipeline Corp | 10/24/19 | RP20-88 | $1,167.38 | OFO Penalty Sharing (Penalty Revenue Sharing for the Annual Period ending 7/31/2019) |
| 6 | Transcontinental Gas Pipeline Corp | 12/18/19 | RP20-344-000 | $392.21 | OFO Penalty Sharing (Rate Schedule S-2 OFO Penalty Refund) |
| 7 | Texas Eastern Transmission Company | 05/15/20 | RP19-343 | $9,570,425.64 | Rate Case Settlement |
| 8 | Transcontinental Gas Pipeline Corp | 06/11/20 | RP20-1016-000 | $767,759.52 | Rate Schedule S-2 Rate Case Flow Through Refund |
| 9 | Transcontinental Gas Pipeline Corp | 06/19/20 | RP20-958 | $4,557.79 | OFO Penalty Sharing (Rate Schedule S-2 OFO Penalty Flow Through Refund) |
| 10 | Transcontinental Gas Pipeline Corp | 07/01/20 | RP18-1126-0004 | $10,325,215.71 | Rate Case Settlement |
| 11 | Transcontinental Gas Pipeline Corp | 07/21/20 | RP20-1029 | $1,167.60 | Rate Schedule GSS and LSS Flow Through Refund |
| 12 | Texas Eastern Transmission Company | 09/10/20 | RP20-988 | $1,007,382.87 | EPC REFUND (applied as credit to invoice) |
| 13 | Texas Eastern Transmission Company | 09/30/20 | RP19-343 | ($980,215.65) | Rate Case Settlement - portion being returned to PECO Gas Choice Low Volume Transportation Suppliers |
| 14 | Transcontinental Gas Pipeline Corp | 09/30/20 | RP18-1126-0004 | ($2,531,044.63) | Rate Case Settlement - portion being returned to PECO Gas Choice Low Volume Transportation Suppliers |
| 15 | Total Retuned to PGC Cusomers through the PGC Process | | | $18,191,636.44 | |

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Docket No. R-2020-3018929

Response of PECO Energy Company
To Interrogatories of the
The Coalition for Affordable Utility Services
& Energy Efficiency in Pennsylvania
CAUSE-PA Set III

Response Date: 01/21/2021

CAUSE-PA-III-5

See CAUSE-PA I-20, I-21, I-22, and I-23. Please provide updated responses for November and December 2020.

RESPONSE:

Please refer to Attachment CAUSE-PA-III-5(a). For the November and December 2020 data related to CAUSE-PA-I-23, please see the following data description.

When a customer receives both electric and gas service from PECO, arrears are not separated by commodity. Therefore, these answers have a 15% allocation to gas; this allocation factor is used to assign administrative and general costs (A&G) between electric and gas utility services. PECO uses the 15% allocation factor in its annual PUC Universal Services Reporting Requirements.

Responsible Witness: Kelly Colarelli

CAUSE-PA-I-20 Number of Payment Trouble Customers

| a. | All Residential Customers |
|---|---|
| Month | 2020 |
| Nov | 88,924 |
| Dec | 96,032 |

| b. | Residential customers, excluding confirmed low income customers and CAP customers |
|---|---|
| Month | 2020 |
| Nov | 75,950 |
| Dec | 83,218 |

| c. | Confirmed low income customers, excluding CAP customers |
|---|---|
| Month | 2020 |
| Nov | 1,751 |
| Dec | 1,762 |

| d. | CAP customers |
|---|---|
| Month | 2020 |
| Nov | 11,223 |
| Dec | 11,052 |

CAUSE-PA-I-21 number of customers with an active payment arrangement

| a. | All Residential Customers |
|---|---|
| Month | 2020 |
| Nov | 14,836 |
| Dec | 13,839 |

| b. | Residential customers, excluding confirmed low income customers and CAP customers |
|---|---|
| Month | 2020 |
| Nov | 9,039 |
| Dec | 8,804 |

| c. | Confirmed low income customers, excluding CAP customers |
|---|---|
| Month | 2020 |
| Nov | 891 |
| Dec | 777 |

| d. | CAP customers |
|---|---|
| Month | 2020 |
| Nov | 4,906 |
| Dec | 4,258 |

CAUSE-PA-I-22 number of customers in debt without an active payment arrangement

| a. | All Residential Customers |
|---|---|
| Month | 2020 |
| Nov | 74,088 |
| Dec | 82,193 |

| b. | Residential customers, excluding confirmed low income customers and CAP customers |
|---|---|
| Month | 2020 |
| Nov | 66,911 |
| Dec | 74,414 |

| c. | Confirmed low income customers, excluding CAP customers |
|---|---|
| Month | 2020 |
| Nov | 860 |
| Dec | 985 |

| d. | CAP customers |
|---|---|
| Month | 2020 |
| Nov | 6,317 |
| Dec | 6,794 |

CAUSE-PA-I-23 the total dollars in debt and the average arrearage level

| a. | All Residential Customers |
|---|---|
| Month | 2020 |
| Nov | $ 6,274,101 |
| Dec | $ 7,128,140 |

| b. | Residential customers, excluding confirmed low income customers and CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 5,016,305 |
| Dec | $ 5,675,409 |

| c. | Confirmed low income customers, excluding CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 320,402 |
| Dec | $ 354,933 |

| d. | CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 937,394 |
| Dec | $ 1,097,798 |

| a. | All Residential Customers |
|---|---|
| Month | 2020 |
| Nov | $ 76 |
| Dec | $ 79 |

| b. | Residential customers, excluding confirmed low income customers and CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 70 |
| Dec | $ 72 |

| c. | Confirmed low income customers, excluding CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 214 |
| Dec | $ 238 |

| d. | CAP customers |
|---|---|
| Month | 2020 |
| Nov | $ 97 |
| Dec | $ 115 |

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To Interrogatories of the
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and Energy Efficiency in Pennsylvania
CAUSE-PA Set IV

Response Date: 02/05/2021

CAUSE-PA-IV-6

Please identify the total amount of in-program CAP customer arrears accrued since March 13, 2020, disaggregated by month, excluding in-program CAP arrears accrued prior to March 13, 2020 and all pre-program CAP arrearages that are otherwise frozen and eligible for forgiveness.

If PECO asserts that it cannot exclude in-program CAP arrears accrued prior to March 13, 2020, please explain the system constraints that prevent this disaggregation, and provide the monthly total of in-program arrears since March 13, 2020.

RESPONSE:

Please refer to Attachment CAUSE-PA-IV-6(a). When a customer receives both electric and gas service from PECO, arrears are not separated by commodity. Therefore, these answers have a 15% allocation to gas; this allocation factor is used to assign administrative and general costs (A&G) between electric and gas utility services. PECO also uses the 15% allocation factor in its annual PUC Universal Services Reporting Requirements.

Responsible Witness: Kelly Colarelli

**CAP customer arrearages since March, 2020**

| Month | Total Past Due |
|---|---|
| Mar | $ 984,640 |
| Apr | $ 975,973 |
| May | $ 968,095 |
| Jun | $ 883,250 |
| Jul | $ 839,376 |
| Aug | $ 881,388 |
| Sep | $ 892,821 |
| Oct | $ 970,650 |
| Nov | $ 979,712 |
| Dec | $ 1,130,514 |

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Response of PECO Energy Company
To Interrogatories of the
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CAUSE-PA Set IV

Response Date: 02/05/2021

CAUSE-PA-IV-12

See PECO Statement 10-R at 3:10-12. Please identify the docket number of the proceeding where PECO was approved to utilize an Interactive Voice Response (IVR) to establish payment arrangements. If PECO did not receive approval from the Commission, please explain why PECO believes Commission approval is not necessary.

RESPONSE:

PECO was approved to utilize an Interactive Voice Response (IVR) to establish payment arrangements, through May 31, 2019, at Docket P-2015-2467894. On February 28, 2019, the Commission amended 52 Pa. Code § 56.97(a) to allow utilities to use both their IVR systems and website for payment agreements by removing the terms "authorized employee" and "through its employees" from 52 Pa. Code 56.97(a). *See* 49 Pa. Bulletin 2815 (June 1, 2019) (Attachment A discussion of 52 Pa. Code § 56.97)

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
To Interrogatories of the
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CAUSE-PA Set IV

Response Date: 02/05/2021

CAUSE-PA-IV-13

See PECO Statement 10-R at 3:10-12. How does PECO identify whether a customer is low income in order to refer them to an appropriate universal service program prior to providing a payment arrangement?

RESPONSE:

For a customer not previously on any universal service programs, a PECO customer service representative would take information regarding income and household size to determine eligibility for universal services and payment agreement terms.

If a customer is already enrolled in a universal service program, the PECO customer service representative would offer the applicable payment arrangement terms based upon the existing financial information for that customer.

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
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CAUSE-PA Set IV

Response Date: 02/05/2021

CAUSE-PA-IV-14

See PECO Statement 10-R at 3:6-7. Does PECO offer longer payment arrangements to low income consumers? Please explain and provide a copy of any guidelines PECO has established regarding the parameters for payment arrangement.

RESPONSE:

Please refer to Attachment CAUSE-PA-IV-14(a).

Responsible Witness: Kelly Colarelli

# PECO Deferred Payments Agreement (DPAs)

## Eligibility

### CAP

CAP customers are eligible for a DPA if:

- CAP re-enrollment (after 12 months)
- BB settlement
- Long period bill

### Non-CAP

Customer can have no more than two (2) unkept agreements in a 5-year period.

| Income Level | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Maximum # of Installments | 60 months Non-Cap<br><br>24 months CAP | 36 months | 12 months | 6 months |
| Minimum Installment Amount | $15.00 | $15.00 | $15.00 | $15.00 |
| Waive Deposit | Yes, with verified income | Yes, with verified income | No | No |

## Restorations

| Income Levels | Level 1 | Level 2 | Level 3 | Level 4 |
|---|---|---|---|---|
| Eligibility | Less than 2 Defaulted DPA, SPA or PUC | Less than 2 Defaulted DPA, SPA or PUC | Less than 2 Defaulted DPA, SPA or PUC | Less than 2 Defaulted DPA, SPA or PUC |
| Required Restoration Payment (excluding theft fees, deposit & restoration fees) | 1/24th of Past Due | 1/12th of Past Due | 1/12th of Past Due | 1/3rd of Past Due |
| Deposit | N/A Bankruptcy must be paid | N/A Bankruptcy must be paid | Required as part of Restoration Requirements | Required as part of Restoration Requirements |
| Agreement Installment Amount | 1/23rd of Remaining Account Balance | 1/11th of Remaining Account Balance | 1/11th of Remaining Account Balance | 1/2 of Remaining Account Balance |
| Agreement Terms | 23 Months | 11th Months | 11th Months | 2 Months |

## CAP Reduced Restoration Eligibility

*CAP customers with an active PPA are not eligible for reduced restoration.*

| Agreement Type PPA | DPA # Un-kept Agreements | Qualify for Reduced Restoration? |
|---|---|---|
| PPA = No | 1 | Yes |
| PPA = No | 2 | No |
| PPA = Yes | 2 | No |
| PPA = Yes | 1 | No |
| PPA = Yes | 0 | Yes |

Pennsylvania Public Utility Commission
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To Interrogatories of the
The Coalition for Affordable Utility Services
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CAUSE-PA Set IV

Response Date: 02/05/2021

CAUSE-PA-IV-15

If the information provided in response to CAUSE-PA to PECO IV-14 has changed at any point since March 13, 2020 as a result of the pandemic, please also provide a copy of any guidelines PECO established regarding the parameters for payment arrangements prior to this change.

RESPONSE:

Since March 13,2020, the changes compared to the response to CAUSE-PA-IV-14 are the following:

1) Down payments are not required on any payment agreements.

   If a customer is not eligible for an income-based agreement due to previous defaults, PECO will offer a payment arrangement of 12 - 24 months, with no down payment required

Responsible Witness: Kelly Colarelli

Pennsylvania Public Utility Commission
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Response of PECO Energy Company
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Response Date: 02/05/2021

CAUSE-PA-IV-16

See PECO Statement 10-R at 4:7-8. It is PECO's position that the referenced Petition is still under active consideration by the Commission without further action by PECO?

RESPONSE:

At the August 6, 2020 Public Meeting, Commissioner Sweet made a Motion to approve PECO's Petition. The Commission split 2-2 on that Motion, and it therefore did not pass. PECO does not know whether the referenced Petition is still under active consideration by the Commission.

Responsible Witness: Kelly Colarelli

# APPENDIX B

**Sample PECO CAP Bill-** Dual Electric and Gas

PECO
An Exelon Company

Emergency and Repairs: 1-800-841-4141. This is the number to call to report power outages, gas leaks or odors, and safety hazards related to PECO Equipment. For all other business, call 1-800-494-4000



Name:
**Account Number:**
Phone Number:
Service Address:

## Billing Summary

| | |
|---|---|
| Bill Date | 01/27/2017 |
| Charges from previous bill | $372.54 |
| InPA: In Program Arrearage | $1.00 |
| InPA: In Program Arrearage | $1.00 |
| InPA: In Program Arrearage | $1.00 |
| Late payment charge | $12.33 |
| **Total Other Charges** | **$387.87** |

## Current Period Charges

| | |
|---|---|
| Gas | $36.06 |
| Electric | $94.76 |
| **Total New Charges** | **$130.82** |
| **Total Amount Due on 02/21/2017** | **$518.69** |

8718-01-0008259-0001-0004290

## General Information

Next scheduled meter reading: **March 01, 2017**
PECO, 2301 Market Street, Philadelphia, PA 19103-1380. If you have any questions or concerns, please call **1-800-494-4000** before the due date. Si tiene alguna pregunta, favor de llamar al numero **1-800-494-4000** antes de la fecha de vencimiento.

**Customer Self Service - Manage Your Account 24/7**
- **www.peco.com/ebill** - Go paperless: receive and pay your bill
- **www.peco.com/service** - Start, stop and transfer your service
- **www.peco.com/SmartIdeas** - Save energy and money
- Pay by phone with credit/debit card at **1-877-432-9384** ($2.35 fee)

## Message Center

**From PECO:**

Your original PPA balance was $224.01 and is currently $93.32.

You are enrolled in PECO's Customer Assistance Program (CAP). A credit may be applied to your monthly bills to provide you affordable service.

New charges contain estimated total state taxes of $7.56, including $5.59 for State Gross Receipts Tax.

Your **Total Account Balance of $654.69** includes your Total Amount Due and all other Arrangement/Agreement balances that are on this account.

## In-Program Arrearage

| | |
|---|---|
| Installment Plan Balance | $136.00 |
| Current Installment | $1.00 |
| Additional Forgiveness | $2.00 |
| Number of Remaining Payments | 43 |

When paying in person, please bring the entire bill.

(continued on next page)

Return only this portion with your check made payable to PECO. Please write your account number on your check.

PECO
An Exelon Company

☐ **Check here to enroll in Power Pay automatic account debit and complete form on reverse side.**

☐ **Check here to pledge a donation to MEAF and complete form on reverse side.**

**To pay by phone call 1-877-432-9384.**
**A convenience fee will apply.**

0008259 01 AV 0.370 **AUTO T8 0 8718 18974-351612 -C01-B1-P08267-I123 567

Account Number

Payment Receipt Stamp

Payment Amount

**Please pay this amount by 02/21/2017** **$518.69**

PECO - PAYMENT PROCESSING
PO BOX 37629
PHILADELPHIA PA 19101-0629

3670201807000051869705205186 98

PECO
An Exelon Company

Emergency and Repairs: 1-800-841-4141. This is the number to call to report power outages, gas leaks or odors, and safety hazards related to PECO Equipment. For all other business, call 1-800-494-4000

Name:



**Account Number:**

## Meter Information

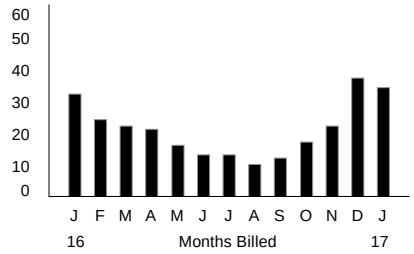
| Read Date | Meter Number | Load Type | Reading Type | Meter Reading Previous | Meter Reading Present | Difference | Multiplier X | Usage |
|---|---|---|---|---|---|---|---|---|
| 01/27 | 133002328 | General Service | Total Ccf | 2418 Actual | 2452 Actual | 34 | 1 | 34 |
| 01/27 | 122171953 | General Service | Tot kWh | 22781 Actual | 23416 Actual | 635 | 1 | 635 |

Total Ccf Used . . . . . 34
Total kWh Used . . . . . 635

## Gas Residential Heating Service CAP - Current Period Detail — Service 12/27/2016 to 01/27/2017 - 31 days

| | | | | |
|---|---|---|---|---|
| Customer charge | | | | $11.75 |
| Natural Gas Supply Charges | 34 Ccf | X | $0.36455 | 12.39 |
| Distribution Charges | 34 Ccf | X | 0.35001 | 11.90 |
| Balancing Service Charges | 34 Ccf | X | 0.04967 | 1.69 |
| Gas Cost Adjustment Charges | 34 Ccf | X | -0.04308 | -1.46 |
| State Tax Adjustment | | | | -0.21 |
| **Total Current Charges** | | | | **$36.06** |

13-Month Usage (Total Ccf)




### Your Usage Profile

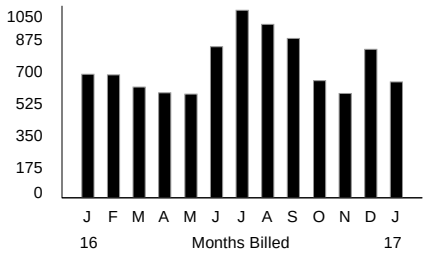
| Period | Usage | Avg Daily Usage | Days | Avg Daily Temp |
|---|---|---|---|---|
| **Current Month** | **34** | **1.1** | **31** | **40** |
| Last Month | 37 | 1.1 | 35 | 41 |
| Last Year | 32 | 1.0 | 31 | 36 |

| | |
|---|---|
| Avg Ccf per Month | 20 |
| Total Annual Ccf Usage | 241 |

## Electric Residential Service CAP - Current Period Detail — Service 12/27/2016 to 01/27/2017 - 31 days

| | | | | |
|---|---|---|---|---|
| Customer charge | | | | $8.43 |
| Generation Charges | 635 kWh | X | $0.06887 | 43.73 |
| Transmission Charges | 635 kWh | X | 0.00580 | 3.68 |
| Distribution Charges | 635 kWh | X | 0.06788 | 43.10 |
| State Tax Adjustment | | | | -0.01 |
| CAP Credit | | | | $-4.17 |
| **Total Current Charges** | | | | **$94.76** |

13-Month Usage (Total kWh)




### Your Usage Profile

| Period | Usage | Avg Daily Usage | Days | Avg Daily Temp |
|---|---|---|---|---|
| **Current Month** | **635** | **20.5** | **31** | **40** |
| Last Month | 814 | 23.3 | 35 | 41 |
| Last Year | 677 | 21.8 | 31 | 36 |

| | |
|---|---|
| Avg kWh per Month | 730 |
| Total Annual kWh Usage | 8,767 |

8718-01-0008259-0001-0004290

DO NOT MAIL THIS PORTION WITH YOUR PAYMENT

# APPENDIX C

Roger Colton, The Home Energy Affordability Gap: Pennsylvania 2019 (published April 2020), *available at* http://www.homeenergyaffordabilitygap.com/03a_affordabilityData.html

PENNSYLVANIA

# THE HOME ENERGY AFFORDABILITY GAP 2019

**(2ND SERIES) PUBLISHED APRIL 2020**

## Finding #1

| Poverty Level | Home Energy Burden |
|---|---|
| Below 50% | 31% |
| 50 – 100% | 17% |
| 100 – 125% | 11% |
| 125 – 150% | 9% |
| 150 – 185% | 8% |
| 185% - 200% | 7% |

Home energy is a crippling financial burden for low-income Pennsylvania households. Pennsylvania households with incomes of below 50% of the Federal Poverty Level pay 31% of their annual income simply for their home energy bills.

Home energy unaffordability, however, is not only the province of the very poor. Bills for households with incomes between 150% and 185% of Poverty take up 8% of income. Pennsylvania households with incomes between 185% and 200% of the Federal Poverty Level have energy bills equal to 7% of income.

## Finding #2

| Poverty Level | Number of Households | |
|---|---|---|
| | Last Year | This Year |
| Below 50% | 299,949 | 290,835 |
| 50 – 100% | 358,086 | 351,184 |
| 100 – 125% | 199,277 | 198,793 |
| 125 – 150% | 204,756 | 199,025 |
| 150 – 185% | 297,872 | 295,130 |
| 185% - 200% | 128,063 | 127,155 |
| Total < 200% | 1,488,003 | 1,462,122 |

The number of households facing unaffordable home energy burdens is staggering. According to the most recent five-year American Community Survey, nearly 291,000 Pennsylvania households live with income at or below 50% of the Federal Poverty Level and face a home energy burden of 31%. And more than 351,000 *additional* Pennsylvania households live with incomes between 50% and 100% of the Federal Poverty Level and face a home energy burden of 17%.

In 2019 the total number of Pennsylvania households below 200% of the Federal Poverty Level stayed relatively constant from the prior year.

## Finding #3

| | |
|---|---|
| Home Energy Affordability Gap: 2011 (base year) | $1,872,227,794 |
| Home Energy Affordability Gap: 2019 (current year) | $1,662,749,294 |
| Home Energy Affordability Gap Index (2011 = 100) | 88.8 |

The Home Energy Affordability Gap Index (2nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In Pennsylvania, this Index was 88.8 for 2019.

The Home Energy Affordability Gap Index (2nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.

## Finding #4

| | Last Year | This Year |
|---|---|---|
| Gross LIHEAP Allocation ($000's) | $178,634 | $206,488 |
| Number of Households <150% FPL | 1,062,068 | 1,039,837 |
| Heating/Cooling Bills "Covered" by LIHEAP | 156,148 | 186,025 |

Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in Pennsylvania. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation to Pennsylvania was $206.5 million in 2019 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 186,025.

In comparison, the gross LIHEAP allocation to Pennsylvania in 2018 reached $178.6 million and covered 156,148 average annual bills.

## Finding #5

| Primary Heating Fuel | Penetration by Tenure | |
|---|---|---|
| | Owner | Renter |
| Electricity | 17% | 35% |
| Natural gas | 52% | 49% |
| Fuel Oil | 20% | 10% |
| Propane | 5% | 3% |
| All other | 6% | 3% |
| Total | 100% | 100% |

The Home Energy Affordability Gap in Pennsylvania is not solely a function of household incomes and fuel prices. It is also affected by the extent to which low-income households use each fuel. All other things equal, the Affordability Gap will be greater in areas where more households use more expensive fuels.

In 2019, the primary heating fuel for Pennsylvania homeowners was Natural Gas (52% of homeowners). The primary heating fuel for Pennsylvania renters was also Natural Gas (49% of renters).

Changes in the prices of home energy fuels over time are presented in Finding #6 below.

## Finding #6

| Fuel | 2017 Price | 2018 Price | 2019 Price |
|---|---|---|---|
| Natural gas heating (ccf) | $1.087 | $1.140 | $1.106 |
| Electric heating (kWh) | $0.150 | $0.147 | $0.143 |
| Propane heating (gallon) | $3.345 | $3.225 | $3.161 |
| Fuel Oil heating (gallon) | $2.495 | $3.021 | $2.940 |
| Electric cooling (kWh) | $0.151 | $0.146 | $0.145 |

In Pennsylvania, natural gas prices stayed relatively constant during the 2018/2019 winter heating season. Fuel oil prices stayed relatively constant and propane prices stayed relatively constant.

Heating season electric prices stayed relatively constant in the same period and cooling season electric prices stayed relatively constant.

# Home Energy Affordability Gap Dashboard -- Pennsylvania 2019 versus 2018

| | |
|---|---|
| **AVERAGE DOLLAR AMOUNT BY WHICH ACTUAL HOME ENERGY BILLS EXCEEDED AFFORDABLE HOME ENERGY BILLS FOR HOUSEHOLDS BELOW 200% OF POVERTY LEVEL.**<br><br>2018: $1,212 per household<br><br>**2019: $1,137 PER HOUSEHOLD** | AVERAGE TOTAL HOME ENERGY BURDEN FOR HOUSEHOLDS BELOW 50% OF POVERTY LEVEL.<br><br>2018: 32% of household income<br><br>**2019: 31% OF HOUSEHOLD INCOME** |
| PERCENT OF INDIVIDUALS BELOW 100% OF POVERTY LEVEL.<br><br>2018: 13% of all individuals<br><br>**2019: 13% OF ALL INDIVIDUALS** | NUMBER OF AVERAGE LOW-INCOME HEATING/COOLING BILLS COVERED BY FEDERAL HOME ENERGY ASSISTANCE.<br><br>2018: 156,148 bills covered<br><br>**2019: 186,025 BILLS COVERED** |
| PRIMARY HEATING FUEL (2019):<br><br>HOMEOWNERS - NATURAL GAS *** TENANTS - NATURAL GAS | |

## NOTES AND EXPLANATIONS

The 2012 Home Energy Affordability Gap, published in May 2013, introduced the 2nd Series of the annual Affordability Gap analysis. The 2012 Home Energy Affordability Gap going forward cannot be directly compared to the Affordability Gap (1st Series) for 2011 and earlier years. While remaining fundamentally the same, several improvements have been introduced in both data and methodology in the Affordability Gap (2nd Series).

The most fundamental change in the Home Energy Affordability Gap (2nd Series) is the move to a use of the American Community Survey (ACS) (5-year data) as the source of foundational demographic data. The Affordability Gap (1st Series) relied on the 2000 Census as its source of demographic data. The ACS (5-year data) offers several advantages compared to the Decennial Census. While year-to-year changes are smoothed out through use of 5-year averages, the ACS nonetheless is updated on an annual basis. As a result, numerous demographic inputs into the Affordability Gap (2nd Series) will reflect year-to-year changes on a county-by-county basis, including:

- The distribution of heating fuels by tenure;
- The average household size by tenure;
- The number of rooms per housing unit by tenure;
- The distribution of owner/renter status;
- The distribution of household size;
- The distribution of households by ratio of income to Poverty Level;

Data on housing unit size (both heated square feet and cooled square feet) is no longer calculated based on the number of rooms. Instead, Energy Information Administration/Department of Energy (EIA/DOE) data on square feet of heated and cooled living space per household member is used beginning with the Home Energy Affordability Gap (2nd Series). A distinction is now made between heated living space and cooled living space, rather than using total living space.

The change resulting in perhaps the greatest dollar difference in the aggregate and average Affordability Gap for each state is a change in the treatment of income for households with income at or below 50% of the Federal Poverty Level. In recent years, it has become more evident that income for households with income below 50% of Poverty Level is not normally distributed. Rather than using the mid-point of the Poverty range (i.e., 25% of Poverty Level) to determine income for these households, income is set somewhat higher (40% of Poverty). By setting income higher, both the average and aggregate Affordability Gap results not only for that Poverty range, but also for the state as a whole, will be lower. The Affordability Gap results for other Poverty ranges remain unaffected by this change.

Another change affecting both the aggregate and average Affordability Gap is a change in the definition of "low-income." The Home Energy Affordability Gap (2nd Series) has increased the definition of "low-income" to 200% of the Federal Poverty Level (up from 185% of Poverty). While this change may increase the aggregate Affordability Gap, it is likely to decrease the average Affordability Gap. Since more households are added to the analysis, the aggregate is likely to increase, but since the contribution of each additional household is less than the contributions of households with lower incomes, the overall average will most likely decrease.

Most of the Home Energy Affordability Gap calculation remains the same. All references to "states" include the District of Columbia as a "state." Low-income home energy bills are calculated in a two-step process: First, low-income energy consumption is calculated for the following end-uses: (1) space heating; (2) space cooling; (3) domestic hot water; and (4) electric appliances (including lighting and refrigeration). All space cooling and appliance consumption is assumed to involve only electricity. Second, usage is multiplied by a price per unit of energy by fuel type and end use by time of year. The

price of electricity, for example, used for space cooling (cooling months), space heating (heating months), and appliances (total year) differs to account for the time of year in which the consumption is incurred.

Each state's Home Energy Affordability Gap is calculated on a county-by-county basis. Once total energy bills are determined for each county, each county is weighted by the percentage of persons at or below 200% of the Federal Poverty Level to the total statewide population at or below 200% of the Federal Poverty Level to derive a statewide result. Bills are calculated by end-use and summed before county weighting.

LIHEAP comparisons use gross allotments from annual baseline LIHEAP appropriations as reported by the federal LIHEAP office. They do not reflect supplemental appropriations or the release of LIHEAP "emergency" funds. The number of average heating/cooling bills covered by each state's LIHEAP allocation is determined by dividing the total base LIHEAP allocation for each state by the average heating/cooling bill in that state, the calculation of which is explained below. No dollars are set aside for administration; nor are Tribal set-asides considered.

State financial resources and utility-specific rate discounts are not considered in the calculation of the Affordability Gap. Rather, such funding should be considered available to fill the Affordability Gap. While the effect in any given state may perhaps seem to be the same, experience shows there to be an insufficiently authoritative source of state-by-state data, comprehensively updated on an annual basis, to be used as an input into the annual Affordability Gap calculation.

Energy bills are a function of the following primary factors:

- Tenure of household (owner/renter)
- Housing unit size (by tenure)
- Heating Degree Days (HDDs) and Cooling Degree Days (CDDs)
- Housing size (by tenure)
- Heating fuel mix (by tenure)
- Energy use intensities (by fuel and end use)

Bills are estimated using the U.S. Department of Energy's "energy intensities" published in the DOE's Residential Energy Consumption Survey (RECS). The energy intensities used for each state are those published for the Census Division in which the state is located. Heating Degree Days (HDDs) and Cooling Degree Days (CDDs) are obtained from the National Weather Service's Climate Prediction Center on a county-by-county basis for the entire country.

End-use consumption by fuel is multiplied by fuel-specific price data to derive annual bills. State price data for each end-use is obtained from the Energy Information Administration's (EIA) fuel-specific price reports (e.g., Natural Gas Monthly, Electric Power Monthly). State-specific data on fuel oil and kerosene is not available for all states. For those states in which these bulk fuels have insufficient penetration for state-specific prices to be published, prices from the Petroleum Administration for Defense Districts (PADD) of which the state is a part are used.

The Home Energy Affordability Gap Index (2nd Series) uses 2011 as its base year. The base year (2011) Index has been set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap has increased since 2011. A current year Index of less than 100 indicates that the Affordability Gap has decreased since 2011. The Affordability Gap Index was, in other words, re-set in 2011. The Affordability Gap Index (2nd Series) for 2012 and beyond cannot be compared to the Affordability Gap Index (1st Series) for 2011 and before.

The Home Energy Affordability Gap is a function of many variables, annual changes in which are now tracked for nearly all of them. For example, all other things equal: increases in income would result in

decreases in the Affordability Gap; increases in relative penetrations of high-cost fuels would result in an increase in the Gap; increases in amount of heated or cooled square feet of living space would result in an increase in the Gap. Not all variables will result in a change in the Affordability Gap in the same direction. The annual Affordability Gap Index allows the reader to determine the net cumulative impact of these variables, but not the impact of individual variables.

Since the Affordability Gap is calculated assuming normal Heating Degree Days (HDDs) and Cooling Degree Days (CDDs), annual changes in weather do not have an impact on the Affordability Gap or on the Affordability Gap Index.

Price data for the various fuels underlying the calculation of the Home Energy Affordability Gap (2nd Series) was used from the following time periods:

| | |
|---|---|
| ***Heating prices*** | |
| **Natural gas** | February 2019 |
| **Fuel oil ***** | Week of 02/11/2019 |
| **Liquefied petroleum gas (LPG) ***** | Week of 02/11/2019 |
| **Electricity** | February 2019 |
| **Cooling prices** | August 2019 |
| ***Non-heating prices*** | |
| **Natural gas** | May 2019 |
| **Fuel oil ***** | Week of 10/07/2019 |
| **Liquefied petroleum gas (LPG) ***** | Week of 10/07/2019 |
| **Electricity** | May 2019 |

*****Monthly bulk fuel prices are no longer published. Weekly bulk fuel prices are published during the heating months (October through March). The prices used are taken from the weeks most reflective of the end-uses to which they are to be applied. Prices from the middle of February best reflect heating season prices. Bulk fuel prices from October best reflect non-heating season prices.**

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- Less than 50% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $2,319 | 1,541 | $3,573,889 | 36.3% |
| Allegheny County | $1,572 | 30,835 | $48,485,912 | 28.0% |
| Armstrong County | $1,835 | 1,426 | $2,617,375 | 30.9% |
| Beaver County | $1,722 | 3,230 | $5,561,469 | 29.5% |
| Bedford County | $2,539 | 990 | $2,513,349 | 39.6% |
| Berks County | $2,155 | 8,980 | $19,349,404 | 33.5% |
| Blair County | $1,922 | 3,226 | $6,201,363 | 32.1% |
| Bradford County | $2,348 | 1,221 | $2,866,987 | 37.1% |
| Bucks County | $2,168 | 6,843 | $14,838,987 | 33.7% |
| Butler County | $1,988 | 2,820 | $5,605,888 | 32.8% |
| Cambria County | $2,061 | 3,705 | $7,637,141 | 34.7% |
| Cameron County | $1,849 | 126 | $233,018 | 32.9% |
| Carbon County | $2,347 | 1,370 | $3,214,707 | 37.0% |
| Centre County | $2,117 | 7,237 | $15,318,291 | 33.9% |
| Chester County | $2,268 | 6,081 | $13,794,598 | 34.7% |
| Clarion County | $1,911 | 1,092 | $2,086,989 | 31.8% |
| Clearfield County | $2,434 | 1,961 | $4,772,957 | 38.7% |
| Clinton County | $2,444 | 1,001 | $2,446,401 | 37.7% |
| Columbia County | $2,227 | 2,132 | $4,748,407 | 36.4% |
| Crawford County | $2,227 | 1,768 | $3,937,375 | 36.1% |
| Cumberland County | $1,944 | 3,328 | $6,469,368 | 32.2% |
| Dauphin County | $1,868 | 7,037 | $13,145,921 | 31.1% |
| Delaware County | $1,870 | 9,838 | $18,399,988 | 29.8% |
| Elk County | $1,922 | 559 | $1,074,432 | 33.0% |
| Erie County | $1,805 | 7,964 | $14,372,258 | 30.2% |
| Fayette County | $1,992 | 4,368 | $8,700,330 | 33.0% |
| Forest County | $2,124 | 104 | $220,927 | 37.5% |
| Franklin County | $2,105 | 2,164 | $4,556,075 | 33.4% |
| Fulton County | $2,376 | 288 | $684,318 | 37.6% |
| Greene County | $1,925 | 890 | $1,712,866 | 31.9% |
| Huntingdon County | $2,397 | 906 | $2,171,636 | 38.2% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- Less than 50% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $1,946 | 2,631 | $5,119,940 | 32.3% |
| Jefferson County | $2,062 | 1,030 | $2,123,413 | 33.9% |
| Juniata County | $2,644 | 316 | $835,404 | 39.9% |
| Lackawanna County | $1,936 | 6,254 | $12,108,613 | 32.2% |
| Lancaster County | $2,166 | 8,560 | $18,542,486 | 33.5% |
| Lawrence County | $1,880 | 2,092 | $3,933,887 | 31.7% |
| Lebanon County | $2,263 | 2,676 | $6,055,649 | 35.3% |
| Lehigh County | $2,099 | 7,482 | $15,706,322 | 33.1% |
| Luzerne County | $2,007 | 8,633 | $17,324,168 | 32.9% |
| Lycoming County | $2,084 | 2,824 | $5,886,120 | 34.1% |
| McKean County | $1,899 | 1,204 | $2,286,433 | 32.3% |
| Mercer County | $1,857 | 2,535 | $4,708,553 | 31.5% |
| Mifflin County | $2,284 | 803 | $1,834,037 | 36.6% |
| Monroe County | $2,771 | 2,890 | $8,009,209 | 39.1% |
| Montgomery County | $1,949 | 9,033 | $17,605,659 | 31.2% |
| Montour County | $2,062 | 361 | $744,285 | 34.0% |
| Northampton County | $2,176 | 4,224 | $9,192,693 | 34.1% |
| Northumberland County | $2,054 | 2,508 | $5,152,536 | 34.5% |
| Perry County | $2,458 | 685 | $1,684,025 | 38.1% |
| Philadelphia County | $1,573 | 69,580 | $109,464,948 | 26.2% |
| Pike County | $2,650 | 923 | $2,446,281 | 40.5% |
| Potter County | $2,207 | 329 | $726,002 | 34.5% |
| Schuylkill County | $2,428 | 3,193 | $7,752,309 | 39.1% |
| Snyder County | $2,403 | 629 | $1,511,468 | 36.7% |
| Somerset County | $2,349 | 1,487 | $3,492,310 | 37.8% |
| Sullivan County | $2,423 | 157 | $380,441 | 40.9% |
| Susquehanna County | $2,956 | 910 | $2,690,238 | 45.9% |
| Tioga County | $2,152 | 831 | $1,788,557 | 34.1% |
| Union County | $2,188 | 801 | $1,752,732 | 35.2% |
| Venango County | $1,947 | 1,071 | $2,084,968 | 32.5% |
| Warren County | $1,996 | 839 | $1,674,590 | 33.4% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- Less than 50% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $1,908 | 3,080 | $5,876,582 | 31.5% |
| Wayne County | $2,941 | 769 | $2,261,931 | 44.1% |
| Westmoreland County | $1,834 | 6,273 | $11,505,814 | 31.2% |
| Wyoming County | $2,826 | 487 | $1,376,183 | 43.0% |
| York County | $2,000 | 7,704 | $15,405,547 | 31.9% |
| Total Pennsylvania | $1,899 | 290,835 | $552,356,956 | 31.06% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 50% - 99% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $1,918 | 1,898 | $3,639,759 | 19.4% |
| Allegheny County | $1,198 | 34,704 | $41,569,453 | 15.0% |
| Armstrong County | $1,449 | 1,858 | $2,691,865 | 16.5% |
| Beaver County | $1,337 | 4,494 | $6,008,499 | 15.7% |
| Bedford County | $2,142 | 1,506 | $3,225,637 | 21.1% |
| Berks County | $1,743 | 10,841 | $18,895,774 | 17.9% |
| Blair County | $1,536 | 4,314 | $6,624,744 | 17.1% |
| Bradford County | $1,952 | 1,753 | $3,422,055 | 19.8% |
| Bucks County | $1,758 | 7,551 | $13,272,314 | 18.0% |
| Butler County | $1,598 | 3,489 | $5,576,993 | 17.5% |
| Cambria County | $1,684 | 5,037 | $8,481,904 | 18.5% |
| Cameron County | $1,489 | 197 | $293,268 | 17.6% |
| Carbon County | $1,950 | 1,839 | $3,585,356 | 19.8% |
| Centre County | $1,718 | 3,411 | $5,859,851 | 18.1% |
| Chester County | $1,853 | 6,831 | $12,658,064 | 18.5% |
| Clarion County | $1,522 | 1,479 | $2,250,607 | 16.9% |
| Clearfield County | $2,044 | 2,683 | $5,482,867 | 20.7% |
| Clinton County | $2,040 | 1,565 | $3,192,055 | 20.1% |
| Columbia County | $1,842 | 1,661 | $3,060,219 | 19.4% |
| Crawford County | $1,838 | 3,137 | $5,767,364 | 19.2% |
| Cumberland County | $1,554 | 3,983 | $6,191,444 | 17.2% |
| Dauphin County | $1,477 | 7,255 | $10,714,217 | 16.6% |
| Delaware County | $1,458 | 10,951 | $15,962,608 | 15.9% |
| Elk County | $1,548 | 787 | $1,218,581 | 17.6% |
| Erie County | $1,413 | 9,949 | $14,061,353 | 16.1% |
| Fayette County | $1,605 | 5,326 | $8,549,109 | 17.6% |
| Forest County | $1,770 | 131 | $231,886 | 20.0% |
| Franklin County | $1,702 | 4,042 | $6,879,560 | 17.8% |
| Fulton County | $1,981 | 391 | $774,604 | 20.0% |
| Greene County | $1,535 | 1,126 | $1,728,540 | 17.0% |
| Huntingdon County | $2,007 | 1,335 | $2,678,768 | 20.4% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 50% - 99% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $1,557 | 3,060 | $4,765,889 | 17.2% |
| Jefferson County | $1,674 | 1,528 | $2,557,824 | 18.1% |
| Juniata County | $2,235 | 799 | $1,785,555 | 21.3% |
| Lackawanna County | $1,549 | 6,831 | $10,578,090 | 17.2% |
| Lancaster County | $1,753 | 11,384 | $19,951,503 | 17.9% |
| Lawrence County | $1,497 | 3,110 | $4,654,298 | 16.9% |
| Lebanon County | $1,858 | 2,865 | $5,322,354 | 18.8% |
| Lehigh County | $1,692 | 9,775 | $16,540,523 | 17.6% |
| Luzerne County | $1,615 | 10,410 | $16,816,606 | 17.6% |
| Lycoming County | $1,695 | 3,676 | $6,230,329 | 18.2% |
| McKean County | $1,520 | 1,663 | $2,527,407 | 17.2% |
| Mercer County | $1,475 | 3,986 | $5,880,903 | 16.8% |
| Mifflin County | $1,893 | 1,948 | $3,686,924 | 19.5% |
| Monroe County | $2,332 | 3,640 | $8,487,665 | 20.9% |
| Montgomery County | $1,543 | 10,523 | $16,235,693 | 16.6% |
| Montour County | $1,675 | 475 | $795,654 | 18.1% |
| Northampton County | $1,770 | 6,154 | $10,893,439 | 18.2% |
| Northumberland County | $1,676 | 2,952 | $4,947,922 | 18.4% |
| Perry County | $2,057 | 854 | $1,756,602 | 20.3% |
| Philadelphia County | $1,165 | 78,620 | $91,608,568 | 14.0% |
| Pike County | $2,247 | 1,250 | $2,808,728 | 21.6% |
| Potter County | $1,801 | 609 | $1,096,524 | 18.4% |
| Schuylkill County | $2,043 | 4,262 | $8,707,672 | 20.9% |
| Snyder County | $1,992 | 927 | $1,846,739 | 19.6% |
| Somerset County | $1,961 | 2,207 | $4,327,848 | 20.2% |
| Sullivan County | $2,059 | 225 | $463,230 | 21.8% |
| Susquehanna County | $2,567 | 1,205 | $3,093,056 | 24.5% |
| Tioga County | $1,750 | 1,469 | $2,570,525 | 18.2% |
| Union County | $1,794 | 876 | $1,571,619 | 18.7% |
| Venango County | $1,561 | 1,971 | $3,076,746 | 17.3% |
| Warren County | $1,613 | 1,324 | $2,135,585 | 17.8% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 50% - 99% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $1,516 | 4,743 | $7,189,169 | 16.8% |
| Wayne County | $2,536 | 1,417 | $3,593,738 | 23.5% |
| Westmoreland County | $1,452 | 8,907 | $12,934,323 | 16.6% |
| Wyoming County | $2,425 | 639 | $1,549,732 | 23.0% |
| York County | $1,594 | 9,376 | $14,949,552 | 17.0% |
| Total Pennsylvania | $1,516 | 351,184 | $532,487,852 | 16.68% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 100% - 124% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $1,487 | 1,158 | $1,722,503 | 12.9% |
| Allegheny County | $796 | 19,400 | $15,451,506 | 10.0% |
| Armstrong County | $1,035 | 1,632 | $1,688,319 | 11.0% |
| Beaver County | $925 | 2,997 | $2,771,343 | 10.5% |
| Bedford County | $1,717 | 962 | $1,651,398 | 14.1% |
| Berks County | $1,302 | 6,526 | $8,495,888 | 11.9% |
| Blair County | $1,121 | 2,266 | $2,540,980 | 11.4% |
| Bradford County | $1,528 | 1,204 | $1,839,568 | 13.2% |
| Bucks County | $1,318 | 4,649 | $6,125,264 | 12.0% |
| Butler County | $1,181 | 2,028 | $2,395,430 | 11.7% |
| Cambria County | $1,280 | 2,499 | $3,197,663 | 12.3% |
| Cameron County | $1,102 | 109 | $120,143 | 11.7% |
| Carbon County | $1,524 | 969 | $1,477,139 | 13.2% |
| Centre County | $1,291 | 1,853 | $2,391,688 | 12.0% |
| Chester County | $1,408 | 5,000 | $7,039,574 | 12.3% |
| Clarion County | $1,104 | 789 | $871,401 | 11.3% |
| Clearfield County | $1,625 | 1,716 | $2,789,002 | 13.8% |
| Clinton County | $1,606 | 572 | $918,900 | 13.4% |
| Columbia County | $1,430 | 1,098 | $1,570,246 | 12.9% |
| Crawford County | $1,422 | 1,734 | $2,466,129 | 12.8% |
| Cumberland County | $1,137 | 2,741 | $3,117,054 | 11.5% |
| Dauphin County | $1,058 | 4,990 | $5,277,145 | 11.0% |
| Delaware County | $1,016 | 6,831 | $6,936,916 | 10.6% |
| Elk County | $1,148 | 599 | $687,666 | 11.7% |
| Erie County | $994 | 5,107 | $5,076,781 | 10.7% |
| Fayette County | $1,191 | 3,013 | $3,588,113 | 11.7% |
| Forest County | $1,391 | 100 | $139,064 | 13.3% |
| Franklin County | $1,270 | 2,672 | $3,392,985 | 11.9% |
| Fulton County | $1,558 | 302 | $470,469 | 13.4% |
| Greene County | $1,118 | 584 | $652,821 | 11.4% |
| Huntingdon County | $1,588 | 807 | $1,281,759 | 13.6% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 100% - 124% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $1,141 | 1,882 | $2,147,744 | 11.5% |
| Jefferson County | $1,259 | 1,020 | $1,283,860 | 12.1% |
| Juniata County | $1,797 | 387 | $695,277 | 14.2% |
| Lackawanna County | $1,133 | 4,300 | $4,873,016 | 11.5% |
| Lancaster County | $1,309 | 6,980 | $9,140,053 | 11.9% |
| Lawrence County | $1,085 | 2,115 | $2,295,313 | 11.3% |
| Lebanon County | $1,424 | 2,082 | $2,963,805 | 12.6% |
| Lehigh County | $1,256 | 5,888 | $7,395,082 | 11.8% |
| Luzerne County | $1,196 | 5,511 | $6,592,079 | 11.7% |
| Lycoming County | $1,278 | 1,575 | $2,012,212 | 12.1% |
| McKean County | $1,113 | 952 | $1,060,010 | 11.5% |
| Mercer County | $1,066 | 1,947 | $2,075,646 | 11.2% |
| Mifflin County | $1,473 | 1,128 | $1,662,008 | 13.0% |
| Monroe County | $1,861 | 2,233 | $4,155,170 | 13.9% |
| Montgomery County | $1,108 | 6,866 | $7,605,498 | 11.1% |
| Montour County | $1,261 | 235 | $296,282 | 12.1% |
| Northampton County | $1,335 | 4,039 | $5,391,932 | 12.1% |
| Northumberland County | $1,271 | 2,160 | $2,744,901 | 12.3% |
| Perry County | $1,627 | 744 | $1,210,273 | 13.6% |
| Philadelphia County | $728 | 33,098 | $24,096,847 | 9.3% |
| Pike County | $1,815 | 642 | $1,165,098 | 14.4% |
| Potter County | $1,365 | 435 | $593,932 | 12.3% |
| Schuylkill County | $1,631 | 3,358 | $5,476,214 | 13.9% |
| Snyder County | $1,552 | 715 | $1,109,696 | 13.1% |
| Somerset County | $1,546 | 1,343 | $2,075,850 | 13.4% |
| Sullivan County | $1,668 | 150 | $250,257 | 14.5% |
| Susquehanna County | $2,150 | 745 | $1,601,437 | 16.3% |
| Tioga County | $1,319 | 931 | $1,227,665 | 12.1% |
| Union County | $1,372 | 496 | $680,433 | 12.5% |
| Venango County | $1,148 | 1,147 | $1,316,428 | 11.6% |
| Warren County | $1,203 | 763 | $917,637 | 11.9% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 100% - 124% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $1,095 | 3,309 | $3,624,970 | 11.2% |
| Wayne County | $2,102 | 827 | $1,738,339 | 15.7% |
| Westmoreland County | $1,043 | 4,740 | $4,943,048 | 11.1% |
| Wyoming County | $1,996 | 460 | $918,178 | 15.3% |
| York County | $1,160 | 6,683 | $7,754,090 | 11.3% |
| **Total Pennsylvania** | $1,123 | 198,793 | $223,235,135 | 11.27% |

# Pennsylvania 2019
# Home Energy Affordability Gap
(Published April 2020)

| County_Only | Shortfall Calculation -- 125% - 149% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $1,201 | 1,354 | $1,625,722 | 10.6% |
| Allegheny County | $529 | 18,736 | $9,909,402 | 8.2% |
| Armstrong County | $758 | 1,173 | $889,506 | 9.0% |
| Beaver County | $650 | 2,710 | $1,761,065 | 8.6% |
| Bedford County | $1,433 | 1,168 | $1,673,913 | 11.5% |
| Berks County | $1,008 | 6,803 | $6,855,787 | 9.7% |
| Blair County | $845 | 2,654 | $2,243,050 | 9.3% |
| Bradford County | $1,245 | 1,438 | $1,790,394 | 10.8% |
| Bucks County | $1,024 | 5,845 | $5,985,949 | 9.8% |
| Butler County | $903 | 2,269 | $2,048,902 | 9.5% |
| Cambria County | $1,010 | 2,413 | $2,437,166 | 10.1% |
| Cameron County | $845 | 138 | $116,555 | 9.6% |
| Carbon County | $1,241 | 1,269 | $1,574,715 | 10.8% |
| Centre County | $1,006 | 1,817 | $1,827,721 | 9.9% |
| Chester County | $1,111 | 3,784 | $4,204,667 | 10.1% |
| Clarion County | $826 | 717 | $592,425 | 9.2% |
| Clearfield County | $1,346 | 1,706 | $2,297,041 | 11.3% |
| Clinton County | $1,318 | 592 | $780,066 | 11.0% |
| Columbia County | $1,155 | 1,311 | $1,514,507 | 10.6% |
| Crawford County | $1,145 | 2,083 | $2,384,414 | 10.5% |
| Cumberland County | $859 | 3,403 | $2,923,228 | 9.4% |
| Dauphin County | $778 | 4,224 | $3,286,429 | 9.0% |
| Delaware County | $721 | 6,390 | $4,605,588 | 8.7% |
| Elk County | $881 | 522 | $459,941 | 9.6% |
| Erie County | $715 | 5,692 | $4,067,366 | 8.8% |
| Fayette County | $915 | 2,850 | $2,606,852 | 9.6% |
| Forest County | $1,138 | 82 | $93,288 | 10.9% |
| Franklin County | $982 | 2,443 | $2,398,302 | 9.7% |
| Fulton County | $1,276 | 278 | $354,641 | 10.9% |
| Greene County | $840 | 544 | $456,776 | 9.3% |
| Huntingdon County | $1,309 | 900 | $1,178,512 | 11.1% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 125% - 149% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $864 | 1,843 | $1,591,772 | 9.4% |
| Jefferson County | $982 | 911 | $894,448 | 9.9% |
| Juniata County | $1,504 | 674 | $1,014,017 | 11.6% |
| Lackawanna County | $856 | 3,791 | $3,246,629 | 9.4% |
| Lancaster County | $1,014 | 8,440 | $8,558,533 | 9.7% |
| Lawrence County | $811 | 1,635 | $1,326,069 | 9.2% |
| Lebanon County | $1,134 | 2,267 | $2,570,971 | 10.3% |
| Lehigh County | $965 | 5,970 | $5,762,126 | 9.6% |
| Luzerne County | $917 | 5,967 | $5,469,713 | 9.6% |
| Lycoming County | $999 | 1,981 | $1,979,839 | 9.9% |
| McKean County | $843 | 956 | $805,495 | 9.4% |
| Mercer County | $793 | 2,016 | $1,599,086 | 9.2% |
| Mifflin County | $1,194 | 1,119 | $1,335,979 | 10.7% |
| Monroe County | $1,547 | 2,273 | $3,515,919 | 11.4% |
| Montgomery County | $818 | 7,182 | $5,871,927 | 9.1% |
| Montour County | $985 | 422 | $415,493 | 9.9% |
| Northampton County | $1,045 | 3,677 | $3,841,921 | 9.9% |
| Northumberland County | $1,001 | 2,248 | $2,249,265 | 10.0% |
| Perry County | $1,340 | 826 | $1,106,766 | 11.1% |
| Philadelphia County | $437 | 30,598 | $13,359,222 | 7.6% |
| Pike County | $1,527 | 742 | $1,132,787 | 11.8% |
| Potter County | $1,075 | 375 | $403,217 | 10.0% |
| Schuylkill County | $1,356 | 2,401 | $3,255,588 | 11.4% |
| Snyder County | $1,259 | 825 | $1,038,339 | 10.7% |
| Somerset County | $1,269 | 1,749 | $2,219,178 | 11.0% |
| Sullivan County | $1,408 | 129 | $181,645 | 11.9% |
| Susquehanna County | $1,871 | 972 | $1,819,000 | 13.3% |
| Tioga County | $1,031 | 771 | $795,047 | 9.9% |
| Union County | $1,090 | 550 | $599,690 | 10.2% |
| Venango County | $872 | 1,159 | $1,010,863 | 9.5% |
| Warren County | $929 | 785 | $729,367 | 9.7% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 125% - 149% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $815 | 3,124 | $2,547,054 | 9.2% |
| Wayne County | $1,813 | 749 | $1,357,585 | 12.8% |
| Westmoreland County | $770 | 5,845 | $4,500,417 | 9.1% |
| Wyoming County | $1,710 | 502 | $858,371 | 12.5% |
| York County | $871 | 6,243 | $5,436,522 | 9.3% |
| Total Pennsylvania | $851 | 199,025 | $169,343,747 | 9.27% |

# Pennsylvania 2019
# Home Energy Affordability Gap
(Published April 2020)

| County_Only | Shortfall Calculation -- 150% - 184% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $857 | 2,122 | $1,817,538 | 8.7% |
| Allegheny County | $208 | 28,242 | $5,868,935 | 6.7% |
| Armstrong County | $427 | 1,953 | $833,710 | 7.4% |
| Beaver County | $320 | 4,172 | $1,335,042 | 7.0% |
| Bedford County | $1,093 | 1,499 | $1,638,351 | 9.5% |
| Berks County | $655 | 9,167 | $6,002,989 | 8.0% |
| Blair County | $514 | 3,480 | $1,787,773 | 7.7% |
| Bradford County | $906 | 1,721 | $1,558,662 | 8.9% |
| Bucks County | $672 | 8,741 | $5,873,939 | 8.1% |
| Butler County | $569 | 3,568 | $2,030,836 | 7.8% |
| Cambria County | $687 | 3,808 | $2,614,346 | 8.3% |
| Cameron County | $535 | 205 | $109,767 | 7.9% |
| Carbon County | $901 | 1,657 | $1,492,506 | 8.8% |
| Centre County | $664 | 3,517 | $2,335,735 | 8.1% |
| Chester County | $755 | 6,133 | $4,630,880 | 8.3% |
| Clarion County | $492 | 1,270 | $625,397 | 7.6% |
| Clearfield County | $1,012 | 2,413 | $2,441,560 | 9.2% |
| Clinton County | $971 | 1,127 | $1,094,467 | 9.0% |
| Columbia County | $825 | 1,777 | $1,466,720 | 8.7% |
| Crawford County | $812 | 2,547 | $2,067,349 | 8.6% |
| Cumberland County | $525 | 5,378 | $2,824,513 | 7.7% |
| Dauphin County | $443 | 6,692 | $2,962,071 | 7.4% |
| Delaware County | $367 | 10,931 | $4,012,137 | 7.1% |
| Elk County | $561 | 1,011 | $566,990 | 7.9% |
| Erie County | $379 | 7,590 | $2,877,881 | 7.2% |
| Fayette County | $583 | 3,888 | $2,267,694 | 7.9% |
| Forest County | $834 | 117 | $97,586 | 9.0% |
| Franklin County | $636 | 3,775 | $2,400,721 | 8.0% |
| Fulton County | $937 | 482 | $451,680 | 9.0% |
| Greene County | $506 | 859 | $434,521 | 7.6% |
| Huntingdon County | $975 | 1,434 | $1,397,928 | 9.1% |

# Pennsylvania 2019
# Home Energy Affordability Gap
(Published April 2020)

| County_Only | Shortfall Calculation -- 150% - 184% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $531 | 1,939 | $1,028,957 | 7.7% |
| Jefferson County | $650 | 1,477 | $959,467 | 8.1% |
| Juniata County | $1,154 | 736 | $849,309 | 9.5% |
| Lackawanna County | $524 | 5,740 | $3,008,784 | 7.7% |
| Lancaster County | $660 | 13,515 | $8,913,702 | 8.0% |
| Lawrence County | $482 | 2,224 | $1,071,985 | 7.6% |
| Lebanon County | $787 | 3,886 | $3,057,283 | 8.4% |
| Lehigh County | $616 | 8,927 | $5,501,233 | 7.9% |
| Luzerne County | $581 | 8,348 | $4,852,293 | 7.9% |
| Lycoming County | $666 | 3,555 | $2,366,197 | 8.1% |
| McKean County | $518 | 1,070 | $553,727 | 7.7% |
| Mercer County | $466 | 3,131 | $1,458,247 | 7.5% |
| Mifflin County | $858 | 1,542 | $1,323,800 | 8.8% |
| Monroe County | $1,170 | 3,161 | $3,698,494 | 9.3% |
| Montgomery County | $469 | 11,255 | $5,283,675 | 7.4% |
| Montour County | $653 | 442 | $288,693 | 8.1% |
| Northampton County | $697 | 5,645 | $3,932,951 | 8.2% |
| Northumberland County | $676 | 2,950 | $1,995,063 | 8.2% |
| Perry County | $996 | 1,089 | $1,084,372 | 9.1% |
| Philadelphia County | $87 | 43,347 | $3,765,780 | 6.3% |
| Pike County | $1,181 | 1,316 | $1,554,086 | 9.7% |
| Potter County | $727 | 436 | $317,019 | 8.2% |
| Schuylkill County | $1,026 | 4,732 | $4,855,462 | 9.3% |
| Snyder County | $906 | 917 | $831,239 | 8.8% |
| Somerset County | $937 | 2,243 | $2,100,795 | 9.0% |
| Sullivan County | $1,096 | 263 | $288,186 | 9.8% |
| Susquehanna County | $1,538 | 1,269 | $1,951,191 | 10.9% |
| Tioga County | $686 | 1,261 | $865,341 | 8.1% |
| Union County | $753 | 1,050 | $790,177 | 8.4% |
| Venango County | $542 | 1,778 | $962,877 | 7.8% |
| Warren County | $601 | 1,405 | $844,239 | 8.0% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 150% - 184% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $479 | 4,158 | $1,992,156 | 7.5% |
| Wayne County | $1,465 | 996 | $1,459,326 | 10.5% |
| Westmoreland County | $443 | 8,529 | $3,774,148 | 7.5% |
| Wyoming County | $1,367 | 602 | $822,656 | 10.3% |
| York County | $523 | 8,920 | $4,669,409 | 7.6% |
| Total Pennsylvania | $512 | 295,130 | $150,992,542 | 7.61% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 185% - 199% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Adams County | $570 | 970 | $552,630 | 7.5% |
| Allegheny County | - | 12,324 | - | 5.8% |
| Armstrong County | $151 | 855 | $128,844 | 6.4% |
| Beaver County | $45 | 1,952 | $88,102 | 6.1% |
| Bedford County | $809 | 527 | $426,595 | 8.2% |
| Berks County | $361 | 3,709 | $1,338,039 | 7.0% |
| Blair County | $238 | 1,518 | $360,580 | 6.7% |
| Bradford County | $623 | 843 | $525,063 | 7.7% |
| Bucks County | $379 | 3,911 | $1,480,581 | 7.0% |
| Butler County | $291 | 1,467 | $426,896 | 6.8% |
| Cambria County | $417 | 1,555 | $648,401 | 7.2% |
| Cameron County | $278 | 115 | $31,949 | 6.8% |
| Carbon County | $617 | 735 | $453,674 | 7.7% |
| Centre County | $379 | 1,357 | $514,732 | 7.0% |
| Chester County | $458 | 2,730 | $1,251,243 | 7.2% |
| Clarion County | $214 | 482 | $103,272 | 6.6% |
| Clearfield County | $733 | 929 | $680,949 | 8.0% |
| Clinton County | $682 | 460 | $313,878 | 7.8% |
| Columbia County | $551 | 1,030 | $567,041 | 7.6% |
| Crawford County | $534 | 1,129 | $603,069 | 7.5% |
| Cumberland County | $247 | 2,349 | $580,242 | 6.7% |
| Dauphin County | $163 | 2,940 | $479,578 | 6.5% |
| Delaware County | $72 | 3,756 | $271,506 | 6.2% |
| Elk County | $294 | 553 | $162,533 | 6.9% |
| Erie County | $100 | 3,069 | $305,858 | 6.3% |
| Fayette County | $307 | 1,598 | $490,686 | 6.9% |
| Forest County | $581 | 62 | $36,027 | 7.8% |
| Franklin County | $348 | 1,703 | $592,349 | 6.9% |
| Fulton County | $655 | 244 | $159,804 | 7.8% |
| Greene County | $228 | 437 | $99,489 | 6.6% |
| Huntingdon County | $696 | 538 | $374,448 | 7.9% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 185% - 199% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Indiana County | $253 | 822 | $208,086 | 6.7% |
| Jefferson County | $373 | 640 | $238,560 | 7.0% |
| Juniata County | $862 | 374 | $322,331 | 8.3% |
| Lackawanna County | $247 | 2,465 | $609,652 | 6.7% |
| Lancaster County | $364 | 5,652 | $2,058,020 | 7.0% |
| Lawrence County | $208 | 1,172 | $243,547 | 6.6% |
| Lebanon County | $497 | 2,058 | $1,023,425 | 7.3% |
| Lehigh County | $325 | 2,783 | $905,779 | 6.9% |
| Luzerne County | $302 | 3,458 | $1,043,435 | 6.8% |
| Lycoming County | $387 | 1,449 | $561,366 | 7.1% |
| McKean County | $247 | 490 | $120,841 | 6.7% |
| Mercer County | $193 | 1,328 | $256,128 | 6.6% |
| Mifflin County | $579 | 655 | $379,238 | 7.6% |
| Monroe County | $856 | 1,430 | $1,224,160 | 8.1% |
| Montgomery County | $179 | 5,459 | $978,997 | 6.5% |
| Montour County | $377 | 185 | $69,737 | 7.1% |
| Northampton County | $407 | 3,150 | $1,280,787 | 7.1% |
| Northumberland County | $406 | 1,120 | $454,796 | 7.2% |
| Perry County | $709 | 474 | $336,043 | 7.9% |
| Philadelphia County | - | 17,207 | - | 5.5% |
| Pike County | $893 | 615 | $549,066 | 8.4% |
| Potter County | $437 | 244 | $106,626 | 7.2% |
| Schuylkill County | $751 | 1,821 | $1,367,981 | 8.1% |
| Snyder County | $613 | 497 | $304,684 | 7.6% |
| Somerset County | $660 | 998 | $658,426 | 7.9% |
| Sullivan County | $835 | 115 | $96,081 | 8.5% |
| Susquehanna County | $1,259 | 537 | $676,298 | 9.5% |
| Tioga County | $399 | 471 | $187,821 | 7.1% |
| Union County | $471 | 695 | $327,382 | 7.3% |
| Venango County | $266 | 616 | $163,869 | 6.8% |
| Warren County | $327 | 662 | $216,700 | 6.9% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Shortfall Calculation -- 185% - 199% of Federal Poverty Level | | | |
|---|---|---|---|---|
| | Individual HH Shortfall | Number of Households | Aggregate Shortfall | Home Energy Burden |
| Washington County | $199 | 2,318 | $461,152 | 6.6% |
| Wayne County | $1,176 | 604 | $710,144 | 9.2% |
| Westmoreland County | $170 | 3,664 | $621,527 | 6.5% |
| Wyoming County | $1,080 | 394 | $425,678 | 8.9% |
| York County | $234 | 4,686 | $1,096,638 | 6.6% |
| **Total Pennsylvania** | $270 | 127,155 | $34,333,061 | 6.65% |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Total Shortfall < 200% of FPL | |
|---|---|---|
| | Number of Households | Aggregate Shortfall |
| Adams County | 9,043 | $12,932,042 |
| Allegheny County | 144,241 | $121,285,209 |
| Armstrong County | 8,897 | $8,849,619 |
| Beaver County | 19,555 | $17,525,520 |
| Bedford County | 6,652 | $11,129,241 |
| Berks County | 46,026 | $60,937,881 |
| Blair County | 17,458 | $19,758,490 |
| Bradford County | 8,180 | $12,002,729 |
| Bucks County | 37,540 | $47,577,035 |
| Butler County | 15,641 | $18,084,946 |
| Cambria County | 19,017 | $25,016,621 |
| Cameron County | 890 | $904,700 |
| Carbon County | 7,839 | $11,798,096 |
| Centre County | 19,192 | $28,248,017 |
| Chester County | 30,559 | $43,579,026 |
| Clarion County | 5,829 | $6,530,090 |
| Clearfield County | 11,408 | $18,464,376 |
| Clinton County | 5,317 | $8,745,767 |
| Columbia County | 9,009 | $12,927,140 |
| Crawford County | 12,398 | $17,225,699 |
| Cumberland County | 21,182 | $22,105,849 |
| Dauphin County | 33,138 | $35,865,361 |
| Delaware County | 48,697 | $50,188,744 |
| Elk County | 4,031 | $4,170,142 |
| Erie County | 39,371 | $40,761,498 |
| Fayette County | 21,043 | $26,202,785 |
| Forest County | 596 | $818,778 |
| Franklin County | 16,799 | $20,219,991 |
| Fulton County | 1,985 | $2,895,516 |
| Greene County | 4,440 | $5,085,013 |
| Huntingdon County | 5,920 | $9,083,051 |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Total Shortfall < 200% of FPL | |
|---|---|---|
| | Number of Households | Aggregate Shortfall |
| Indiana County | 12,177 | $14,862,388 |
| Jefferson County | 6,606 | $8,057,571 |
| Juniata County | 3,286 | $5,501,893 |
| Lackawanna County | 29,381 | $34,424,784 |
| Lancaster County | 54,531 | $67,164,296 |
| Lawrence County | 12,348 | $13,525,097 |
| Lebanon County | 15,834 | $20,993,487 |
| Lehigh County | 40,825 | $51,811,065 |
| Luzerne County | 42,327 | $52,098,294 |
| Lycoming County | 15,060 | $19,036,063 |
| McKean County | 6,335 | $7,353,913 |
| Mercer County | 14,943 | $15,978,564 |
| Mifflin County | 7,195 | $10,221,986 |
| Monroe County | 15,627 | $29,090,617 |
| Montgomery County | 50,318 | $53,581,448 |
| Montour County | 2,120 | $2,610,144 |
| Northampton County | 26,889 | $34,533,723 |
| Northumberland County | 13,938 | $17,544,483 |
| Perry County | 4,672 | $7,178,080 |
| Philadelphia County | 272,450 | $242,295,366 |
| Pike County | 5,488 | $9,656,047 |
| Potter County | 2,428 | $3,243,320 |
| Schuylkill County | 19,767 | $31,415,225 |
| Snyder County | 4,510 | $6,642,164 |
| Somerset County | 10,027 | $14,874,407 |
| Sullivan County | 1,039 | $1,659,839 |
| Susquehanna County | 5,638 | $11,831,221 |
| Tioga County | 5,734 | $7,434,955 |
| Union County | 4,468 | $5,722,033 |
| Venango County | 7,742 | $8,615,751 |
| Warren County | 5,778 | $6,518,119 |

# Pennsylvania 2019
# Home Energy Affordability Gap
## (Published April 2020)

| County_Only | Total Shortfall < 200% of FPL | |
|---|---|---|
| | Number of Households | Aggregate Shortfall |
| Washington County | 20,732 | $21,691,083 |
| Wayne County | 5,362 | $11,121,062 |
| Westmoreland County | 37,958 | $38,279,277 |
| Wyoming County | 3,084 | $5,950,797 |
| York County | 43,612 | $49,311,757 |
| **Total Pennsylvania** | 1,462,122 | $1,662,749,294 |
| | | $1,137 |