HOME ENERGY AFFORDABILITY FOR LOW-INCOME CUSTOMERS IN PENNSYLVANIA

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Home Energy Affordability for Low-Income Customers in Pennsylvania

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Executive Summary

On May 5, 2017, the Pennsylvania Public Utility Commission (Commission) initiated a study to examine home energy burdens for low-income Pennsylvanians as "a necessary first step in evaluating the affordability, cost-effectiveness, and prudence of Universal Service Programs." *Energy Affordability for Low Income Customers Order*, Docket No. M-2017-2587711 (order entered on May 5, 2017), at 1.

This staff report[1] by the Commission's Bureau of Consumer Services (BCS) and the Law Bureau tabulates 2012 to 2016 customer data related to energy burdens[2] gathered from Pennsylvania's larger natural gas distribution companies (NGDCs) and electric distribution companies (EDCs). The report also incorporates information from other states and several independent studies.[3]

This is the first comprehensive energy burden and affordability study of Pennsylvania households using customer income, billing, and payment information. While the information collected from utilities has allowed the Commission to fill in perception and presumption gaps and review trends and details that have never before been analyzed for Pennsylvania, staff has identified limitations of and inconsistencies in the reported data that impacted the scope and the extent of the analysis. In particular, the utilities that were queried for this study were unable to identify or provide income information on low-income households that did not participate in customer assistance programs (CAPs) or other universal service programs. Additionally, many of the responding utilities interpreted, tracked, and reported information differently from utility to utility and sometimes within a utility from year to year. For some years, data were not available.

It was anticipated that work at this docket would allow Commission staff to make "recommendations concerning affordable energy burdens." *Energy Affordability for Low Income Customers Order* at 5 (Ordering Paragraph #1). However, making these recommendations has proved somewhat elusive for several reasons. First, inconsistencies in utility reporting and limitations in the utility data constrain the development of a specific statement of what constitutes energy "affordability" for low-income Pennsylvanians. Further, the utilities and Commission staff were not generally privy to corresponding data for low-income customers who did not participate in a utility CAP. Second, energy efficiency and conservation can play major roles in making energy bills

[1] This report is solely the work product of staff and does not reflect the opinions of the Commission or actions that it may take in the future. The legal, policy, and procedural issues raised in this matter remain under Commission review and may be factored into a subsequent order at this or other dockets. The report will be published, and comment and reply comments periods will be established.

[2] For the purposes of this staff report, a household's energy burden is the percentage of household income dedicated to paying jurisdictional energy costs.

[3] The Commission's Consumer Services Information System (CSIS) Project at Pennsylvania State University assisted with the collation and processing of raw data and information and the review of the published studies.

more affordable. The impact of these programs on energy burden levels is not measured as part of this study. Third, the Pennsylvania Department of Human Services (DHS) administers the Commonwealth's Low-Income Home Energy Assistance Program (LIHEAP), which provides federally-funded energy assistance grants to low-income customers independent of Commonwealth- and Commission-mandated low-income benefits. As described in this report, whether low-income customers receive LIHEAP grants can have a sizable impact on customer energy burden levels.

Nevertheless, this study attempts to establish a starting point or process for identifying an affordable energy burden level for Pennsylvania's low-income population by evaluating the effectiveness of current utility CAPs. A CAP, as part of a jurisdictional energy utility's universal service and energy conservation program (universal service program), assists payment-troubled, low-income households by making their jurisdictional energy service more affordable through reduced bills and/or arrearage forgiveness. The Commission's CAP Policy Statement at 52 Pa. Code §§ 69.261-69.267 provides guidelines relative to the maximum energy burdens that low-income residential customers in customer assistance programs should be charged.[4] Currently, many low-income customers, both in CAPs and not in CAPS, have energy burdens in excess of the Commission's CAP Policy Statement guidelines.

Based on the available data, this study measures whether the various CAP payment designs are meeting universal service goals such as reducing customer debt, improving customer payment habits, reducing defaults and terminations, and reducing the number of customers in debt who are not on payment agreements. The study also examined the impact of LIHEAP grants on CAP customer energy burden levels, outlined the maximum energy burdens used by neighboring state programs, and reviewed previous third-party studies dealing with related topics. Finally, the study considers CAP cost trends and estimates the financial impact to CAP customers and non-CAP residential ratepayers if Pennsylvania were to adopt a maximum 10% energy burden.

Summarized below are staff observations related to each topic in the report. Citations have been omitted from these summaries but are included in the expanded discussion of each segment.

Energy Burden Levels for Gas and Electric Service

The study first examined the percent of household income spent on electric and gas service (*i.e.*, energy burdens) by low-income customers enrolled in CAPs and by non-CAP residential customers to determine the energy burden differences between these two groups.

[4] There is no similar guideline relative to low-income customers not enrolled in a CAP.

Even with discounted payments, CAP customers had a higher energy burden than non-CAP residential customers.[5] From 2012 to 2016, the average energy burden was 7% to 8% for NGDC CAP heating customers, 5 to 6% for EDC non-heating CAP customers, and 8 to10% for EDC CAP heating customers.[6] Residential non-CAP customers had an average annual energy burden of 4% for NGDC and EDC service during this time period, regardless of heating or non-heating status and energy type.

Customers in the 0 to 50% Federal Poverty Income Guidelines (FPIG) level, regardless of heating or non-heating status and energy type, often had energy burdens exceeding the CAP Policy Statement guidelines.

Impact of LIHEAP Grants on Energy Burden Levels

Unlike other states, Pennsylvania does not use LIHEAP grants to fund its CAPs. In Pennsylvania, LIHEAP grants issued to CAP accounts are applied as customer payments to reduce energy bills for the specific grantee-customer. Since LIHEAP is often the sole or primary source of funding for state energy assistance programs in other states, this study examined CAP accounts pre- and post-application of LIHEAP grants to determine LIHEAP's effect on energy burden levels in the Commonwealth.

The study found that LIHEAP had a measurable impact on energy burdens for CAP customers. CAP customers with incomes at or below 50% of the FPIG experienced an average energy burden decrease of approximately 5 to 6 percentage points for gas heating, 6 to 8 percentage points for electric non-heating, and approximately 7 to 9 percentage points for electric heating. CAP customers with incomes between 51 and 100% of the FPIG experienced an average energy burden decrease of approximately 2 to 3 percentage points for gas heating and 3 percentage points for electric non-heating and heating. CAP customers with incomes between 101 and 150% of the FPIG experienced an average energy burden decrease of approximately 1 to 2 percentage points for gas heating, electric non-heating, and electric heating.

Even with these decreases, however, the average energy burden for some CAP households at the 0 to 50% and 51 to 100% FPIG levels exceeded the maximum energy burden guidelines in the CAP Policy Statement.

Pre-Program Arrearages (PPAs) and In-Program Arrears

CAPs are intended to eliminate customer debt by deferring collection and payment of a CAP customer's pre-program arrearage (PPA) balance and reducing this debt with each monthly CAP payment. Full PPA forgiveness can be achieved within one to three years, depending on the utility's CAP provisions. Presumably, if CAP bills are

[5] Staff obtained data from the U.S. Census to determine average incomes for Pennsylvania non-CAP residential customers.

[6] The combined NGDC heating and EDC non-heating energy burden for CAP customers ranged between 12% and 14%.

affordable, low-income participants should gradually reduce their PPAs and accrue minimal or no new debt within the program. Staff considered the levels of PPA and in-program arrearage potential indicators of affordability within CAPs.

The data indicated that average PPAs and in-program arrears for most NGDCs showed decreasing arrearage trends, possibly due to lower natural gas costs, warmer winters, and declining CAP enrollments during this study period.

Most EDC CAP customers with in-program arrears carried an average balance of less than $200.

Since many utilities were unable to provide data for the PPA and in-program arrears balances by FPIG levels and/or by heating type, it is unclear whether customers at specific incomes (*e.g.*, at or below 50% of the FPIG) or with specific heating types carried a disproportionate share of CAP PPA or in-program arrears.

CAP enrollment eligibility varied among the utilities. Utilities that required low-income customers to be "payment troubled" (*e.g.*, had a payment arrangement in the past 12 months) to qualify for CAPs had higher average PPA balances than CAPs that did not have this restriction.

Percentage of CAP Bills Paid In-Full

If a CAP provides affordable monthly bills, the expectation was that a large percentage of participating customers would be paying their CAP bills in-full (i.e., 100% of the bill) by the due date. Staff considered payment history another possible indicator of affordability for utility CAPs.

At the 0 to 50% FPIG level, a higher percentage of NGDC CAP bills were paid in comparison to the percentage of EDC CAP bills paid in-full at the same FPIG level. Given the low cost of natural gas compared to electricity, this observation may be indicative that the bills of NGDC CAP customers were more affordable in comparison to the bills of EDC CAP customers during this five-year study period.

Payment behavior of CAP customers did not appear to have been strongly or definitively correlated to household income. EDCs reported *fewer* CAP heating customers at the 101 to 150% FPIG level paid their bills in comparison to the percentage of bills paid by customers at the 51 to 100% FPIG level. This pattern may indicate that other factors – beyond income – had an impact on whether CAP utility bills were regularly paid in full.

NGDC and EDC billing system changes and upgrades appeared to affect CAP monthly billing amounts and thus influenced whether utility bills were paid in-full.

CAP Default Exit and Termination Rates

Other indicators of affordability for CAP customers may include the rate of customers defaulting (*i.e.*, default exiting) on program requirements (*e.g.*, making full and timely payments) and termination rate for CAP customers. Presumably, CAPs with affordable monthly payments should have lower instances of customers defaulting on the programs and lower termination rates.

Given the apparent inconsistencies between how utilities defined and tracked "default exits" and CAP terminations, staff was unable to compare these data points among utilities or to confidently establish a correlation. However, differences in the CAP heating termination rates for Met-Ed and the other FirstEnergy companies suggested that other factors – besides CAP design – contributed to higher termination rates for CAP customers in Met-Ed's service territory.

Non-CAP Residential and Confirmed Low-Income Customer Debt

The final indicator of affordability reviewed was the amount of debt owed by customers on utility- or Commission-issued payment agreements and those not on agreements. When customers have difficulty paying their bills on time and accrue debt, accounts may be terminated and the debt written-off to be recovered through base rates. Debt that is on agreement is considered active and less at risk for write-off. Debt that is not on agreement is considered a higher risk for write-off.

The number of NGDC and EDC confirmed low-income customers in debt to their utility who were not on payment agreements had declined from 2012 to 2016. This may indicate that utilities were having greater success in either enrolling/maintaining low-income customers into CAPs or in establishing payment agreements.[7]

Review of Other State Programs and Relevant Studies

Pennsylvania's maximum energy burdens as articulated in the CAP Policy Statement are higher than maximum energy burdens used by neighboring states. Ohio's utility payment assistance program has a maximum energy burden of 10%. The New York and New Jersey utility payment assistance programs both have a maximum energy burden level of 6%.

Staff reviewed multiple independent studies that dealt with topics similar to those addressed in this study. Insights from these studies include:

- If the cost of all sources of household energy are counted – not just natural gas and electric – Pennsylvania households with incomes at or below 150% of the FPIG experience some of the highest energy burdens in the country. Pennsylvania residents with incomes at or below 50% of the FPIG had energy burden levels at

[7] However, these assumptions cannot be confirmed from available data.

30% or higher for four of the five years of this study. This suggests that households that use non-electric heating (*e.g.*, propane, oil) may have higher energy burden levels than those reflected in this study.

- Although nearly eight-in-ten Pennsylvanians live in urban areas,[8] households in rural areas may experience the highest energy burden levels due to poor housing stock. Focusing energy-efficient education and weatherization services can help to reduce the energy burden disparity in these areas and help make CAPs more effective.
- Payment behavior may not reflect affordability. Customers may neglect other household expenses to pay their utility bill each month;
- Not every household in poverty is payment-troubled;
- Factors other than income play a role in determining the effectiveness of an assistance program; and
- Customers that enter a payment assistance program with lower PPAs are more likely to improve their payment behavior than customers with higher PPAs.

CAP Costs and Forecasts

Based on information submitted by NGDCs and EDCs in support of USECPs covering the period after 2016, NDGC and EDC CAP costs are projected to increase annually through 2021 despite an industry drop in CAP expenditures from 2012-2016. The overall average costs per non-CAP residential customer are also projected to increase through 2021, varying among the utilities and with CAP enrollments levels. EDC customers could experience the largest increase, with average annual CAP costs recovered from non-CAP residential customers projected to increase by approximately $20 from 2017 to 2021.

Based on an energy burden model developed by Commission staff for this Report, staff estimated the cost of establishing a 10% maximum energy burden level for CAPs, which parallels Ohio's maximum energy burden level. Based on 2012 to 2016 average CAP bills and income levels, the total amount of additional discounts (*i.e.*, CAP credits) that would have been needed to establish maximum energy burdens of 6% for gas heating, 4% for electric non-heating, and 10% for electric heating would be approximately $102 million per year, not accounting for inflation. This amount breaks down to approximately $32 million for gas heating, $62 million for electric non-heating, and $9 million for electric heating. Such a change would have resulted in an average annual increase of $14.52 to non-CAP residential ratepayers' gas and electric bills. Average increases would vary among the utilities.

The energy burden model developed by staff for this Report does not factor in all variables and specifically does not take into consideration (1) any possible reductions in CAP costs if some CAP customers are required to pay more under a new energy burden

[8] Pennsylvania State Data Center, Penn State Harrisburg. (October 2012). Pennsylvania's Urban and Rural Population. Retrieved from http://pasdc.hbg.psu.edu/sdc/pasdc_files/researchbriefs/Urban_Rural_SF1_RB.pdf.

level; (2) whether rate discount pricing (rather than, *e.g.*, percent of income pricing) might be better for some CAP customers or reduce overall CAP costs; (3) CAP costs borne by PGW's non-residential ratepayers; (4) individual utility CAP credit limits; (5) system/administrative costs associated with adopting new energy burdens; and (6) factors specific to each utility.

Study Limitations

There have been changes in utility CAPs and other universal service programs since the data reviewed in this study were collected. Such program changes are on-going. More current data reflecting these changes may have an impact on the observations drawn in this study. Further inspection of future data may substantiate trends as well as identify the aspects of CAPs that appear to work well or that produce better customer outcomes. Collection of valid data that can be consistently compared across income levels, among utilities, and over time would increase the reliability of projections and allow better evaluations of the success of CAPs.

I. Introduction

According to the 2012-2016 American Community Survey (ACS) data, Pennsylvania had a population of approximately 12.8 million and approximately 5 million housing units.[9] Almost 38% of Pennsylvania residents were either elderly (age 65 or over) or minors (under 18). Over 70% of Pennsylvania households heat with either natural gas or electricity (51% of heat with natural gas and 22% heat with electricity).[10] Over one-third of Pennsylvania households experience some level of poverty.[11] Approximately 8% of Pennsylvania's households reported incomes below 50% of the FPIG; 17% reported incomes below 100%; 27% reported incomes below 150%, and 37% had incomes below 200%, cumulatively.[12]

Universal Service Programs in Pennsylvania

The Commission's leadership in addressing the home energy needs of low-income households in Pennsylvania began as early as 1984 when it commenced *Recommendations for Dealing with Payment Troubled Customers* at Docket No. M-840403. As a result of that proceeding, energy utilities in Pennsylvania began implementing low-income usage reduction programs (LIURPs) and contemplating how to address the arrearages of low-income customers.

In 1992, with the continued accumulation of arrearages and uncollectable debt by low-income utility customers, the Commission adopted a policy statement at 52 Pa. Code §§ 69.261-69.267 that established guidelines for major electric and natural gas utilities to voluntarily implement pilot CAPs. The purpose of a CAP is two-fold: to help make utility services more affordable for low-income, payment-troubled individuals and to reduce the costs of a utility's uncollectible amounts. *Investigation of Uncollectible Balances*, Docket No. I-900002, at 115 to 118. Low-income, payment-troubled customers are defined as residential utility customers whose annual household gross income is at or below 150% of the FPIG and who have failed to maintain one or more payment arrangements.[13] 52 Pa. Code §§ 54.72 and 62.2.

The CAP Policy Statement, which was subsequently amended, in part, in 1999, provides guidelines on the design and operation of CAPs, including establishing guidance on maximum energy burden ranges that low-income customers could be expected to pay in exchange for continued utility services. The 1992 CAP Policy Statement

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[9] Table B11001. Household Type (Including Living Alone) (Universe - Households) - 5 Year Estimates. Table B11002. Household Type by Relatives and Nonrelatives for Population in Households (Universe - Population) - 5 Year Estimates.

[10] 2012-2016 ACS 5-Year Estimates.

[11] Approximately 15% of Pennsylvania residents were age 65 and over and 23% were under the age of 18. 2012-2016 ACS 5-Year Estimates.

[12] *See* Appendix 1 for demographic profiles for each NGDC and EDC service territory.

[13] The requirement of a missed payment arrangement has been somewhat eased over the years by Commission orders regarding individual utility universal service programs.

recommended that a CAP customer's combined jurisdictional natural gas and electric energy burden should not exceed 15%. The 1999 CAP Policy Statement amendment increased the maximum household energy burden to 17%. Table 1-1 below indicates the energy burden levels based on the FPIG and the nature of the energy usage in the household from Section 69.625 in the CAP Policy Statement.

Table 1-1
CAP Policy Statement Maximum Energy Burden Levels[14]

Utility Service	0-50% FPIG	51-100% FPIG	101-150% FPIG
Non-Heat Electric	2-5%	4-6%	6-7%
Gas Heat	5-8%	7-10%	9-10%
Electric Heat	7-13%	11-16%	15-17%

The Competition Acts

In 1997 and 1999, respectively, the Electricity Generation Customer Choice and Competition Act (Electric Competition Act), 66 Pa. C.S. §§ 2801-2812 and the Natural Gas Choice and Competition Act (Gas Competition Act), 66 Pa. C.S. §§ 2201-2212, were adopted. (Collectively, Competition Acts.) The primary purpose of the Competition Acts was to introduce competition into the retail electric and natural gas markets by establishing standards and procedures for the restructuring of the electric and natural gas utility industries. The Competition Acts also included several provisions relating to universal service programs for low-income customers in the Commonwealth. The Competition Acts require the Commission to continue, at a minimum, the policies, practices, and services that were in existence as of the effective date of the laws. 66 Pa. C.S. §§ 2203(7) and 2802(10).

The Competition Acts define "universal service and energy conservation" as the policies, practices, and services that help low-income customers maintain utility service. Although the universal service provisions of the Competition Acts tie the affordability of electric and natural gas service to a customer's ability to maintain utility service, the Competition Acts do not specifically define the term "affordable" as it relates to the provision of retail electric and natural gas services to customers.[15]

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[14] 52 Pa. Code § 69.265(2)(i)(A-C).

[15] Section 2202 defines "universal service and energy conservation" as the "[p]olicies, practices and services that help residential low-income retail gas customers and other residential retail gas customers experiencing temporary emergencies, as defined by the [C]ommission, to maintain natural gas supply and distribution services. The term includes retail gas [CAPs], termination of service protections and consumer protection policies and services that help residential low-income customers and other residential customers experiencing temporary emergencies to reduce or manage energy consumption in a cost-effective manner, such as [LIURPs] and consumer education." Section 2803 defines universal service and energy conservation as the "[p]olicies, protections and services that help low-income customers to maintain electric service. The term includes [CAPs], termination of service protection and policies and services that help low-

The Commission is tasked with ensuring that utilities administer universal programs in a cost-effective manner and that services are appropriately funded and available in each utility distribution territory. 66 Pa. C.S. §§ 2203(8) and 2804(9). In the exercise of this authority, the Commission balances the interests of customers who benefit from the programs with the interests of the residential customers who pay for the programs. *See Final Investigatory Order on CAPs: Funding Levels and Cost Recovery Mechanisms*, Docket No. M-00051923 (Dec. 18, 2006), (*Final CAP Investigatory Order*), at 6-7.[16]

Universal Service Programs

Utility universal service programs include CAP, LIURP, Customer Assistance Referral and Evaluation Program (CARES), and Hardship Funds. Of particular relevance to this study and report are the CAPs which are administered individually by the major EDCs and NGDCs. CAPs, which vary in design by utility, provide an alternative to traditional collection methods for low-income, payment-troubled customers. Customers who enroll in a CAP agree to make monthly payments in exchange for continued utility services and debt forgiveness. Those monthly payments, which may be set at an amount less than the customer's current bill based on usage at tariff rates, are generally based on factors such as household size and gross income of the household and may include an add-on amount to help offset the customer's pre-program arrearages (PPAs), if relevant. EDCs and NGDCs may call their respective CAPs by different names (*e.g.*, PPL refers to its CAP as OnTrack, PGW refers to its CAP as the Customer Responsibility Program or CRP). For the purposes of this report, staff will collectively refer to all utility customer assistance programs as CAPs.

Energy Affordability for Low-Income Customers Study

On May 5, 2017, at Docket No. M-2017-2587711, the Commission initiated a study to evaluate residential energy burdens for electric and gas service in Pennsylvania

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income customers to reduce or manage energy consumption in a cost-effective manner, such as [LIURPs], application of renewable resources and consumer education."

[16] The proceeding at Docket No. M-00051923 was closed December 18, 2006, and staff was directed to revise the CAP Policy Statement (OP 1) and to initiate a rulemaking regarding funding and design of CAPs (OP 2). Two proceedings were opened: *Proposed Revision to CAP Policy Statement*, Docket No, M-00072036 (order entered September 5, 2007), and *Proposed Rulemaking relating to Universal Service and Energy Conservation Reporting Requirements*, Docket No, L-00070186 (order entered September 4, 2007). These dockets were closed by Commission order entered May 10, 2012, due, in part, to "changes to the LIHEAP policy and the initiation of a stakeholder process studying the treatment of universal service customers in an enhanced competitive retail electricity market. . . . [*See Investigation of Pennsylvania's Retail Electricity Market*, Docket No. I-2011-2237952.] . . . A new rulemaking and amended policy statement will be initiated in the future after these issues have been resolved and the stakeholder process completed." May 10, 2012 Order at-12-14,

and to determine what may constitute an affordable energy burden for Pennsylvania's low-income households. May 5, 2017 Order. Despite the programs and services designed to bridge the energy affordability gap[17] in Pennsylvania, the Commission routinely receives complaints from customers enrolled in CAPs who are failing to or are unable to keep up with payments, accumulating in-program arrears, facing loss of program eligibility, and risking service termination. *See, e.g., Knapp v. Penelec*, Docket No. C-2015-2511723 (Order entered October 27, 2016). This payment, assistance, and arrearage cycle is a recurring issue for many low-income customers in the state.

According to some sources, households falling below 50% of the FPIG are billed an average of 30% of their income for home energy costs.[18] However, only approximately 30% of eligible Pennsylvania households are enrolled in a CAP.[19] Given these realities, the Commission concluded that the necessary first step to evaluate the affordability, cost-effectiveness, and prudence of universal service programs would be to undertake an energy affordability study. The Commission also recognized its obligation to balance the costs[20] and benefits of universal service programs as potential changes to affordability standards will inevitably require an examination of overall program funding. May 5, 2017 Order at 3-4.

While other fuel sources[21] are available and used by households in Pennsylvania, for purposes of this study the Commission is exclusively examining the affordability of jurisdictional natural gas and electric services to low-income customers in Pennsylvania. The original intent of this study was to examine energy affordability for low-income customers both inside and outside of CAPs. However, NGDCs and EDCs could not provide income information and other data for customers who were not participating in CAPs or other universal service programs. Further, absent enrollment in a CAP, even a confirmed low-income residential customer is required to pay the full tariff rate for

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[17] Fisher, Sheehan, & Colton, cited and discussed in greater detail below, use "affordability gap" to refer to the difference between *actual home energy bills* and *affordable home energy bills*.

[18] Fisher, Sheehan, & Colton. *The Home Energy Affordability Gap 2015: Pennsylvania* (Public Finance and General Economics, 2nd Ser. 2016), at 1. These studies are based on jurisdictional and deliverable energy sources.

[19] 2012-2016 Reports on Universal Service Programs & Collections Performance. http://www.puc.state.pa.us/filing_resources/universal_service_reports.aspx
http://www.puc.state.pa.us/filing_resources/universal_service_reports.aspx

[20] The May 5, 2017 Order noted that, based on a review of the Commission's Reports on Universal Service Programs & Collections Performance for the years 2001 through 2015, total gross CAP costs for EDCs have increased by approximately 177% between 2001 and 2015 (inflation adjusted), from $68.25 million to $189 million (expressed in 2001 dollars). Total gross CAP costs for NGDCs distribution companies have increased by approximately 270% between 2002 and 2015 (inflation adjusted), from $22.6 million to $83.6 million (expressed in 2002 dollars). Additionally, during the 2001/2002 to 2015 timeframe, the numbers of estimated low-income EDC and NGDC customers have increased by 80% and 104%, respectively.

[21] Also, not included in this study are customers of such energy providers as small jurisdictional NGDCs and EDCs, rural electric cooperatives, municipal authorities, and municipalities providing energy services to customers outside the municipal boundaries.

jurisdictional energy service. As a result, the staff analysis focuses primarily on low-income customers enrolled in large-utility CAPs.

Specifically, the overarching objectives of this study are to:

1. Identify the average energy burden of low-income customers enrolled in CAPs compared to the average energy burden of all other residential customers in Pennsylvania and the impact of LIHEAP grants on CAP energy burden levels;

2. Ascertain and analyze trends and indicators of energy affordability in Pennsylvania CAPs, including PPAs (*i.e.*, pre-CAP arrearages) and in-program CAP arrears, the percentage of CAP bills paid in-full, and CAP default/termination rates;

3. Determine trends in residential/low-income debt and CAP costs for EDCs and NGDCs and identify the projected impacts of adjusting the household energy burden in the Commonwealth; and

4. Compare and contrast the average energy burden of low-income residents in Pennsylvania with the energy burden of customers of neighboring states.

Staff used the Commission's CSIS Project at Penn State University to collect and collate the results of the utility responses and the state surveys and to review independent studies that may provide further insight into energy affordability issues. The analyses and observations in this report are solely the work product of staff[22] and do not reflect the opinions of the Commission. Nor is this report an indication of any action the Commission may take in the future.

[22] This document is the collective work product of BCS and the Law Bureau.

II. Methodology

By Secretarial Letter dated October 16, 2017, the Commission notified the major jurisdictional energy distribution companies of its intent to conduct an energy affordability study and requested specific information from the eight major NGDCs and seven major EDCs for the years 2012-2016. The NGDCs and EDCs that reported data to the Commission include the following:

> **Natural Gas**: Columbia Gas of Pennsylvania (Columbia), PECO Energy Co. (PECO Gas), National Fuel Gas Distribution Corp. (NFG), Peoples Natural Gas Co. (Peoples), Peoples-Equitable Division (Peoples Equitable), Philadelphia Gas Works (PGW), UGI Utilities Inc.– Gas (UGI Gas) and UGI Penn Natural Gas (UGI PNG).[23]
>
> **Electric**: Duquesne Light Co. (Duquesne), Metropolitan Edison Co. (Met-Ed), PECO Energy Co. (PECO Electric), Pennsylvania Electric Co. (Penelec), Pennsylvania Power Co. (Penn Power), PPL Electric Utilities Corp. (PPL), and West Penn Power Co. (West Penn).

The Commission's data request asked for the following information, broken down by customer type (residential, confirmed low-income [CLI], CAP), by heating type, and by poverty level from each NGDC and EDC, consistent with universal service and collections reporting (USR) requirements[24]:

- Number of monthly bills issued
- Amount (in dollars) of monthly bills issued
- Number of monthly bills paid in full
- Amount (in dollars) of monthly bills paid in full
- Number of account terminations
- Number of account reconnections
- Energy Burden Levels for LIHEAP recipients
- Energy Burden Levels for non-LIHEAP recipients
- Number of CAP Accounts with Pre-Program Arrears

[23] By Order entered September 20, 2018, the Commission approved a Joint Petition for Approval of Settlement in *Joint Application of UGI Utilities, Inc., UGI Penn Natural Gas, Inc., and UGI Central Penn Gas, Inc. for Approval of Merger*, Docket Nos. A-2018-3000381, A-2018-3000382, & A-2018-3000383. By Secretarial Letter at those dockets, the Commission approved tariff supplements, effective October 1, 2018, that reflect post-merger name changes due to the adoption by UGI Utilities, Inc. of UGI Penn Natural Gas, Inc.'s and UGI Central Penn Gas, Inc.'s existing tariffs and their application within new service and rate districts of UGI Utilities, Inc. corresponding to their existing service territories as UGI North and UGI Central, respectively, and the adoption by UGI Utilities, Inc. of its existing tariff to be applied to a new UGI South service and rate district. For the purposes of this study, which references data for a time period prior to the merger, the UGI companies were treated as separate NGDCs.

[24] Pursuant to 52 Pa. Code §§ 54.71-54.78 (electric) and §§ 62.1-62.8 (natural gas).

- Amount (in dollars) of Pre-Program Arrears
- Number of CAP Accounts with In-Program Arrears
- Amount (in dollars) of In-Program Arrears
- Number of CAP and Confirmed Low-Income Accounts
- Annual average income of CAP and Confirmed Low-Income accounts
- Number of accounts in arrears on an agreement
- Number of accounts in arrears not on an agreement
- Amount of arrears (in dollars) for accounts on an agreement
- Amount of arrears (in dollars) for accounts not on an agreement

When an analysis in this report refers to an "average" for multiple utilities, the average is a weighted average to compensate for the differences in size among the utilities.

Data Limitations

Staff identified inconsistencies and limitations in the reported data that impacted the analysis. Reasons for data variations included policy and procedure changes implemented by the utilities during the five-year time frame, specific enhancements to their systems, changes to their low-income programs, and/or mergers/acquisitions. Upon review of the data submitted, staff also found many utilities interpreted, tracked, and reported information differently.

At the onset of the study, the Commission initially requested the above data be categorized by CAP, CLI, and non-CAP residential accounts. Although the utilities responded to this request, staff questioned the validity and consistency of some of the reported numbers of CLI accounts; thus, the data used in this report do not always differentiate between CLI and non-CAP residential.

Furthermore, there is marked variability among the utilities in how they determine and verify the income status of their customers. For example, some utilities allow customers to "self-certify" their income designation while others require documentation from the customer to verify income status. As a result, staff used current U.S. Census data, when appropriate, to describe any relevant demographics of a utility's service area as opposed to the low-income account information submitted by the utilities.

III. Energy Burden Levels for Gas and Electric Service

Objective

Examining the percent of household income spent on electric and gas service (*i.e.*, energy burdens) by low-income customers enrolled in CAPs and by non-CAP residential customers to determine the energy burden differences between these two groups.

Background[25]

For the purposes of this segment, staff intended to compare three groups of residential customers: CAP households, residential non-CAP households, and CLI households. While all three groups of residential customers comprise the Residential Class of customers, CAP households are tracked separately as a group. CLI households are a subset of the non-CAP residential household group. The utilities reported that they do not possess income information for most CLI customers.[26] Thus, this segment will only compare CAP energy burdens to non-CAP residential energy burdens.

Staff considered the following components:

- The average energy burden for households for electric and gas service;
- Individual utility service type (electric heating, electric non-heating, and natural gas heating);
- FPIG level; and
- Status as residential non-CAP or CAP customer for the past five years.

Additionally, utilities use a variety of payment approaches to structure their CAP programs, consistent with the CAP Policy Statement guidelines. Utilities charge different amounts, offer various percentage discounts or billing options, and can have differing minimum payment requirements. Table 3-1 below shows each utility's CAP payment method and any applicable minimum payments for both heating and non-heating accounts during the study.

[25] *See also* VIII. Residential and Confirmed Low-Income Customer Debt for a discussion of CLI customers.

[26] CLI customers are often identified when they assign a LIHEAP grant to the utility. Receipt of LIHEAP confirms the customer has income at or below 150% of the FPIG, but it does not disclose the household's gross income, so energy burdens at the three FPIG levels cannot be calculated for comparison.

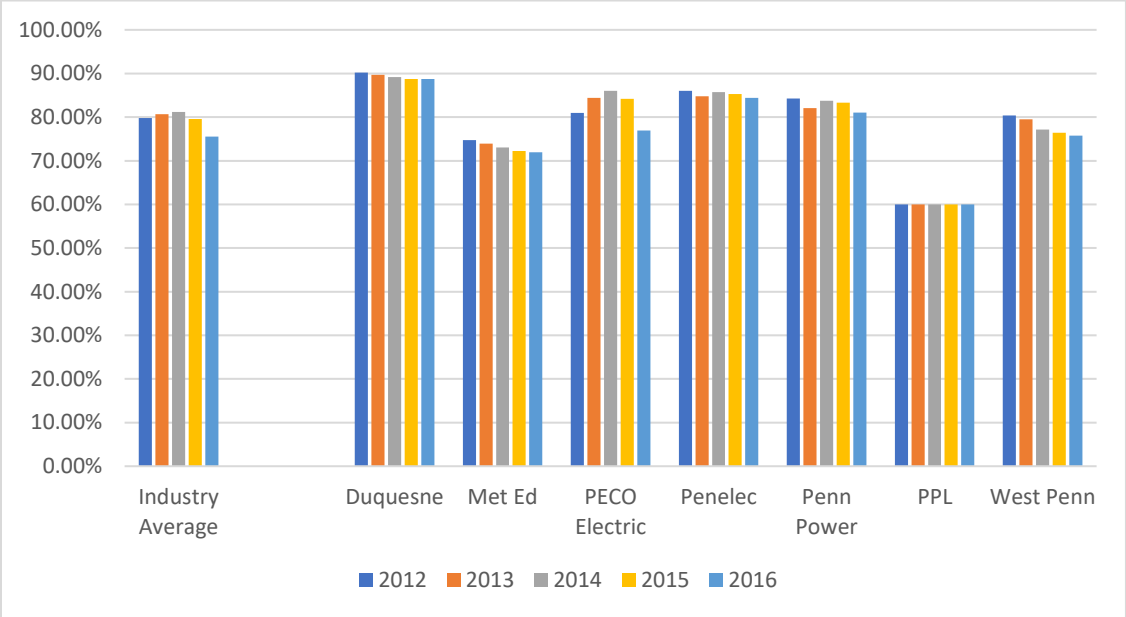
Table 3-1
CAP Billing Methods by Utility

Utility	CAP Billing Method	Minimum Payments
Duquesne	*Percentage of Budget Billing* 30% to 85% of Budget Billing	**Heat:** $40 **Non-Heat:** $15
FE Companies: Met-Ed, Penelec, and Penn Power West Penn (2016)	*Percent of Income and Fixed Annual Credits* Annual credits are calculated based on customer paying 3% of income for non-heat electric and 9% for electric heat. FE Companies provide 1/12th of annual credits each month.	**Heat:** $45 **Non-Heat:** $12
West Penn (formerly Allegheny Power) West Penn (2012-2015)	*Percentage of Income Payment Plan* Subsidy credits are calculated based on total gross household income, primary heat source, and energy burden. 1. Either 13%, 16%, or 17% of income for Electric Heat 2. Either 8%, 12%, or 14% of income for Water Heat 3. Either 5%, 6%, or 7% for Baseload Heat *(i.e.*, electric non-heating)	**Electric Heat:** $50 **Water Heat:** $30 **Baseload Heat:** $25
PECO Electric*	*Rate Discount* Between 3-93% discount (dependent upon the household's FPIG level)	**Heat:** $30 **Non-Heat:** $12
PPL	*Percentage of Budget Billing* 3 options based on customer ability to pay: 1. Minimum Payment (budget bill - maximum monthly CAP credit) 2. 50% to 80% of Budget Billing 3. Agency Selected (% of budget bill plus discounts)	**Heat:** $30 **Non-Heat:** $12
Columbia	*Percent of Income, Budget Billing, or Average Payment* 3 options based on customer ability to pay: 1. 7% or 9% of income 2. Average payment 3. 50% of budget billing	**Heat:** $25
PECO Gas*	*Rate Discount* Between 14-79% (dependent upon the Household's FPIG level)	**Heat:** $25
Peoples	*Percentage of Income* 8% to 10% of income OR budget billing, whichever is lower	**Heat:** $21
Peoples-Equitable	*Percentage of Income* 8% to 10% of income	**Heat:** $39
NFG	*Rate Discount* 10-40% discount off budget billing	**Heat:** $12
PGW	*Percentage of Income* 8% to 10% of income	**Heat:** $25
UGI Gas and UGI PNG	*Percentage of Income* 7% to 9% of income OR average bill, whichever is lower	**Heat:** $25

*PECO implemented a fixed credit methodology as part of its gas and electric CAP on October 1, 2016.

Table 3-1 above does not delineate the utilities that that add CAP Plus[27] and/or monthly PPA co-payment amounts[28] to the CAP customer bills.

Table 3-2
Percent of EDC CAP Bills Rendered to Non-Heating Customers



Another consideration to note is that Pennsylvania EDCs have a higher percentage of non-heating accounts in CAP than heating accounts. As seen in Table 3-2, based on the PA industry average, over 75% of EDC CAP bills issued were for non-heating accounts. *See* Appendix 5.D *for EDCs Number of CAP Bills Paid*. Thus, affordability issues involving electric non-heating accounts impact the majority of EDC CAP customers.

Methodology

To calculate the energy burden levels for non-CAP residential and CAP customers for the years 2012 to 2016, staff obtained data from the utilities and information from the U.S. Census to determine average bills and average incomes for both sets of customers. The average annual tariff rate, usage, and median income was used to determine the

[27] A CAP Plus payment is intended to help offset program expenses for all residential customers who pay for CAPs. Utilities that use CAP Plus typically calculate the monthly charge on an annual basis contingent on the amount of LIHEAP Cash grants they were assigned by their CAP customers in the prior year. At the time of this study, PPL, Columbia Gas, and Peoples added CAP Plus amounts to CAP bills.

[28] Some NGDCs and EDCs charge a monthly PPA co-payment amount to their CAP customers. During the time of this study, Columbia Gas, Peoples, Peoples-Equitable, and PGW each added a $5 co-payment to the monthly CAP bill for customers that had PPAs. Until 2018, PPL charged its $5 monthly PPA co-payment even if a customer had received full PPA forgiveness.

average energy burden levels for non-CAP residential customers. The average annual CAP bill amount and the average annual CAP income were used to determine the average energy burden levels for CAP customers.

Data Limitations

Customers who enroll in utility CAPs with zero income (zero-income customers) may inflate the average energy burdens levels, particularly for the analysis of customers with incomes at or below 50% of the FPIG. Utilities require customers that report zero income to pay the utility's CAP minimum payment amount. Thus, it is not mathematically possible for zero-income customers to receive bills below the maximum energy burden guidelines in the CAP Policy Statement because any billed amount will exceed 100% of their household income. There is some question regarding whether or not the utilities treated the zero-income customers consistently when reporting data for this study.

PPL reported system issues that required it to reconstruct all data prior to 2016 for several of the requested data points. Thus, all PPL data for the energy burden calculations in 2012 to 2015 should be considered estimates.

PECO originally reported combined data for all three customer types, electric heating, electric non-heating and gas heating. PECO was instructed to separate electric from gas but had to apply an allocation percentage to separate the dual-enrolled customers. PECO used actual 2016 data, but the 2012 to 2015 data had to be estimated.

NFG could not provide its data broken down by FPIG level, so staff did not include NFG in the analysis of NGDC average energy burdens at different FPIG levels, and only included NFG in the aggregate analysis.

As noted above, the utilities do not have income levels for the CLI customers so the CLI aspect of this study has been eliminated.

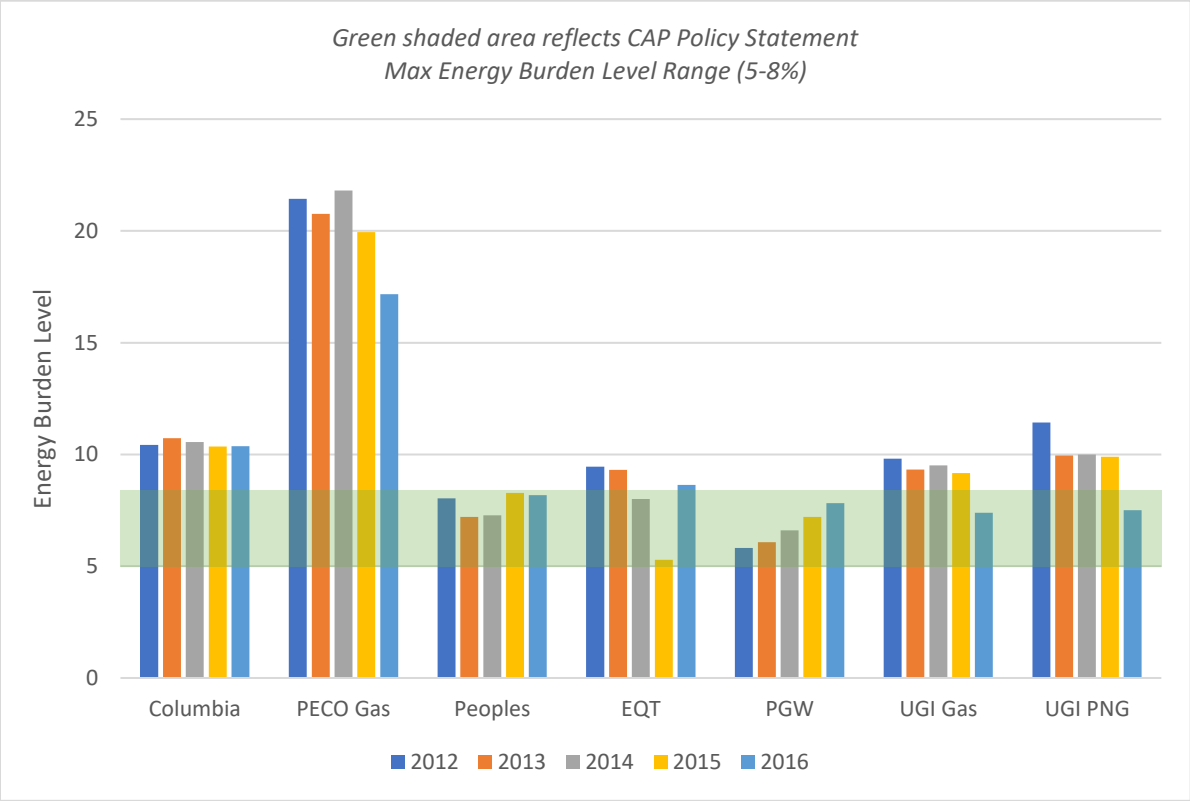
Analysis

Non-CAP Residential NGDC and EDC Customers

The non-CAP residential data show that the average energy burden for residential customers was approximately 4% for combined gas heating and electric non-heating (*i.e.*, 2% for each) and 4% for electric heating. These data can be found in Appendix 1.A: *Non-CAP Residential NGDC and EDC Average Energy Burdens*. For the residential categories, the averages did not vary widely throughout the years of the study or among the utilities and remained relatively consistent for the non-CAP residential customers.

NGDC CAP Customers[29]

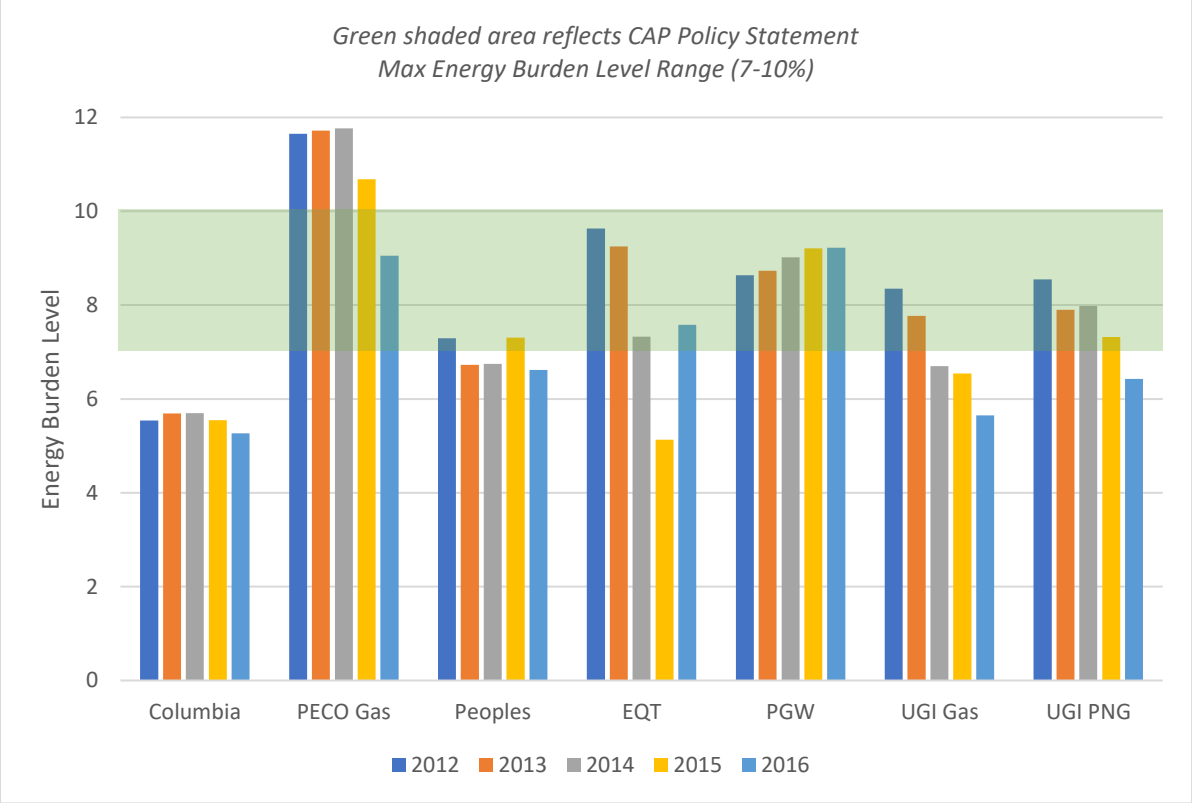
Table 3-3
NGDC CAP Energy Burden Levels for Heating Customers at 0-50% of FPIG, 2012-2016



NGDC CAP customers in the 0-50% FPIG level had the highest reported energy burdens. CAP customers at this income level from Columbia, Peoples Equitable, PECO Gas, UGI Gas, and UGI PNG had energy burdens that exceeded the guidelines in the CAP Policy Statement. PECO Gas' energy burdens for customers at this income level ranged from 17% to 22% over the five years of this study. Columbia's percentages remained in the 10% range throughout this study. Peoples Natural Gas' energy burdens were also relatively consistent, but lower at the 7 to 8% range. The remaining NGDCs had energy burdens that varied from year to year but generally stayed within a few percentage points: Peoples Equitable ranged from 5-9%, UGI PNG from 7 to 11%, UGI Gas from 7 to 10%, and PGW from 6 to 8%. This pattern is illustrated in Table 3-3 above.

[29] *See* Appendix 2.B: *CAP Industry Average NGDC and EDC Energy Burdens.*

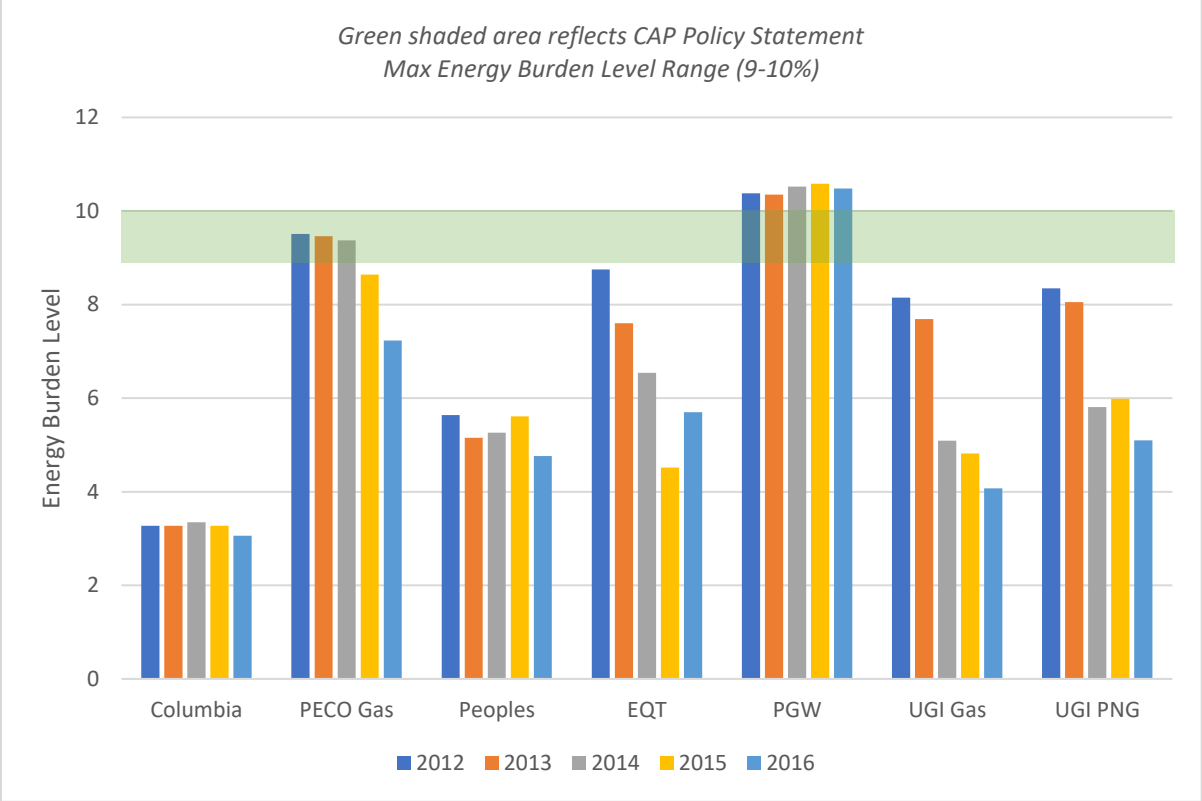
Table 3-4
NGDC CAP Energy Burden Levels for Heating Customers at 51-100% of FPIG, 2012-2016



As seen in Table 3-4, on average, NGDC CAP customers with incomes in the 51 to 100% FPIG level had energy burdens that fell within or below the CAP Policy Statement range of 7 to 10%. PECO Gas, however, had the highest energy burdens in the category with three out of five years above the CAP Policy Statement guidelines. Overall, the PECO Gas energy burdens were between 9 and 12% which is above the range in the CAP Policy Statement guidelines and replicates the trend from the 0 to 50% FPIG level. PECO's lowest energy burden in 2016, was within the range in the CAP Policy Statement guidelines.[30] Columbia's energy burdens fell well below the range and were consistently less than 6%. Peoples Gas' energy burdens averaged 6 to 7%; PGW's energy burdens averaged 8 to 9%. Peoples Equitable and both UGI utilities also fell within the CAP Policy Statement guidelines for this income level.

[30] PECO switched from a rate discount CAP to a fixed credit percent of income CAP in October 2016, so the energy burdens in this study reflect the previously-structured CAP.

Table 3-5
NGDC CAP Energy Burden Levels for Heating Customers at 101-150% of FPIG 2012-2016



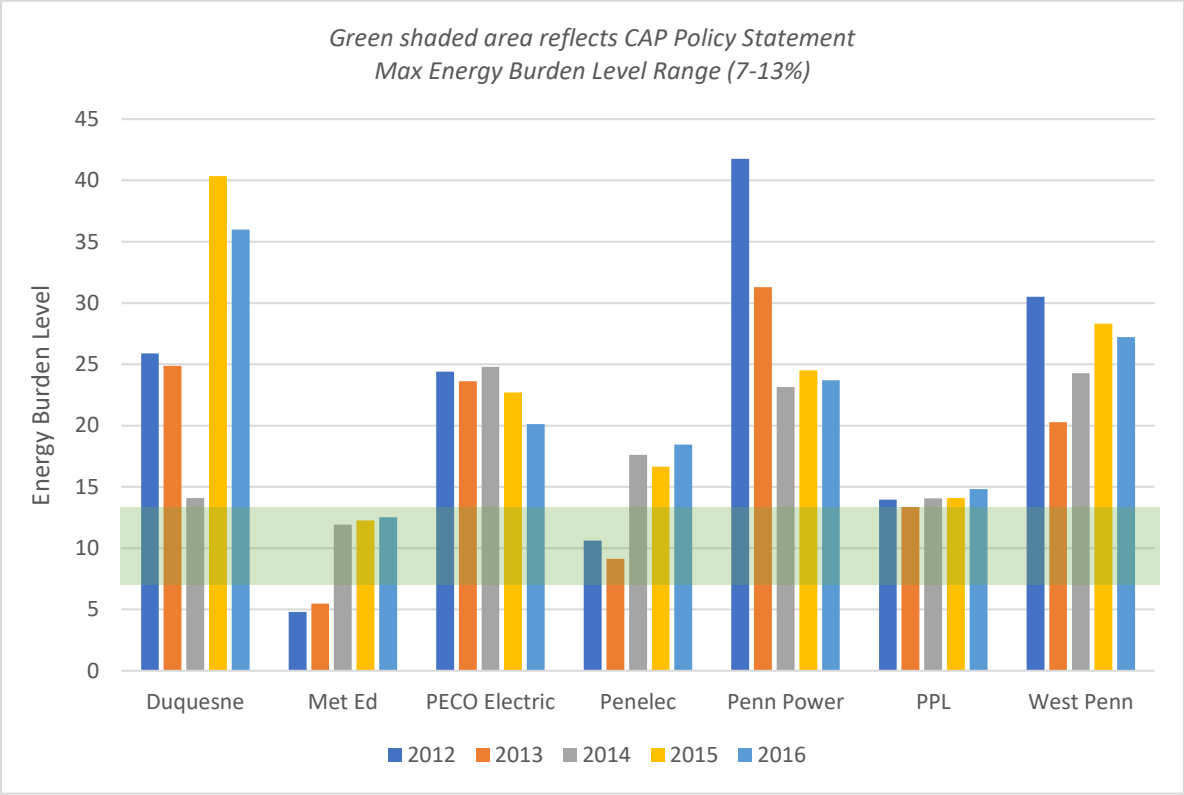
As seen in Table 3-5 above, most NGDC CAP customers with incomes between 101 and 150% of the FPIG had energy burdens at or below the CAP Policy Statement guidelines of 9 to 10%. CAP customers in Columbia, both Peoples utilities, and both UGI utilities had energy burdens of less than 9 to 10%. Columbia had a consistent average energy burden of 3%.[31] Peoples Gas' energy burdens ranged between 5-6%, Peoples Equitable between 5 and 9%, UGI Gas between 4 and 8%, and UGI Penn between 5 and 8%.

PGW CAP customers paid on average between 10% and 11% of income for CAP bills and thus had energy burdens during the five years of this study which were above the range in the CAP Policy Statement guidelines. In-program arrears may have also added to the monthly CAP bill of some PGW CAP customers and may account for why energy burdens were on average over 10%.

[31] Columbia Gas is the only NGDC whose CAP customers with incomes in the 51 to 100% and 101 to 150% FPIG groups were billed on average below the CAP Policy Statement guidelines.

EDC CAP Customers

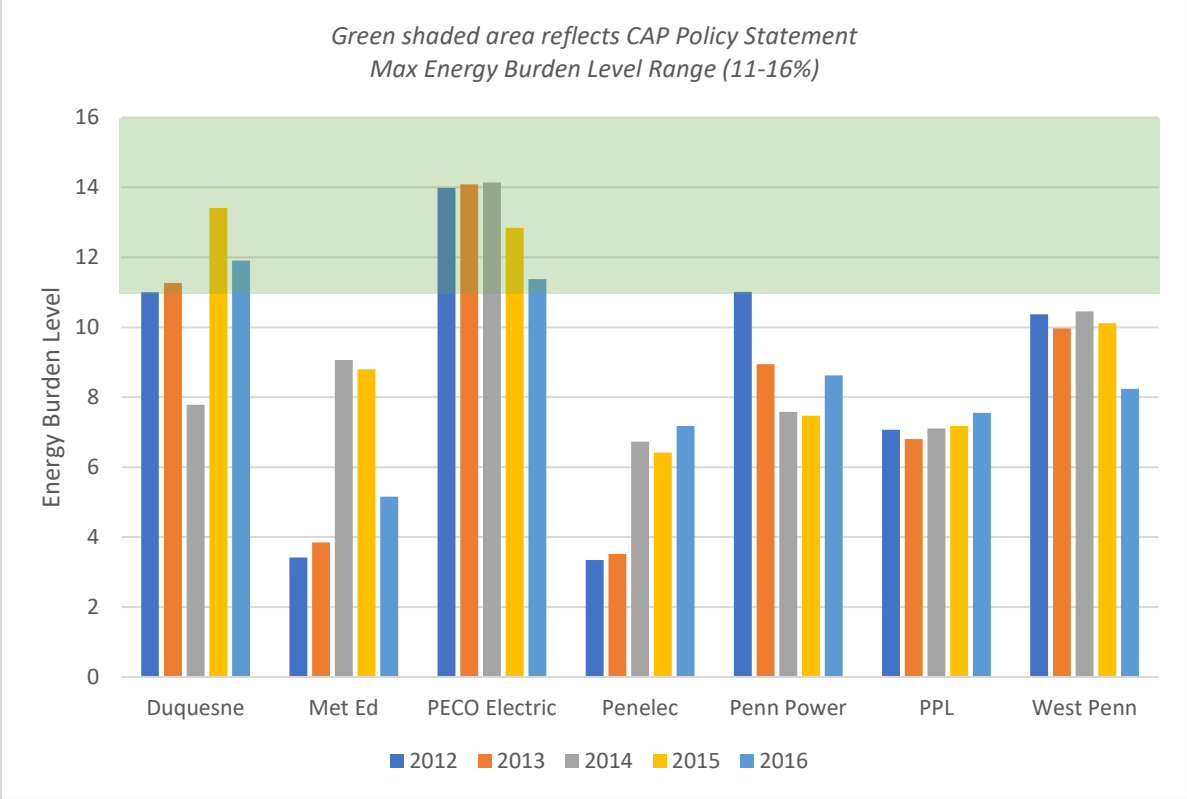
Table 3-6
EDC CAP Energy Burden Levels for Heating Customers at 0-50% of FPIG 2012-2016



As seen in Table 3-6, EDC CAP customers of Duquesne, Penelec, Penn Power, PPL, West Penn, and PECO Electric at the 0 to 50% FPIG level with electric heating accounts exceeded the CAP Policy Statement energy burden range of 7 to 13%. The average energy burdens for most EDC CAP customers at this income level exceeded this range. Met-Ed is the only EDC with energy burden levels within the CAP Policy Statement range for this income category.[32] Most EDC CAP heating customers within this income category had average energy burden levels exceeding 20% for most years in this study. However, it is unclear whether utilities included zero-income customers in the data used for these energy burden calculations.

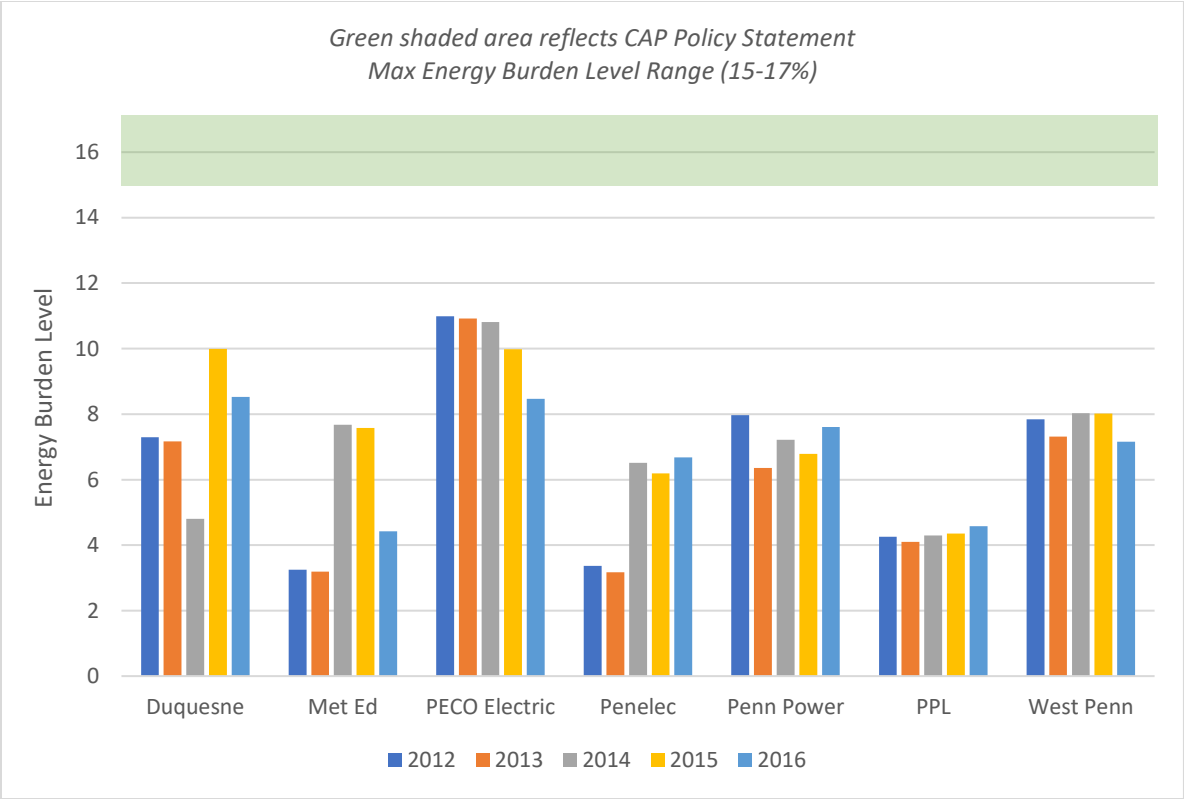
[32] The other FirstEnergy companies (*i.e.*, Penelec, Penn Power, and West Penn) have energy burden levels above the 7 to 13% CAP Policy Statement guidelines. It is not clear why Met-Ed's- energy burden levels are lower. In general, all FirstEnergy Companies calculate a CAP heating bill based on 9% of household income for this FPIG level.

Table 3-7
EDC CAP Energy Burden Levels for Heating Customers at 51-100% of FPIG 2012-2016



As seen in Table 3-7, all utilities were below or within the CAP Policy Statement maximum energy burden range of 11-16%. PECO Electric and Duquesne CAP heating energy burdens were within this range. The remainder of the EDCs had CAP energy burdens at or below 11%.

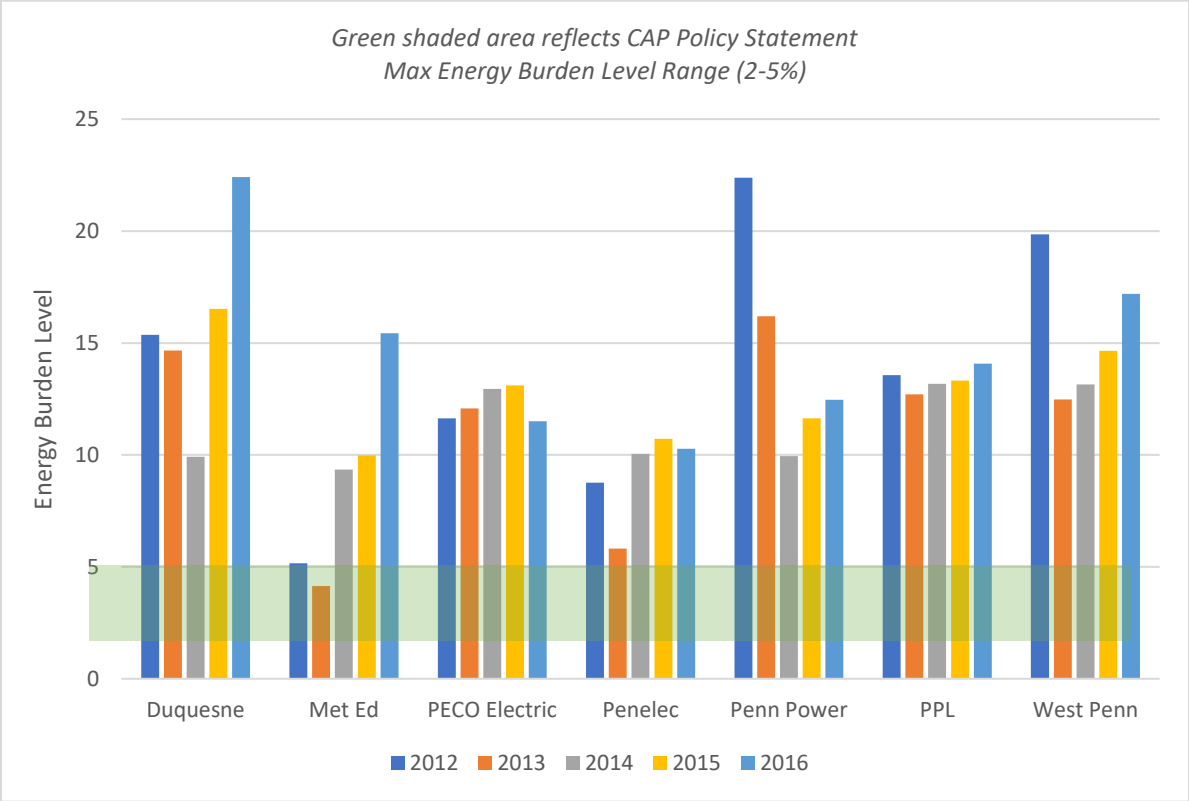
Table 3-8
EDC CAP Energy Burden Levels for Heating Customers at 101-150% of FPIG 2012-2016



The CAP Policy Statement suggests a maximum energy burden of 15-17% for electric heating customers in households in the 101 to 150% FPIG group. Section 69.265(2)(i)(C)(III). On average, EDC CAP heating customers with incomes between 101 to 150% of the FPIG had energy burdens well below the CAP Policy Statement maximum range of 15 to 17%. As seen in Table 3-8, most EDC CAP customers at this income level had energy burdens between 5 and 8% for most years in this study. PECO Electric's energy burden levels dropped from 11% to 9% from 2012 to 2016 for customers in this category.

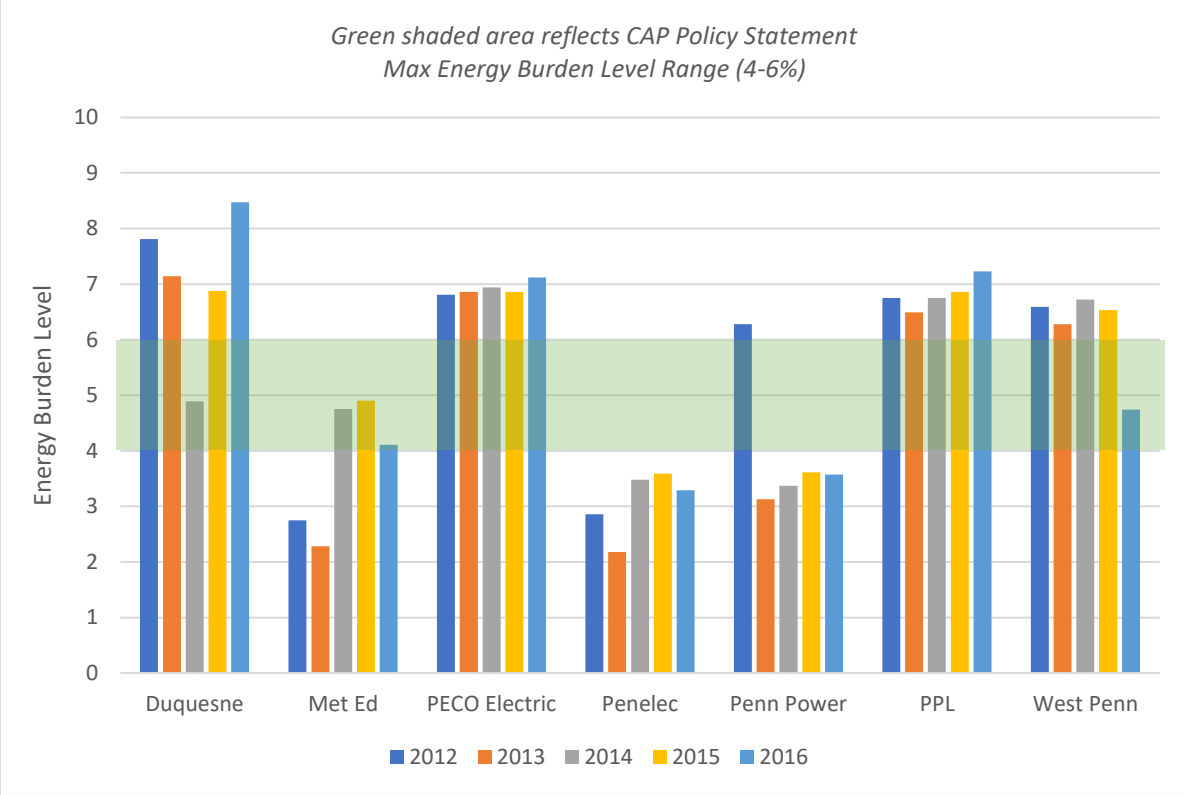
EDC CAP Non-Heating Customers

Table 3-9
EDC CAP Energy Burden Levels for Non-Heating Customers at 0-50% of FPIG 2012-2016



The CAP Policy Statement has a maximum energy burden range of 2-5% for EDC CAP non-heating customers with incomes at or below 50% of the FPIG. As seen in Table 3-9, all EDC CAP customers in this category exceeded this energy burden range, especially in the later years of the study. Most EDC non-heating CAP customers at this income level had energy burdens at or above 10% for most years in this study. However, as with the EDC CAP heating customers, it is unclear whether utilities included the zero-income customers in the data reported for this study.

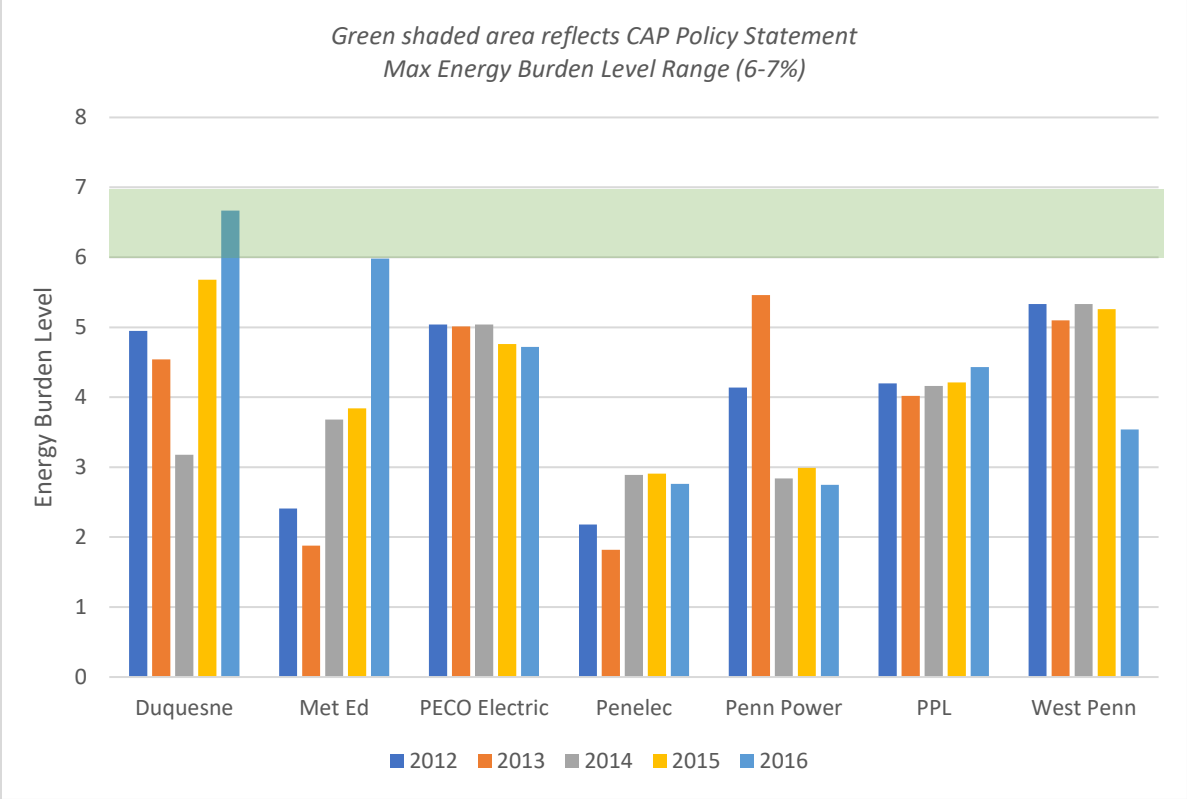
Table 3-10
EDC CAP Energy Burden Levels for Non-Heating Customers at 51-100% of FPIG 2012-2016



The CAP Policy Statement recommends a maximum energy burden range of 4 to 6% for EDC CAP non-heating customers with incomes between 51 and 100% of the FPIG. As seen in Table 3-10, over half of CAP customers in this category had energy burdens slightly above this range for most years of this study. Met-Ed, Penelec, and Penn Power non-heating CAP customers had energy burdens between 3% to 5%, and Duquesne CAP customers in this category increased from 5% to 8% from 2014 to 2016. However, this increase may have been due to Duquesne's budget billing issues that occurred during this time period. [33]

[33] Duquesne introduced a new billing system in November 2014 which did not retain prior usage data. Because its CAP bills were based on a percentage of budget billing, bills were considerably lower for most CAP customers through the beginning of 2015 but increased greatly thereafter, resulting in increased in-program arrears. Duquesne froze collections during this period so that CAP customers were not terminated for non-payment. *See Duquesne 2017-2019 USECP*, Docket No. M-2016-2534323, at 32-34 (order entered on March 23, 2017). CAP bills exceeded the maximum energy burdens in the CAP Policy Statement, and the Commission directed Duquesne to work with stakeholders to address CAP issues. March 23, 2017 Order at 28-31. By order entered on April 19, 2018, the Commission approved Duquesne's proposal to reduce the percent-of-bills discount (*i.e.*, rate discount) for most CAP customers in 2018 and switch to a percent-of-income (*i.e.*, PIPP) CAP by 2020.

Table 3-11
EDC CAP Energy Burden Levels for Non-Heating Customers at 101-150% of FPIG, 2012-2016



The CAP Policy Statement suggests a maximum energy burden range of 6% to7% for electric non-heating customers with income between 101% and 150% of the FPIG. As seen in Table 3-11, the energy burdens for most EDC CAP customers in this category fell below the CAP Policy Statement guidelines for all five years of this study. Duquesne CAP customers' energy burdens increased from 6% in 2015 to 7% in 2016. This increase was likely due to Duquesne's budget billing issues at this time.

Observations

From 2012 to 2016, the average energy burden was 7% to 8% for NGDC CAP heating customers, 5 to 6% for EDC non-heating CAP customers, and 8 to 10% for EDC CAP heating customers. Residential non-CAP customers had an average energy burden of 4% for gas and electric service during this time period.

Although not consistent across all income levels, the staff noted less variance in energy burdens of companies with percentage of income CAPs rather than rate discount CAPs.

On average, NGDC CAP customers at or below 50% of the FPIG level have energy burdens between 8% and 9% of their income, customers with incomes between 51% and 100% of FPIG have energy burdens between 7% and 8% of income, and

customers with incomes between 101% and 150% of FPIG have energy burdens between 5% and 7% of their income. These ranges are within the CAP Policy Statement for all except customers at the 0 to 50% FPIG level.

There are numerous generalizations that can be made from the data provided by the EDCs. CAP customers in the lowest FPIG levels had the largest energy burden, and, as income increased, energy burdens tended to decrease across the board.

There has been variability in the energy burdens for CAP customers across Pennsylvania. As each utility determined its own CAP billing calculation, there was no discernable consistency across energy programs.

Customers in the 0 to 50% FPIG level, regardless of heating or non-heating status and energy type, often had energy burdens exceeding the CAP Policy Statement guidelines. Inclusion of zero-income customers by some utilities may have inflated the energy burden calculations for this FPIG level.

For the CAP customers in the 101 to 150% FPIG level, all three types of energy service show that both NGDC and EDC CAPs had energy burdens within the CAP Policy Statement guidelines. However, non-heating EDC CAP customer energy burdens at various FPIG levels seemed to exceed the CAP Policy Statement guidelines at a greater proportion than EDC heating CAP customers.

IV. Impact of LIHEAP Grants on Energy Burden Levels

Objective

As many states rely solely or primarily on LIHEAP funds as a means of energy assistance, this study examined the effect of LIHEAP grants on CAP customer bills to determine its impact on energy burden levels.

Background

LIHEAP is a federally-funded grant[34] that helps low-income households pay for their home energy[35] bills. Pennsylvania's LIHEAP is administered by DHS.[36] LIHEAP is traditionally available in Pennsylvania to eligible households from November through March, although DHS has extended the program into April when funding permits. Other states have summer cooling LIHEAP grants. LIHEAP grants are available to help pay for jurisdictional energy costs as well as deliverable energy costs. To qualify for Pennsylvania's LIHEAP, household income must be at or below 150% of FPIG, and the customer must be responsible for heating costs. 55 Pa. Code § 601.31 (1-2) (1988).[37]

LIHEAP offers two types of grants: Cash and Crisis. A LIHEAP Cash grant is available to all income-eligible customers that pay for their primary heating costs directly to a vendor or indirectly through rent. Section 601.31 (1-2) (1988). The amount of the LIHEAP Cash grant is calculated based on each household's gross income, number of occupants, county of residence, and source of heat (*i.e.*, electric, gas, oil, etc.). Section 601.41 (1988). From 2012 through most of 2016, the minimum amount of a LIHEAP Cash grant was $100, and the maximum amount was $1,000. For the 2016 - 2017 LIHEAP season (beginning November 2016), DHS increased the minimum Cash grant to $200. Households can receive only one LIHEAP Cash grant per LIHEAP season. Section 601.43 (1988).

A LIHEAP Crisis grant is available to all income-eligible households who are (1) responsible for paying for their primary or secondary heating costs directly or indirectly; and (2) are experiencing a home-heating emergency (*i.e.*, currently without heat or in imminent danger of being without heat). Section 601.32 (1-2) (1988). From 2012 through 2016, the minimum amount of a LIHEAP Crisis grant was $25, and the

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[34] *See* 42 U.S.C. §§ 8621 – 8630. Low-Income Home Energy Assistance.

[35] "Home energy" means a source of heating or cooling in residential dwellings. 42 U.S.C. § 8622(6).

[36] Formerly the Department of Public Welfare.

[37] DHS changes aspects of the LIHEAP State Plan yearly, but the changes only affect some of the sections originally codified in Chapter 601 of Title 55 of the Pennsylvania Code. Citations to Title 55 of the Pennsylvania Code will only be to sections that have not changed over the time frame of the study. Citations to changed sections will be to the specific LIHEAP state plan for a given year.

maximum amount was $500.[38] Households could receive more than one Crisis grant, as long as the total amount of these grants did not exceed $500. Section 601.63 (1988).

In August/September of 2015 and 2016, DHS also administered a LIHEAP Summer Turn-On program that provided supplemental Crisis grants (up to $500) to households who had received LIHEAP Cash and/or Crisis grants during the previous season and are experiencing a heating emergency.[39]

Based on historical averages of the data reported by the utilities for 2013 to 2016, low-income CAP customers who assigned their LIHEAP grants to gas utilities received average Cash and/or Crisis grants of $361 for those in the 0 to 50% FGIP level, $258 for those in the 51 to 100% FPIG level, and $216 for those in the 101 to 150% FPIG level. Low-income CAP customers who assigned their LIHEAP grants to electric utilities received slightly more, on average. Cash and/or Crisis grants to electric heating utilities averaged $474 for the 0 to 50% FPIG level, $333 for the 51 to 100% FPIG level, and $282 for the 101 to 150% FPIG level. Non-heating CAP customers received an average of $417 in the 0 to 50% FPIG level, $319 in the 51 to 100% FPIG level, and $298 in the 101 to 150% FPIG level.

Most utilities apply LIHEAP Cash grants directly to the CAP customer's "asked to pay" amount" (ATP), in compliance with the Pennsylvania LIHEAP State Plan.[40] This means the grant is first applied to any in-program arrears, then the current bill. Any remaining amount is kept on the account as a credit toward the next month's bill.

Rather than rely on LIHEAP to address affordability concerns, Pennsylvania CAPs and other universal service programs are funded primarily and significantly through residential ratepayer rates.[41] DHS prohibits utilities from using LIHEAP grants to fund the discounts on a CAP bill or to reduce any debt forgiveness. DHS also prohibits pooling LIHEAP grants to fund CAPs or other universal service benefits.

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[38] Households are ineligible for LIHEAP Crisis benefits if the grant does not resolve the home-heating emergency. "Emergency" is defined at 42 U.S.C. § 8622(1).

[39] If DHS determined a household was off or in termination status with both its primary and secondary heating sources (*i.e.*, gas and electric), a supplemental Crisis grant was issued to both utilities, up to $500 each (if the grant(s) resolved the termination or restored service). Thus, some customers received up to $1,000 in supplemental Crisis grants through the LIHEAP Summer Turn-On program.

[40] NFG is the only utility that applied LIHEAP Cash grants differently during this study period. NFG would apply a LIHEAP cash grant toward any past or current CAP charges. However, any remaining amount would be factored into a new budget billing calculation. The Commission ordered NFG to, among other things, comply with the LIHEAP State Plan and apply any remaining LIHEAP grant monies as a credit to the CAP customer's account. NFG 2017-2020 USECP at 10-18, 61-62, 65; Docket No. M-2016-2573847 (order entered on March 1, 2018).

[41] Other states use LIHEAP as the main source of funding for their energy assistance programs.

Methodology

Staff compared the average energy burdens of CAP customers before and after they received a LIHEAP grant to determine the impact that LIHEAP grants have in making CAP bills more affordable. Staff examined the following information for CAP customers who received LIHEAP: total number of customers who received LIHEAP, average usage, average billing, average income, and the total amount of LIHEAP dollars received. Most utilities provided this data by FPIG level and heating type.

The impact of the LIHEAP grants on CAP energy burden levels was determined by comparing the average energy burdens for CAP customers prior to receiving LIHEAP and then after the annual LIHEAP amount is applied to their average bill. This analysis examined the change in energy burdens for each FPIG level and heating type.

The CAP energy burdens in this analysis are not comparable to the average energy burdens for CAP customers identified in Section III, *Energy Burden Levels for Gas and Electric Service*. This inconsistency is primarily due to the count of LIHEAP households during a calendar year. The number of CAP customers who received LIHEAP includes each household that received a LIHEAP Cash and/or Crisis grant during a LIHEAP season. Since a calendar year encompasses two partial LIHEAP seasons (*i.e.*, January to March and November to December), households are counted twice if they received a grant in both seasons for the same calendar year. In 2015 and 2016, a CAP household could be counted three times if it received a grant in both seasons and also received a LIHEAP Summer Turn-On grant.

There could also be differences in the value of LIHEAP grants received during each calendar year by a given household. From 2012 through 2014, a CAP customer may have received multiple LIHEAP grants within a calendar year: two CASH grants (January to March and November to December) and Crisis grant(s) (up to $500 total/season). In 2015 and 2016, a CAP customer may have received an additional one or two Summer Turn-On grants.

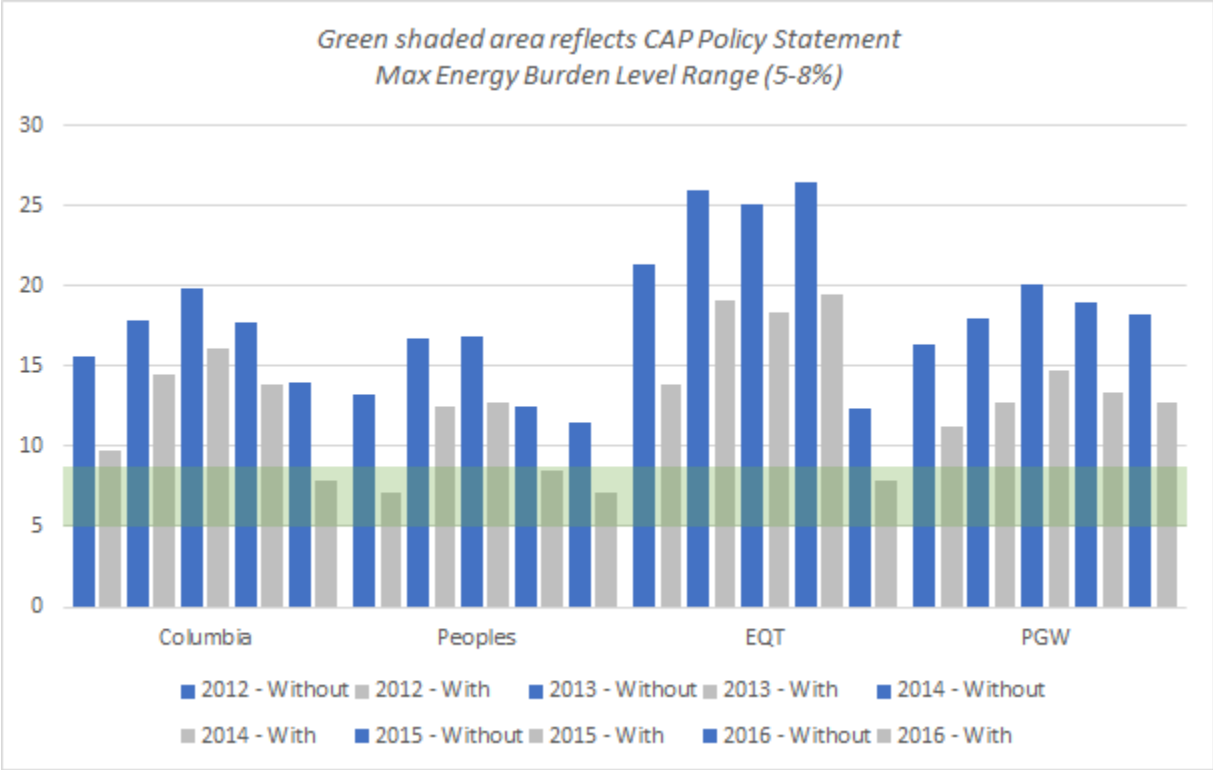
Data Limitations

UGI Gas, UGI PNG, and PECO Gas are not included in this part of the analysis because these utilities could not provide average annual income for CAP customers who received LIHEAP. NFG could not provide data by FPIG level, so it is included only in the analysis of CAP customers at the aggregate income level (*i.e.*, up to 150% of the FPIG).

Analysis

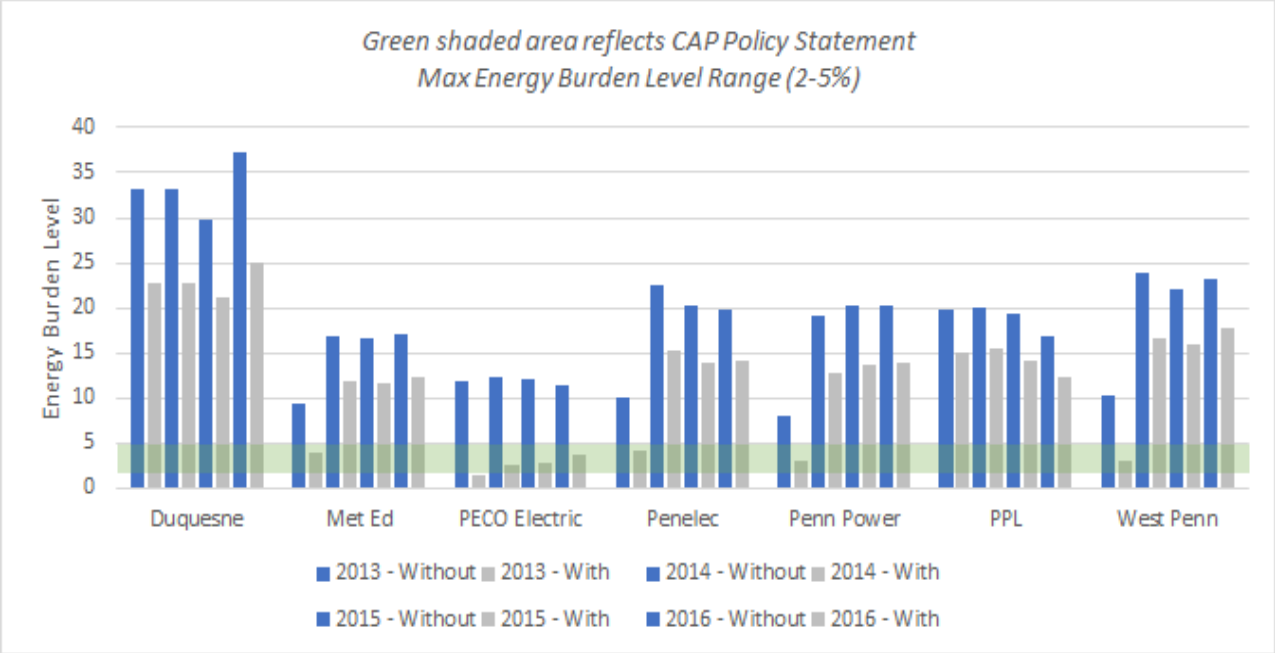
Average Impact of LIHEAP for CAP Customers at 0-50% of FPIG

Table 4-1
NGDC CAP LIHEAP Recipients at 0-50% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2012-2016



The average impact of LIHEAP on energy burdens was greatest for CAP households with the lowest incomes. Based on the industry average, the energy burdens for NGDC CAP customers with incomes at or below 50% of the FPIG decreased by over 5.47 percentage points after receipt of LIHEAP, from 17.74% to 12.27%. For the customers of some individual NGDCs, LIHEAP grants provided a nearly 50% reduction in their energy burdens. Table 4-1 shows the pre- and post-LIHEAP energy burdens for NGDC CAP customers with incomes at 0-50% who received LIHEAP.

Table 4-2
EDC Non-Heating CAP LIHEAP Recipients at 0-50% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2013-2016



EDC non-heating CAP customers at 0% to 50% FPIG experienced an industry average energy burden decrease of over 7.16 percentage points after LIHEAP grants were applied to the average annual bill, from 18.47% to 11.31%. Table 4-2 shows the pre- and post-LIHEAP energy burdens for EDC non-heating CAP customers with incomes at 0 to 50% who received LIHEAP. EDC CAP customers with electric heat at this FPIG level saw the biggest benefits from LIHEAP. Their industry average energy burdens decreased by over 7.68 percentage points after receipt of LIHEAP, from 27.07% to 19.39%.

Table 4-3
EDC Heating CAP LIHEAP Recipients at 0-50% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2013-2016

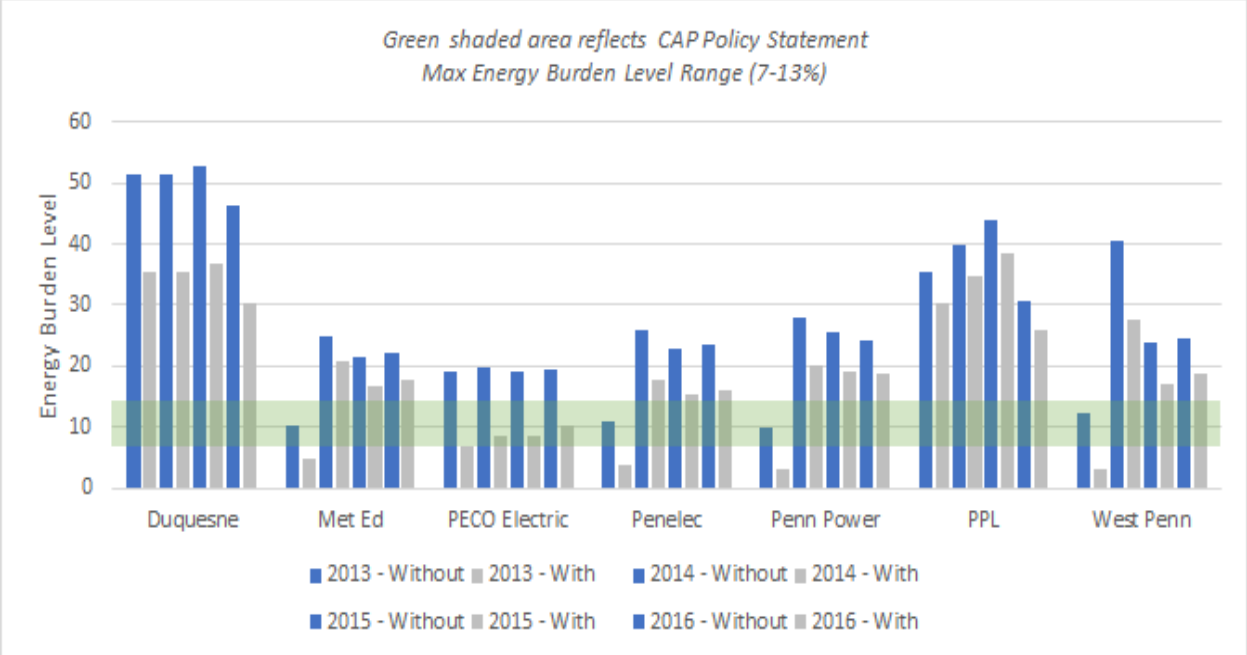
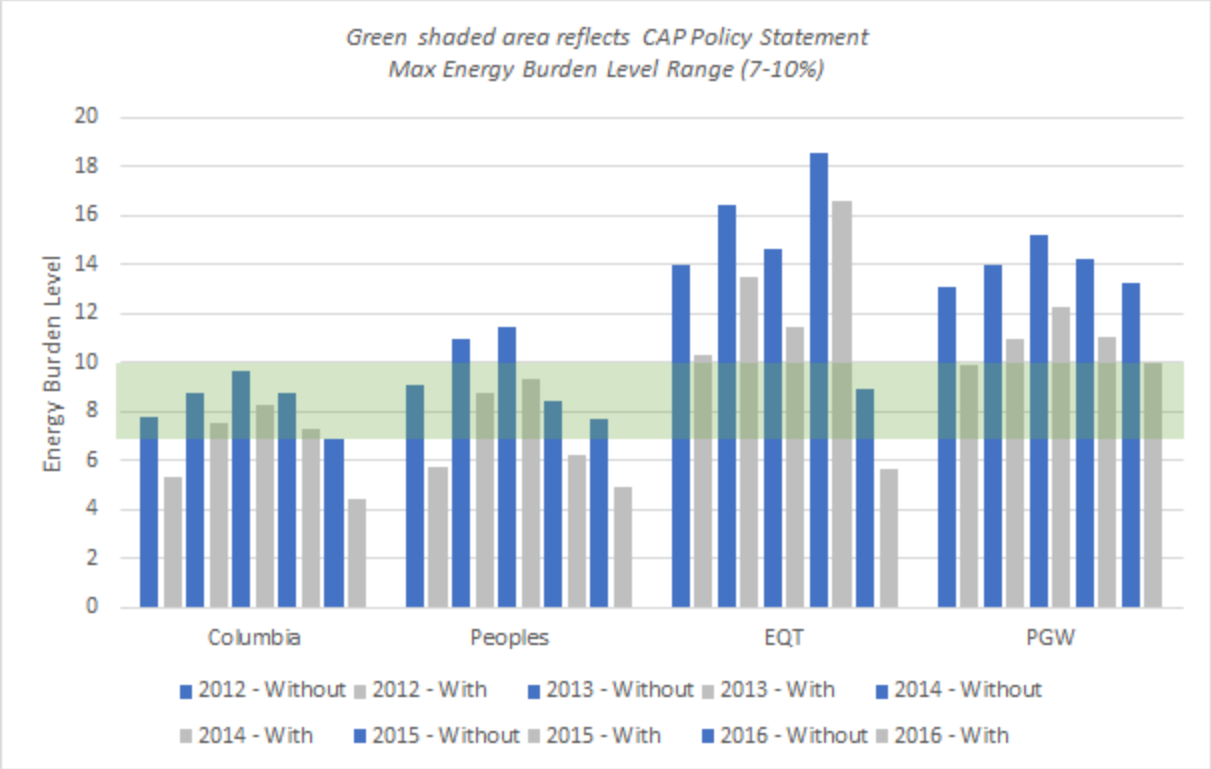


Table 4-3 shows the pre- and post-LIHEAP energy burdens for EDC CAP heating customers with incomes at 0 to 50% who received LIHEAP.

Average Impact of LIHEAP for CAP Customers at 51-100% of FPIG

Table 4-4
NGDC CAP LIHEAP Recipients at 51-100% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2012-2016



As seen in Table 4-4, based on the industry average, LIHEAP reduced the energy burdens for NGDC CAP customers with incomes between 51 and 100% of the FPIG by over 2.69 percentage points, from 11.43% to 8.74%.

Table 4-5
EDC Non-Heating CAP LIHEAP Recipients at 51-100% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2013-2016

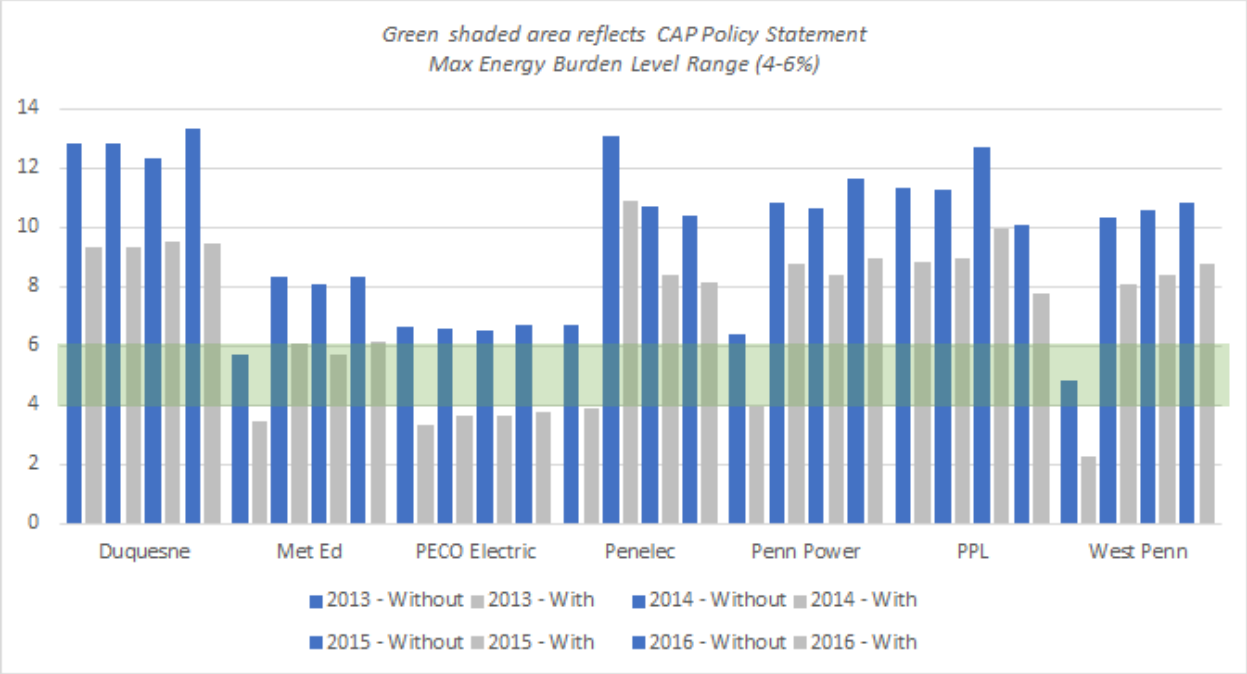
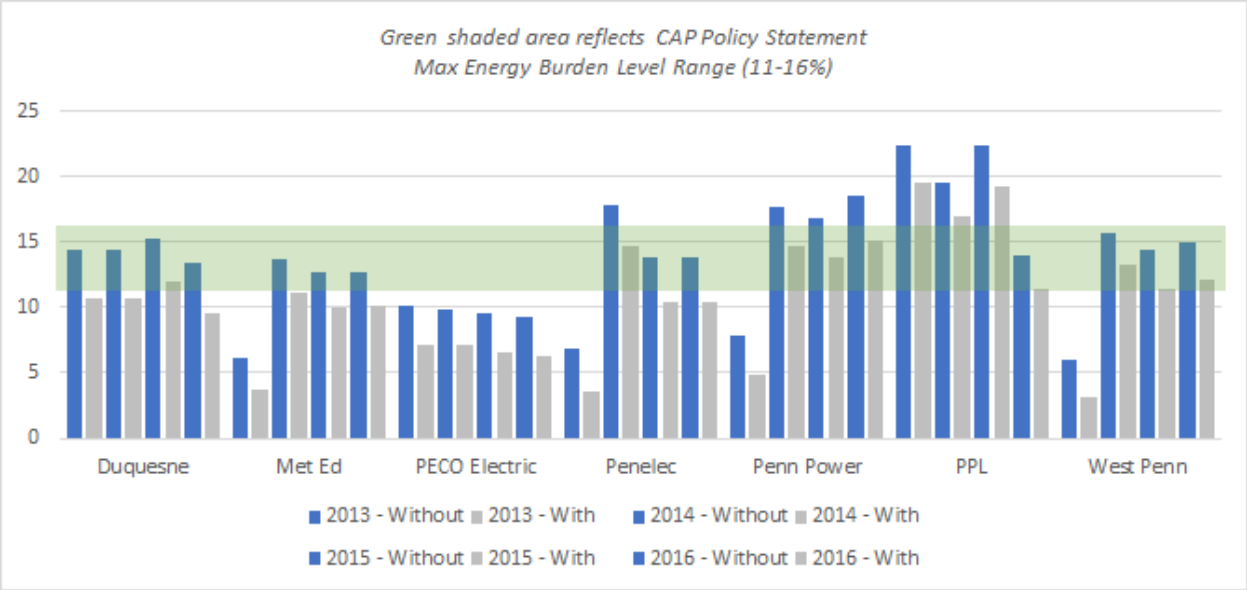


Table 4-6
EDC Heating CAP LIHEAP Recipients at 51-100% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2013-2016

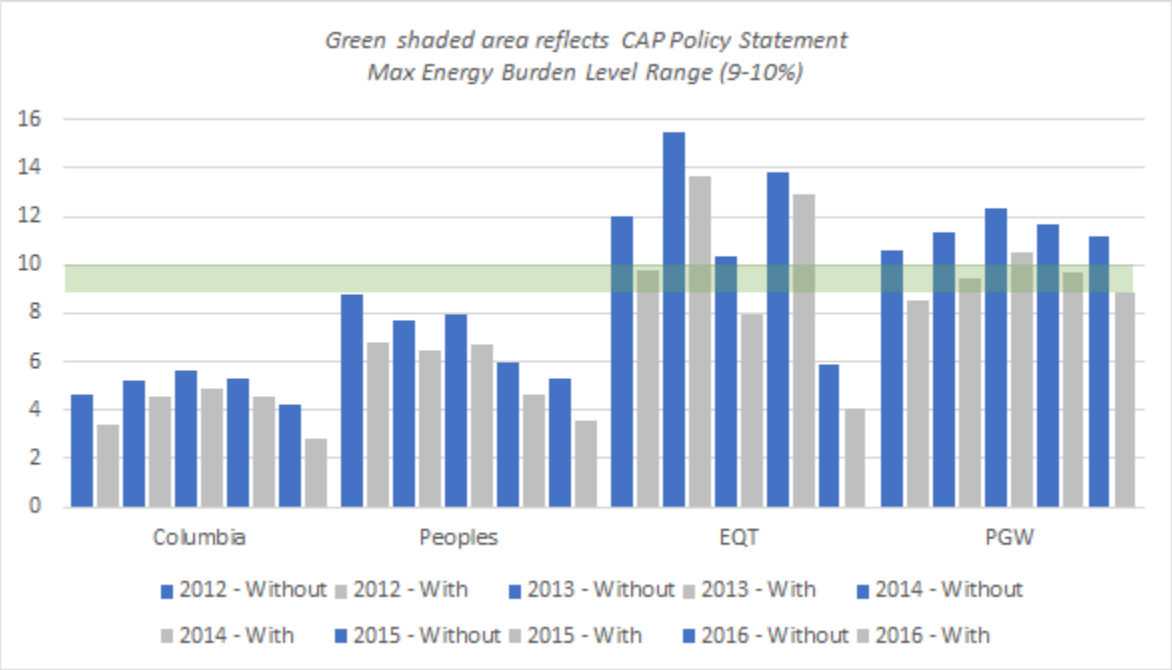


EDC non-heating CAP customers with incomes between 51% and 100% of FPIG level experienced an industry average energy burden decrease of over 2.59 percentage points, from 9.81% to 7.22%, after applying LIHEAP to their average annual bills. The industry average energy burdens for EDC heating CAP customers at this FPIG level decreased by over 2.94 percentage points, from 14.39% to 11.45%, after applying LIHEAP to their average bills. Tables 4-5 and 4-6 show the pre- and post-LIHEAP

energy burdens for EDC non-heating and heating CAP customers with incomes between 51 and 100% of FPIG who received LIHEAP.

Average Impact of LIHEAP for CAP Customers at 101 to 150% of FPIG

Table 4-7
NGDC CAP LIHEAP Recipients at 101-150% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2012-2016



NGDC CAP customers with incomes between 101 and 150% of FPIG experienced an industry average decrease of over 1.54 percentage points, from 8.41% to 6.87%, in their energy burden levels after receipt of LIHEAP. Tables 4-7 shows the pre- and post-LIHEAP energy burdens for NGDC CAP customers with incomes at 101% to 150% FPIG level who received LIHEAP.

Table 4-8
EDC Non-Heating CAP LIHEAP Recipients at 101-150% FPIG
Without & With LIHEAP Grants Applied to Average Bills 2013-2016

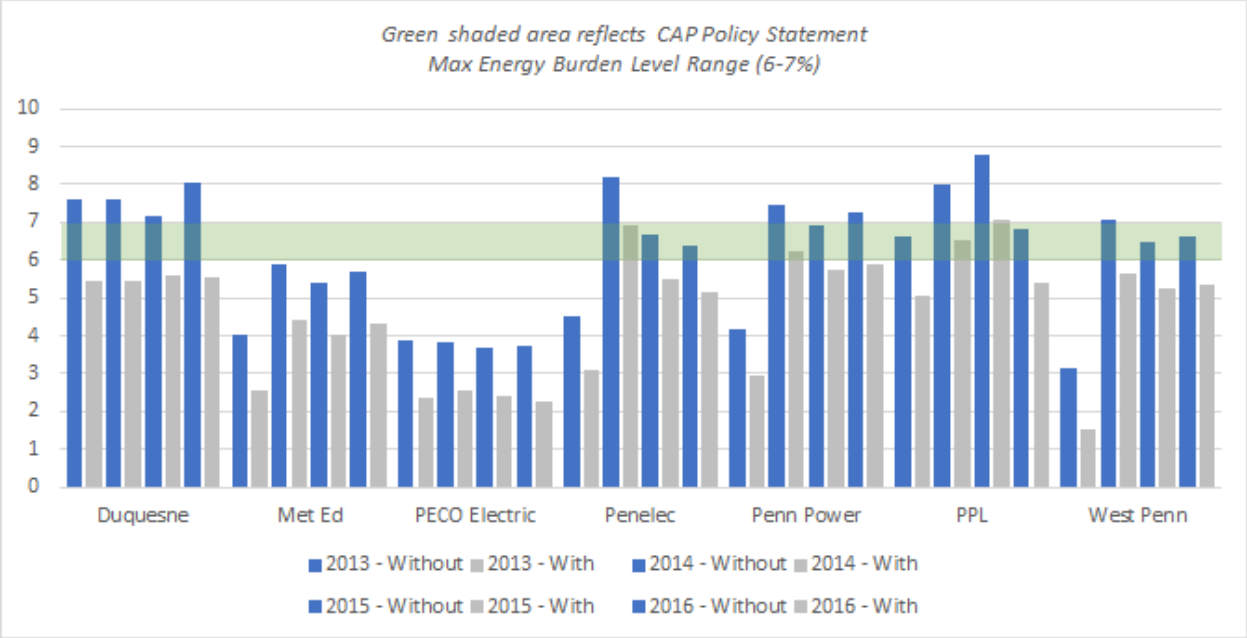
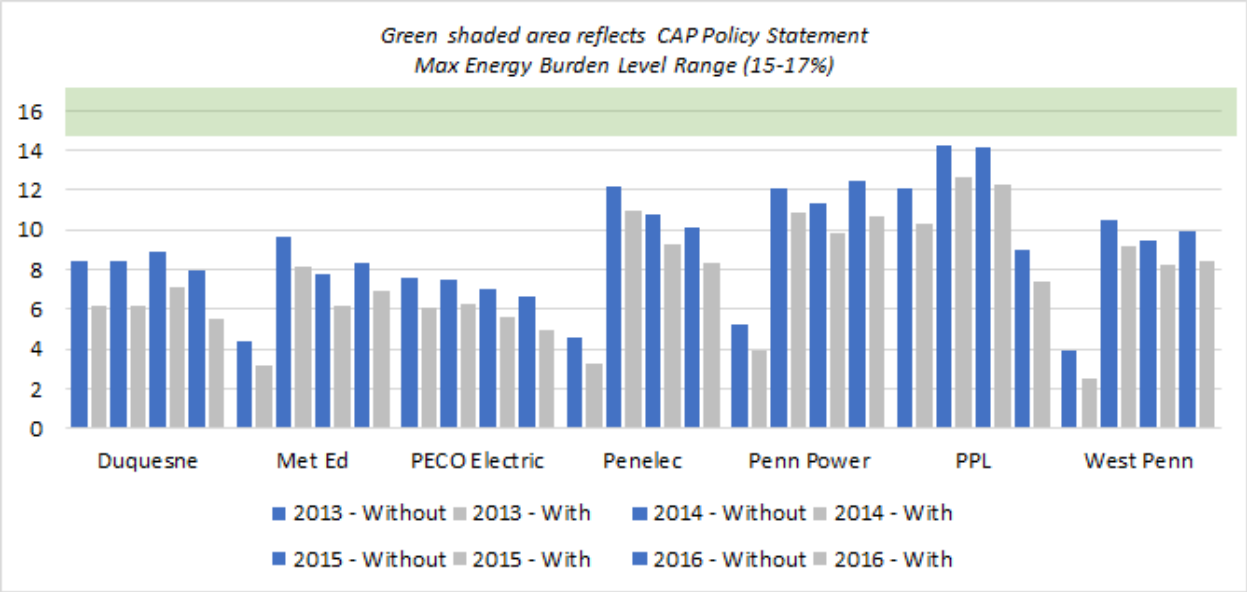


Table 4-9
EDC Heating CAP LIHEAP Recipients at 101-150% FPIG
Without & With LIHEAP Dollars Applied to Average Bill 2013-16



EDC non-heating CAP customers at this FPIG level experienced an industry average energy burden decrease of over 1.5 percentage points, from 6.28% to 4.78%, after LIHEAP grants were applied to their average annual bills. The industry average energy burden for EDC heating CAP customers at this FPIG level decreased by over 1.57 percentage points, from 9.7% to 8.13%, after LIHEAP grants were applied to their average bills. Tables 4-8 and 4-9 show the pre- and post-LIHEAP energy burdens for EDC CAP customers with incomes at 101 to 150% of FPIG who received LIHEAP.

Observations

The analysis reflects that LIHEAP has a measurable impact on energy burdens for CAP customers.

After applying LIHEAP, CAP customers with incomes at or below 50% FPIG level experienced an energy burden decrease of approximately 5 to 6 percentage points for gas heating, 6 to 8 percentage points for electric non-heating, and approximately 7 to 9 percentage points for electric heating. Even with these decreases, however, the average energy burden for CAP households at this FPIG level who received LIHEAP generally exceeded the maximum energy burden guidelines in the CAP Policy Statement.

After applying LIHEAP, CAP customers with incomes between 51 and 100% of the FPIG experienced an energy burden decrease of approximately 2 to 3 percentage points for gas heating and 3 percentage points for electric non-heating and heating. The energy burdens for some NGDC and EDC non-heating CAP customers at this income level remained above the CAP Policy Statement guidelines after application of LIHEAP.

After applying LIHEAP, CAP customers with incomes between 101 and 150% of the FPIG experienced an energy burden decrease of approximately 1 to 2 percentage points for gas heating, electric non-heating, and electric heating. The energy burden levels for NGDC and EDC CAP customers at this FPIG were generally below the CAP Policy Statement guidelines after application of LIHEAP.

LIHEAP had the most impact on reducing energy burdens for NGDC CAP customers in 2016, across all FPIG levels. This may suggest that more CAP customers assigned their LIHEAP grants to their gas utility that year or the introduction of the Summer Turn-On grants increased the amount of LIHEAP monies applied to NGDC CAP accounts.

V. Pre-Program Arrearages (PPAs) and In-Program Arrears

Objective

Determine what the amounts of PPA and/or in-program arrears accrued by CAP customers indicate about the affordability of utility CAPs and customer payment behavior.

Background

Pre-Program Arrearages (PPAs)

When a low-income customer is initially enrolled in a CAP, any balance due which was accrued prior to enrollment (*i.e.*, PPA) is deferred and is not counted as part of the customer's CAP balance. This allows the CAP customer to begin the program with a "clean slate" (*i.e.*, a zero balance).

Table 5-1
Minimum Time frames for Full Forgiveness of PPA

Minimum Time Frame	Utilities
One-year (1/12th forgiveness for each payment)	PECO Electric, PECO Gas
18 months (1/18th forgiveness for each payment)	PPL
Two-years (1/24th forgiveness for each payment)	Duquesne, NFG[42]
Three-years (1/36th forgiveness for each payment)	Columbia, FirstEnergy (Met-Ed, Penelec, Penn Power, and West Penn), Peoples Natural Gas, Peoples Equitable, PGW, UGI Gas, UGI PNG

Table 5-1 reflects the PPA forgiveness time frames for utility CAPs during the 5-year period of this study. Each time a household pays its monthly CAP bill, the utility forgives a portion of the household's deferred PPA balance.[43] The amount of time required for a CAP household to receive full PPA forgiveness differs by utility. The

[42] NFG's PPA forgiveness component was limited to 36 months. NFG forgave 1/24th of PPAs for each month CAP customers pay their CAP monthly bill in-full and forgave any missed months once the in-program CAP balance was satisfied. After 36 months, any remaining PPA balance was added to the customer's account. NFG 2017-2020 USECP at 13, Docket No. M-2016-2573847 (filed on April 2, 2018). No other utility CAPs imposed a time restriction on a CAP customer's opportunity to earn PPA forgiveness.

[43] Some utilities imposed a monthly PPA co-payment. The co-payment goes to reduce the CAP customer's PPA in conjunction with the proportional forgiveness earned by full CAP payments. Thus, a utility with a monthly PPA co-payment is not actually providing full forgiveness of the CAP customer's PPA.

utilities set the minimum period required to earn the PPA forgiveness.[44] Only one utility limited the amount of time a CAP customer can take to achieve full PPA forgiveness.

Higher PPA balances may indicate the unaffordability of pre-CAP bills (*i.e.*, full-tariff bills). Such balances could also indicate poor payment behavior. Customers enrolling in CAPs with higher PPA balances have been found to have less success in payment assistance programs.[45]

In-Program Arrears

One of the benefits of a CAP is that it attempts to provides the customer with an affordable monthly payment while the customer is in CAP. Regardless of any PPA, all customers start with a "clean slate" when they are first enrolled into CAP. If participants continue to accumulate arrearages while in CAP (*i.e.*, in-program arrearages), it may indicate that the monthly CAP payment is not affordable and/or that the customer has poor or ineffective payment habits.

Accrual of in-program arrears may also indicate problems with the utility's collection procedures. Most utilities report initiating collection efforts up to and including service termination activity or removal from CAP after one or two missed CAP payments. If collection activity or program removal is delayed, in-program CAP arrears may continue to accumulate.

Methodology

To determine the average amount of PPA and in-program arrears carried by CAP customers, staff reviewed the following data from NGDCs and EDCs for the period from 2012 through 2016:

- The number of CAP accounts with PPAs and the total dollar amounts of the PPAs; [46] and
- The number of CAP accounts with in-program arrears and the total dollar amount of these arrears.

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[44] The CAP Policy Statement recommends PPA forgiveness over 24 to 36 months, contingent upon regular monthly payments by the CAP participant. Section 69.265(6)(ix).

[45] *Pathways to Success in Low-Income Energy Assistance Payment Programs: The Differential Effects of Customer Characteristics and Program Design on Payment Rates* at 8-9. Megan Campbell, Opinion Dynamics (2013). http://www.opiniondynamics.com/wp-content/uploads/2013/08/Pathways-to-Success-in-Low-Income-Energy-Assistance-Payment-Programs1.pdf

[46] These PPA balances reflected the amount of PPAs carried by CAP customers during each year. It does not reflect the average PPA balance of CAP customers when they enrolled in the program with a PPA.

Data Limitations

Some utilities could not provide PPA and in-program arrearage amounts by FPIG level or heating type (*i.e*., electric heating and electric non-heating). Specifically:

- The FirstEnergy Companies could not provide PPA data by FPIG level.
- The FirstEnergy companies could not provide data by heating type for electric.

Some utilities could not provide PPA and in-program arrears data for every year of this study. Specifically:

- Columbia Gas could not provide data for 2012.
- West Penn could not provide data prior to 2015.
- Duquesne could not provide data prior to 2015.

Further, the PPAs and in-program arrears were not tallied in terms of the age of the debt.

As a result, staff analyzed the PPA and in-program arrearage amounts in the aggregate across all FPIG levels (*i.e.*, 0-150%). Electric heat and electric non-heating CAP accounts are combined.

Analysis

NGDCs–PPAs

For gas heating CAPs, staff found a variance in the amount of PPAs carried by CAP customers. Most gas utilities reported average PPA balances between $400 and $800 for CAP customers with a PPA. Columbia Gas had the lowest average amount of PPAs, ranging from $99 to $133 per CAP customer for the four years of data provided (2013-2016). PGW reported the highest average amount of PPA, ranging from $1,260 to $1,342 per CAP customer for 2012 through 2016.

One possible reason for the variance in the average amounts of PPAs between Columbia Gas and PGW may be the differences in their CAP enrollment restrictions. Columbia Gas will enroll any low-income customer with a heating account into its CAP if the customer is "payment troubled," which is defined as having received a termination notice or having broken a payment agreement within the past 12 months or having been identified through a utility referral or credit scoring. Columbia Gas 2015-2018 USECP at 17, Docket No. M-2014-2424462 (filed on August 12, 2015). During the time-period of this study, PGW enrolled low-income customers into its CAP only if the percentage-of-income payment (*i.e.*, 8-10%) was the most affordable option. PGW 2014-2016 USECP at 9, Docket No. M-2013-2366301 (filed on September 22, 2014). Thus, low-

income customers could qualify for Columbia Gas' CAP after two missed payments, while PGW customers may have had to wait to qualify until CAP offered the most affordable payment.

Overall, PPA balances trended downward for most gas utilities. This decrease may be attributable to the lower cost of natural gas[47] and the warmer winters Pennsylvania experienced after the polar vortex in 2014-2015. Columbia (with the lowest average PPAs) and Peoples have, however, seen their average PPAs trend slightly upward over the five years.

Table 5-2
Average PPAs Carried by NGDC CAP Customers with PPA Balances
(Gas Heating Only)

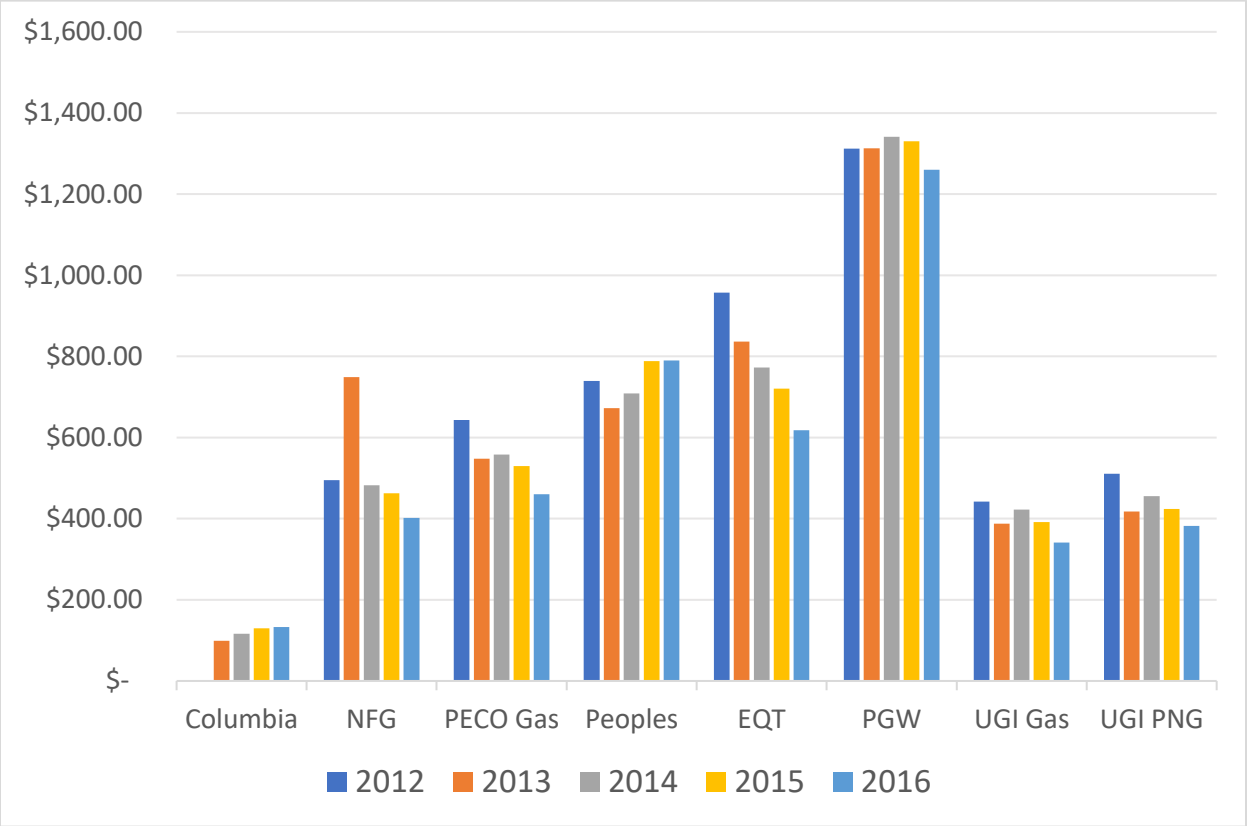

Table 5-2 reflects the average PPA per NGDC CAP customer with a PPA balance during the five-year- period of this study.

NGDCs–In-Program Arrears (IPAs)

Most NGDCs reported in-program arrears averaging from $100 to $400 for CAP customers who carried in-program arrears during 2012-2016. All NGDCs reported

[47] *See* the Commission's *Rate Comparison Reports*, published annually by the Commission's Bureau of Technical Services:
http://www.puc.state.pa.us/filing_resources/rate_comparison_report.aspx

decreasing in-program arrearage balances in 2016. In addition to lower natural gas costs and warmer winters in 2015-2016, declining CAP enrollment may also be a factor. The average 2016 CAP enrollment rate for both NFG and Peoples Equitable declined by 43% compared to their average 2012 CAP enrollment rates. PGW's average CAP enrollment in 2016 was 34% lower than 2012. 2012 and 2016 Report on Universal Service Programs & Collections Performance at 39 and 59, respectively.

Table 5-3
Average IPAs Carried by NGDC CAP Customer with IPAs Balances
(Gas Heating Only)

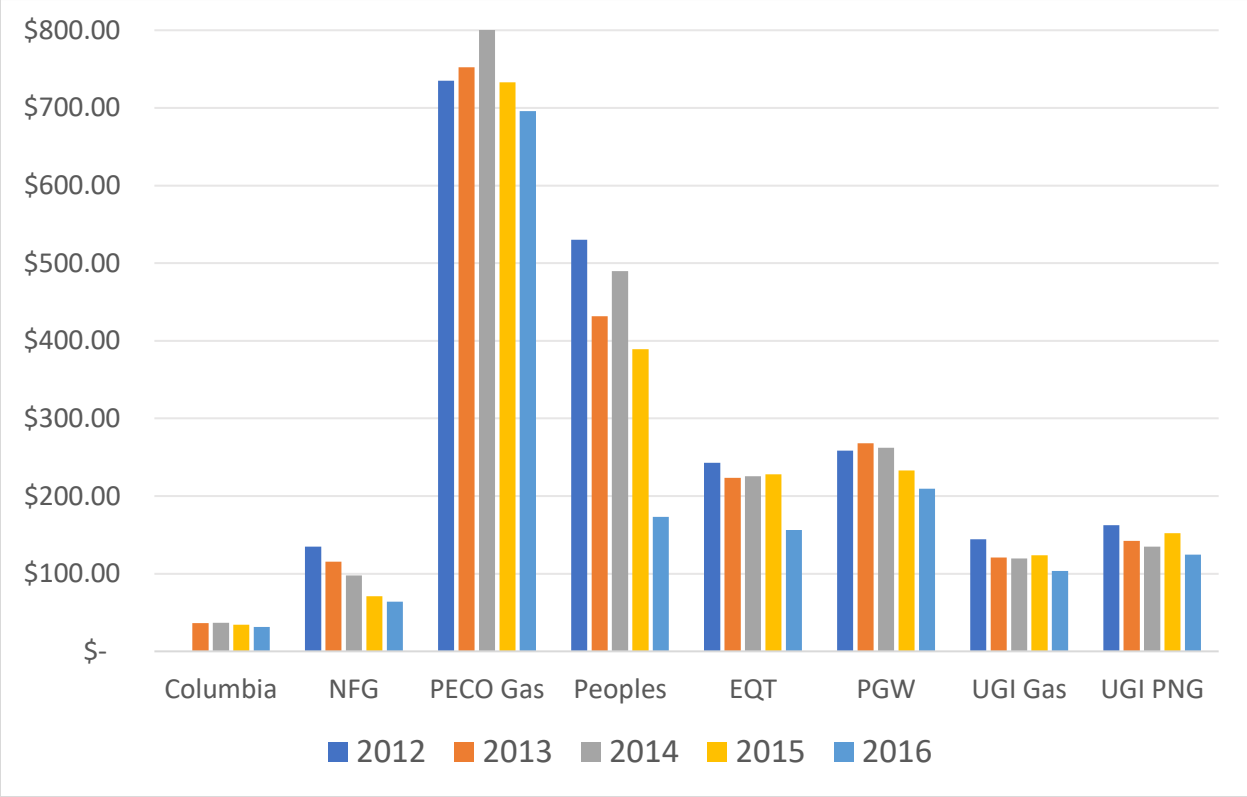

Table 5-3 reflects the average in-program arrears for NGDC CAP customers who carried in-program arrears during the five-year period of this study.

Columbia reported the lowest amount of in-program arrears, ranging from $31 to $36 for CAP customers who carried in-program arrears during the four years of data it provided (2013-2016). Columbia initiated termination procedures after two missed CAP payments,[48] and it also reported higher CAP termination rates, on average, than most other NGDCs. *See* Table 5-3. Beginning collection activity before a CAP customer accrues a sizeable in-program arrears may prevent CAP customers from accruing high in-program arrears balances, but, besides Columbia, this study did not detect a possible correlation between these two variables.

[48] Columbia 2015-2018 USECP at 21, Docket No. M-2014-2424462 (filed on August 12, 2015).

PECO Gas reported the highest amount of in-program arrears, ranging from $643 to $746 for CAP customers who carried in-program arrears for 2012 through 2016. During this period, PECO Gas had allowed CAP customers to obtain payment agreements[49] for in-program arrears which likely is responsible for its higher levels.[50]

EDCs – PPAs

Table 5-4
Average PPAs Carried by EDC CAP Customers with PPA Balances
(Electric Non-Heating and Electric Heating)

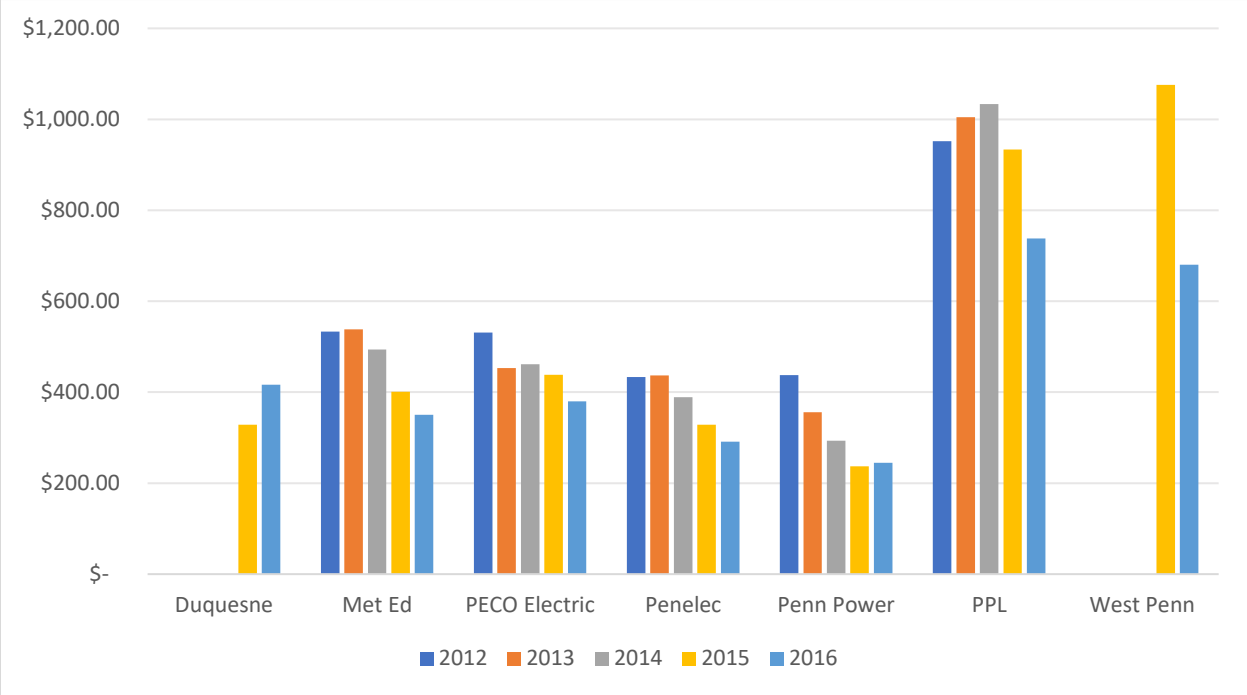

Table 5-4 reflects the average PPA amounts for EDC CAP customers who carried a PPA balance. Most EDCs reported a decrease in the average PPA balances carried by

[49] The Commission generally uses "arrangements" to refer to Commission-facilitated payment arrangements pursuant to Chapter 14 and "agreements" to refer to accords reached between the customer and the utility without Commission input. In this report, staff shall refer to both as "agreements."

[50] PECO Gas and Electric allowed CAP customers to obtain payment agreements on in-program arrears as one way to address unaffordability, especially for customers with incomes below 50% of the FPIG. The availability of payment agreements, however, allowed CAP customers to accrue large amounts of in-program arrears. PECO reported that the combined gas and electric in-program arrears balance was approximately $45 million by July 2015. PECO 2016 - 2018 USECP at 36, Docket No. M-2015-2507139 (filed on February 17, 2017). The Commission approved PECO's 2016 - 2018 USECP by order entered on August 11, 2018, which permitted PECO to alter its CAP structure to improve affordability for its lowest income customers. PECO also eliminated payment agreements for in-program arrears after October 2016. PECO 2016 - 2018 USECP at 9-10.

CAP customers by 2016. PPL and West Penn CAP customers, however, carried the highest amount of average PPAs for EDC customers with PPAs, peaking at $1,034 for PPL in 2014 and $1,076 for West Penn in 2015.[51, 52]

EDCs – In-Program Arrears

Table 5-5
Average IPAs Carried by EDC CAP Customers with IPA Balances
(Electric Non-Heating and Electric Heating)

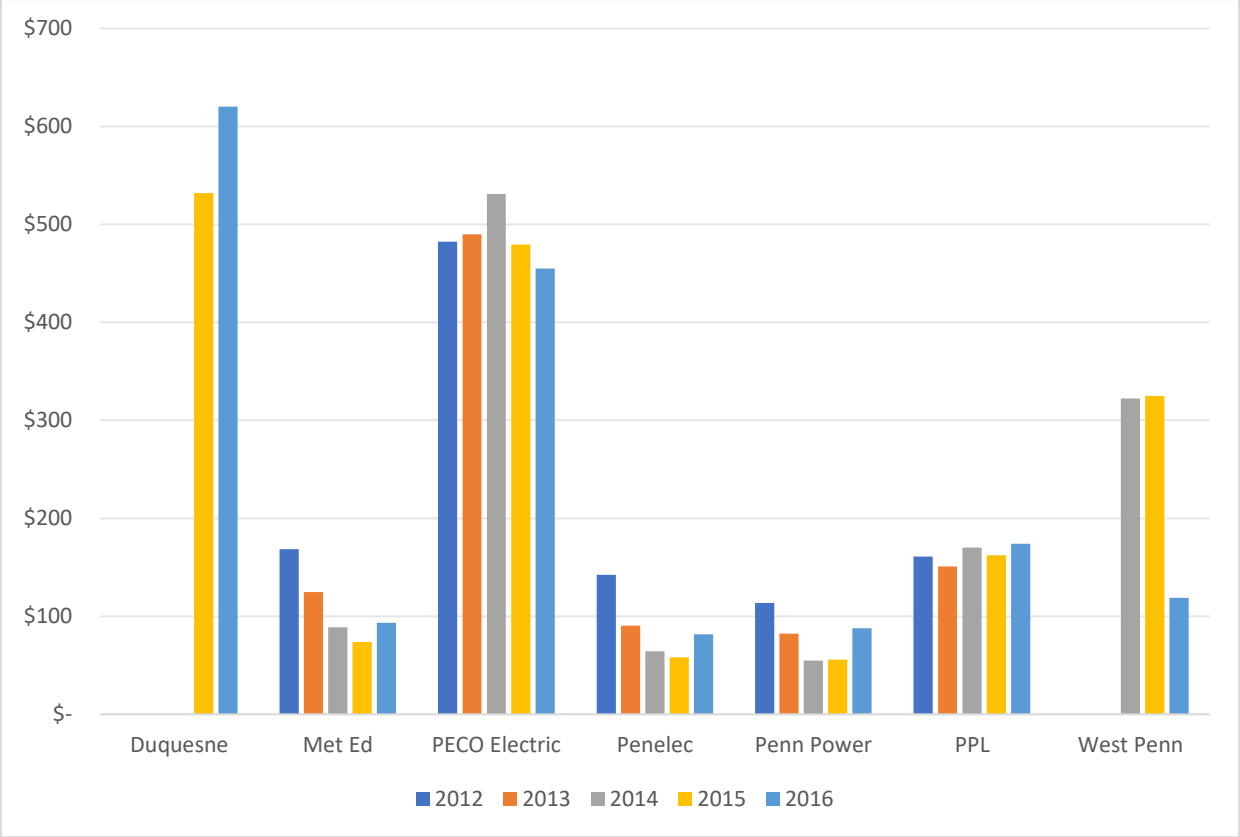

Table 5-5 reflects the average in-program arrears for EDC CAP customers who carried arrears during the five-year period of this study.

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[51] PPL's high average PPA balances were likely a result of its CAP eligibility requirements during this time period. From 2011 through September 11, 2014, income-eligible customers must have defaulted on one or more payment agreements to qualify for PPL's CAP. PPL 2011-2013 USECP at 9, Docket No. M-2010-2179796 (filed on February 18, 2011). PPL subsequently amended this requirement by allowing any income-eligible customer who had a payment arrangement within the past 12 months to qualify for CAP. During the time frame of the study, PPL also required that customers have a PPA to enroll in CAP. PPL 2017-2019 USECP at 16-17 (filed on September 11, 2014), Docket No. M-2013-2367021, (order entered on November 6, 2017) at 16-17.

[52] In December 2015, West Penn converted all in-program arrears carried by CAP customers to PPA status. This may explain the high amount of PPAs reported by West Penn in 2015 and 2016.

Most EDCs reported an average in-program arrears balance of less than $200 per customer with an in-program arrears balance. Duquesne and PECO Electric reported the highest average in-program arrears carried by electric CAP customers.

Duquesne's average in-program arrears were $532 in 2015 and increased to $620 in 2016. Duquesne's higher in-program arrearage amounts are most likely result of the budget billing issues Duquesne experienced during this time. [53]

PECO Electric's in-CAP payment agreements, which paralleled its NGDC CAP payment agreements, likely contributed to the higher in-program arrears reported during this time period. [54]

Observations

With the collection and assessment of the data noted above, staff offers several observations:

- CAP eligibility requirements may have impacted the amount of PPA carried by customers when they enroll in the program. Utilities that restricted CAP enrollments to customers with a broken payment agreement to households which would pay less on a percent of income plan or to accounts with existing arrearages reported higher average PPA balances.

[53] Duquesne introduced a new billing system in November 2014 which did not retain prior usage data. Because its CAP bills were based on a percentage of budget billing, bills were considerably lower for most CAP customers through the beginning of 2015 but increased greatly thereafter, resulting in increased in-program arrears. Duquesne froze collections during this period so that CAP customers were not terminated for non-payment. See Duquesne 2017-2019 USECP, Docket No. M 2016 2534323, at 32-34 (order entered on March 23, 2017). CAP bills exceeded the maximum energy burdens in the CAP Policy Statement, and the Commission directed Duquesne to work with stakeholders to address CAP issues. March 23, 2017 Order at 28-31. By order entered on April 19, 2018, the Commission approved Duquesne's proposal to reduce the percent-of-bills discount (i.e., rate discount) for most CAP customers in 2018 and switch to a percent-of-income (i.e., PIPP) CAP by 2020.

[54] PECO Gas and Electric allowed CAP customers to obtain payment agreements on in-program arrears as one way to address unaffordability, especially for customers with incomes below 50% of the FPIG. The availability of payment agreements, however, allowed CAP customers to accrue large amounts of in-program arrears. PECO reported that the combined gas and electric in-program arrears balance was approximately $45 million by July 2015. PECO 2016 - 2018 USECP at 36, Docket No. M-2015-2507139 (filed on February 17, 2017). The Commission approved PECO's 2016 - 2018 USECP by order entered on August 11, 2018, which permitted PECO to alter its CAP structure to improve affordability for its lowest income customers. PECO also eliminated payment agreements for in-program arrears after October 2016. PECO 2016 2018 USECP at 9-10.

- PPA balances trended downward for most gas utilities. This decrease may be attributable to the lower cost of natural gas and the warmer winters Pennsylvania experienced after the polar vortex in 2014-2015.

- The data show in-program arrears were generally decreasing for all NGDCs from 2012 to 2016. Factors that may have contributed to this trend include lower natural gas costs, warmer winters, and declining CAP enrollments during this study period.

- Most EDC CAP customers with in-program arrears carried a balance of less than $200 during this five-year period.

- Since many utilities were unable to provide data for the PPA and in-program arrears balances by FPIG levels and/or by heating type, staff is unable to determine if customers at specific incomes (*e.g.*, at or below 50% of the FPIG) or with specific heating types carried a disproportionate share of CAP PPA or in-program arrears.

VI. Percentage of CAP Bills Paid In-Full

Objective

Explore whether the percentage of CAP bills paid in-full could be an indicator of energy affordability for CAP customers.

Background

CAPs are designed as alternatives to traditional collection methods for low-income, payment-troubled customers. In exchange for continued utility services, customers participating in CAPs agree to make regular monthly payments, which may be set at an amount less than the customer's current bill based on usage at tariff rates. While participation in a CAP does not guarantee that low-income, payment-troubled customers will receive the most economical bill for utility services, CAPs and other universal service programs are intended and designed to make those energy bills more affordable. Notwithstanding other factors that may affect a household's ability to pay its monthly home energy bills, it is presumed that CAP customers are more likely to pay their monthly home energy bills if those bills do not consume an unmanageable percentage of income for low-income, payment-troubled customers.

As discussed previously in this report, NGDCs and EDCs have discretion in many aspects of the design and operation of their CAPs, including determining the monthly payment amounts of each CAP participant. Section 69.265(2)(i)-(vi) of the CAP Policy Statement provides guidelines for determining how CAP monthly payment plans should be established, including providing maximum home energy burden guidelines for total electric and natural gas home energy costs. A majority of Pennsylvania utilities set CAP payment amounts based on the customer's household family size and gross monthly income or the customer's average monthly bill, whichever is less. *See* Table 3-1 for an overview of how the major utilities determine monthly CAP payment amounts, including the minimum monthly CAP payments established for those customers with no income.

Methodology

To assess whether monthly CAP bills are set at an amount that facilitates low-income customers to pay their monthly electric and/or natural gas bills in-full, the Commission requested CAP billing data from the major EDCs and NGDCs for the years 2012-2016. The data requested included the number of monthly CAP bills issued and the amount (in dollars) of those bills. The data submitted by the utilities were categorized by FPIG level and by account status (electric heating, electric non-heating, gas heating).

Data Limitations

Certain utilities experienced limitations regarding the availability of the data requested. For example, NFG could not provide the data requested for CAP customers by FPIG level; thus, Commission staff was not able to evaluate if there were differences in the percentage of bills paid among the FPIG levels within NFG's CAP. In addition, West Penn was unable to provide data for the years 2012 and 2013, and PPL could only provide estimated data for the years 2012-2015. Furthermore, the EDCs and NGDCs had no meaningful way to distinguish if "payment in full" data exclusively included a full payment on current monthly charges or if "payment in full" data included the full payment of current plus any delinquent or "catch up" amounts. Three of the FirstEnergy Companies, Met-Ed, Penelec, and Penn Power, submitted 2012 to 2015 data that showed several months of billings that were reported as negative dollar amounts. Therefore, although the Commission requested data regarding the dollar amounts of CAP billings and payments, staff was unable to use it in the analyses.

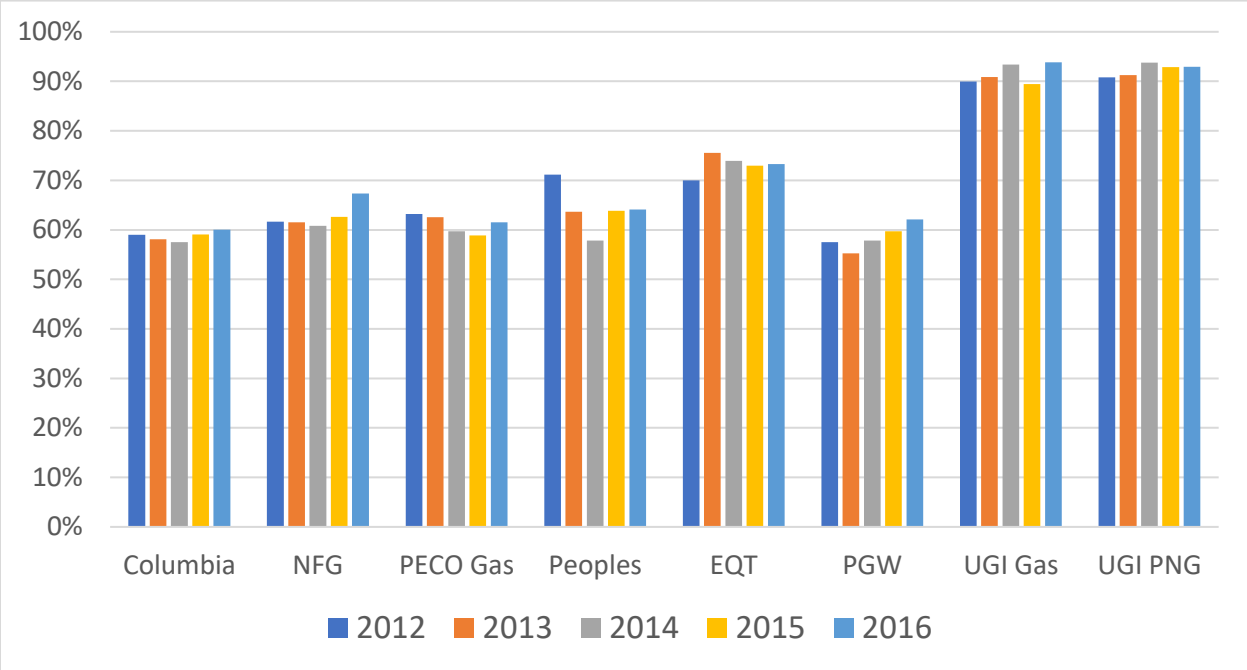
Analysis

CAP Customer Billing Data by Heating Type

This analysis is in two parts. Staff first examined the bill-paying patterns based on heating type. The second part looks at bill-paying patterns based on the customers' income levels.

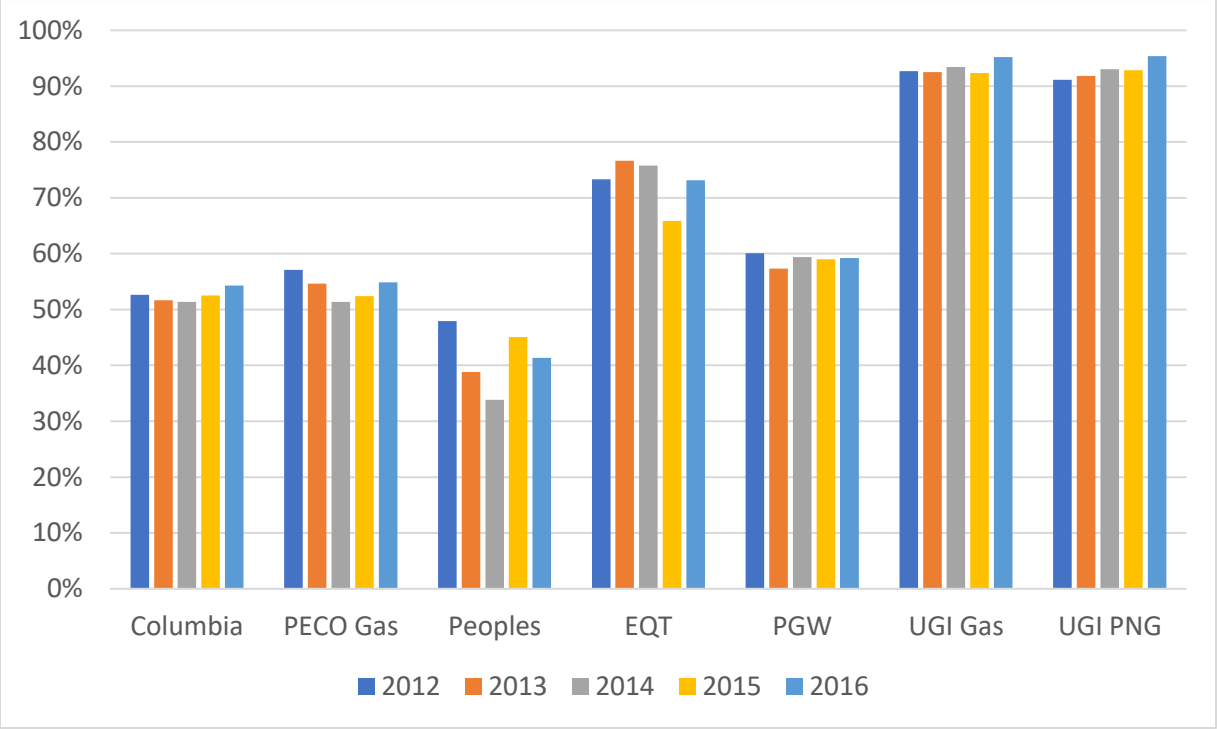
NGDC Percent of CAP Bills Paid

Table 6-1
Percentage of NGDC CAP Bills Paid In-Full



The data depicted in Table 6-1 above includes NGDC CAP customer billing information at all FPIG levels. From this data, it appears that CAP customers of UGI Gas and UGI PNG are the most reliable in paying their natural gas bills in-full. According to annual data submitted by UGI Gas and UGI PNG for the years 2012 to 2016, approximately 89 to 93% of CAP customer bills were paid. If this information is accurate, staff would expect to see lower in-program arrears accrued by UGI Gas and UGI PNG CAP customers, as the majority of the CAP bills should have been paid in full. According to Table 5-3**,** above, UGI Gas and UGI PNG CAP reported that their customers carried average in-program arrears exceeding $100 during the years 2012 to 2016. Based on the differences between these data points and that UGI Gas and UGI PNG's percentage of CAP bills paid is much higher than any other NGDC, there may be inconsistencies in how these utilities track the number of bills issued and the amount paid by CAP customers.

Table 6-2
Percentage of NGDC CAP Bills Paid In-Full
0-50% FPIG

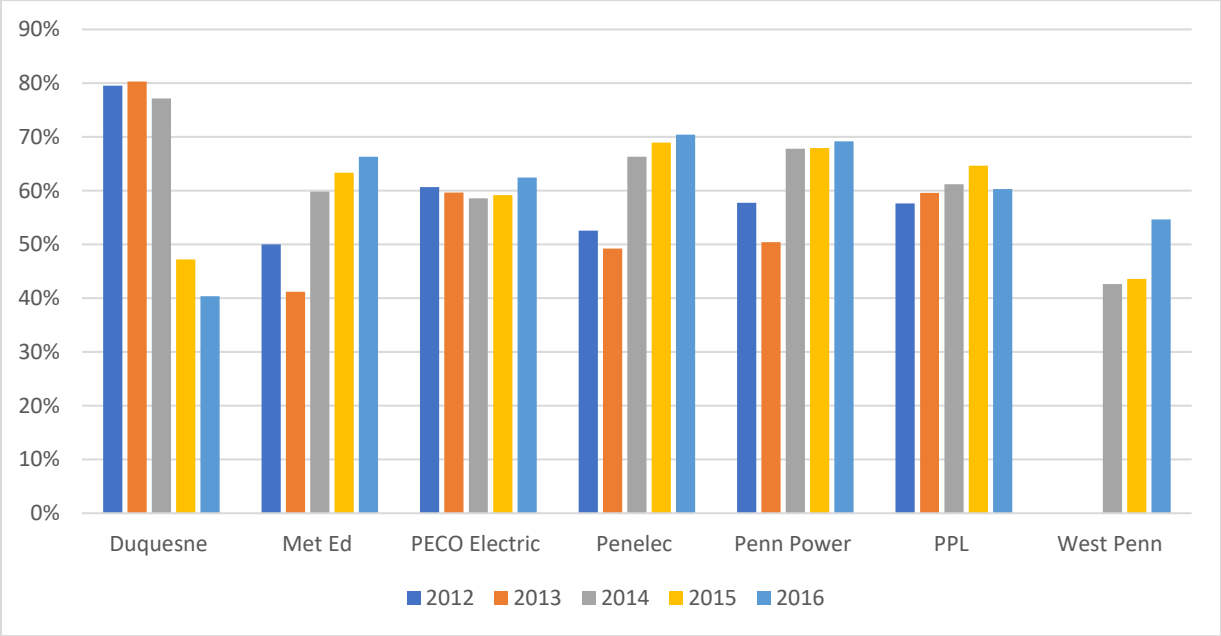


Staff also notes the differences in the percentage of bills paid by Peoples and Peoples Equitable CAP customers. Peoples and Peoples Equitable have maintained the same CAP requirements since at least 2015, including charging CAP customers 8% to 10% of their income or budget billing, whichever is less. Despite these commonalities, the two utilities reported different CAP customer payment behaviors. For example, while Peoples provided information that indicates that 57 to 71% of CAP bills were paid in-full during 2012-2016, Peoples Equitable reported that 69 to 75% of CAP bills were paid in-full during the same time period. The differences between the utilities are particularly noteworthy when one examines and compares their respective data for

CAP customers at or below the 0 to 50% FPIG level. *See* Table 6-2. While Peoples Equitable reported that 65 to 76% of CAP bills for customers at the 0 to 50% FPIG level were paid in-full during 2012-2016, Peoples reported that only 33 to 47% of its CAP bills at this income level were paid in-full. These variances between Peoples and Peoples Equitable may merit additional evaluation.

EDC Percent of CAP Bills Paid

Table 6-3
Percentage of EDC CAP Bills Paid In-Full
(Electric Heating and Non-Heating Accounts)



The information displayed in Table 6-3 includes 2012-2016 EDC CAP customer billing data aggregated from all FPIG levels, as well as by account status, including electric heating and electric non-heating accounts. Notable in this data is the information submitted by Duquesne, which indicates a dramatic decrease in the number of CAP customer bills paid in-full. From a high of nearly 80% in 2012 and 2013, the utility reported that only 40% of CAP customers' bills were paid in full in 2016. While this seemingly substantial decrease may be alarming, it is likely attributable to the changes that the utility implemented to its billing system in November 2014, resulting in higher monthly CAP bills in 2015 and 2016 due to budget bill corrections. *See* Footnote 29.

Aside from the information provided by Duquesne, the data in Table 6-3 nevertheless still shows marked annual and EDC variability, ranging from a low of 40% to a high of 70% of EDC CAP customer bills paid in-full. PECO and PPL appear to have the least variability over the same time frame.

Table 6-4
Percentage of EDC CAP Bills Paid In-Full
(Electric Heating Accounts)

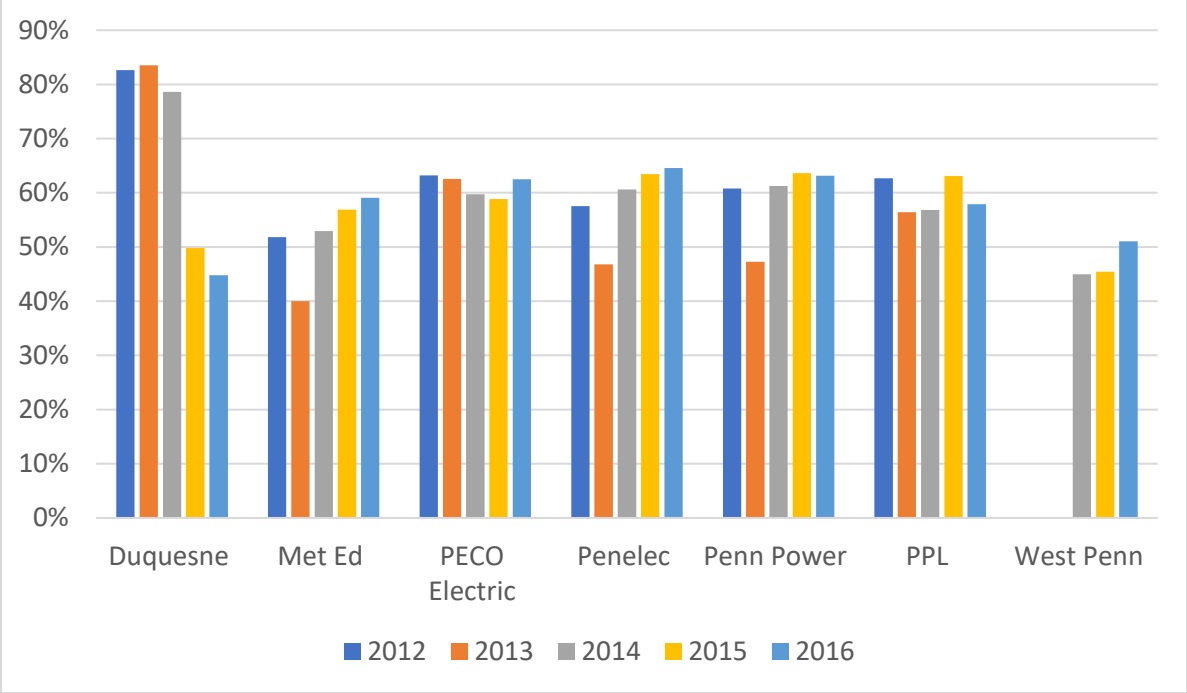
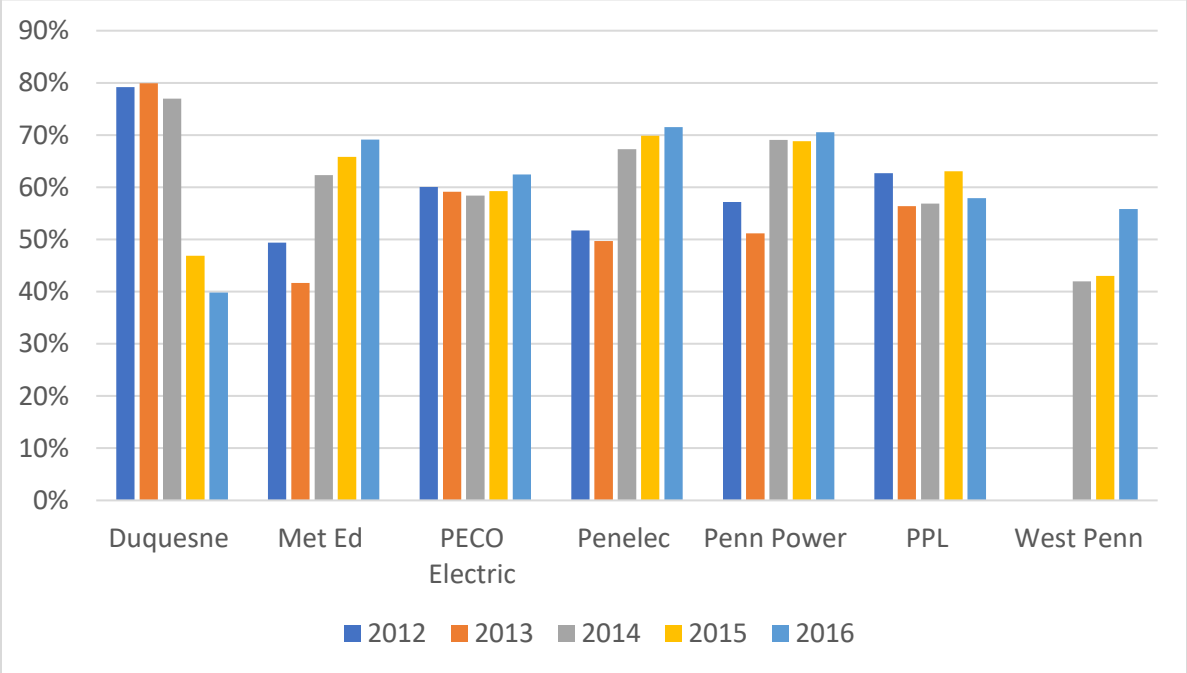


Table 6-5
Percentage of EDC CAP Bills Paid In-Full
(Electric Non-Heating Accounts)



In Tables 6-4 and 6-5 above, the data show some variability between the percentage of CAP electric heating bills paid in-full compared to the percentage of CAP electric non-heating bills paid in-full. While seemingly negligible, there are differences,

such as electric heating generally being more expensive than gas heating, that could indicate why a greater percentage of CAP electric non-heating bills were paid in-full compared to the percentage of CAP electric heating bills. This variability warrants further scrutiny and examination.

CAP Customer Billing Data by FPIG Level

Staff also examined the percentage of NGDC and EDC CAP customer bills paid at the 0 to 50%, 51 to 100%, and 101 to 150% FPIG levels. This analysis was conducted to determine if the increased income for CAP customers positively influences the percentage of utility bills paid in-full.

NGDCs

Table 6-6
Percentage of NGDC CAP Bills Paid In-Full
(0-50% FPIG Level)

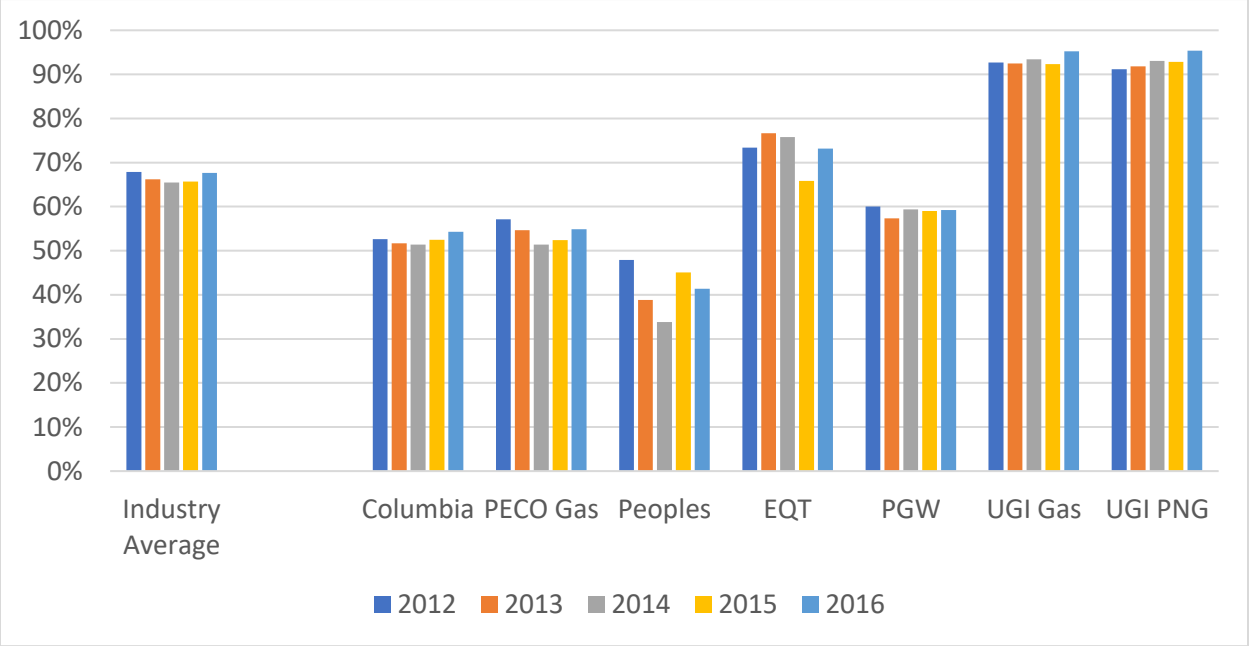


Table 6-7
Percentage of NGDC CAP Bills Paid In-Full
(51-100% FPIG Level)

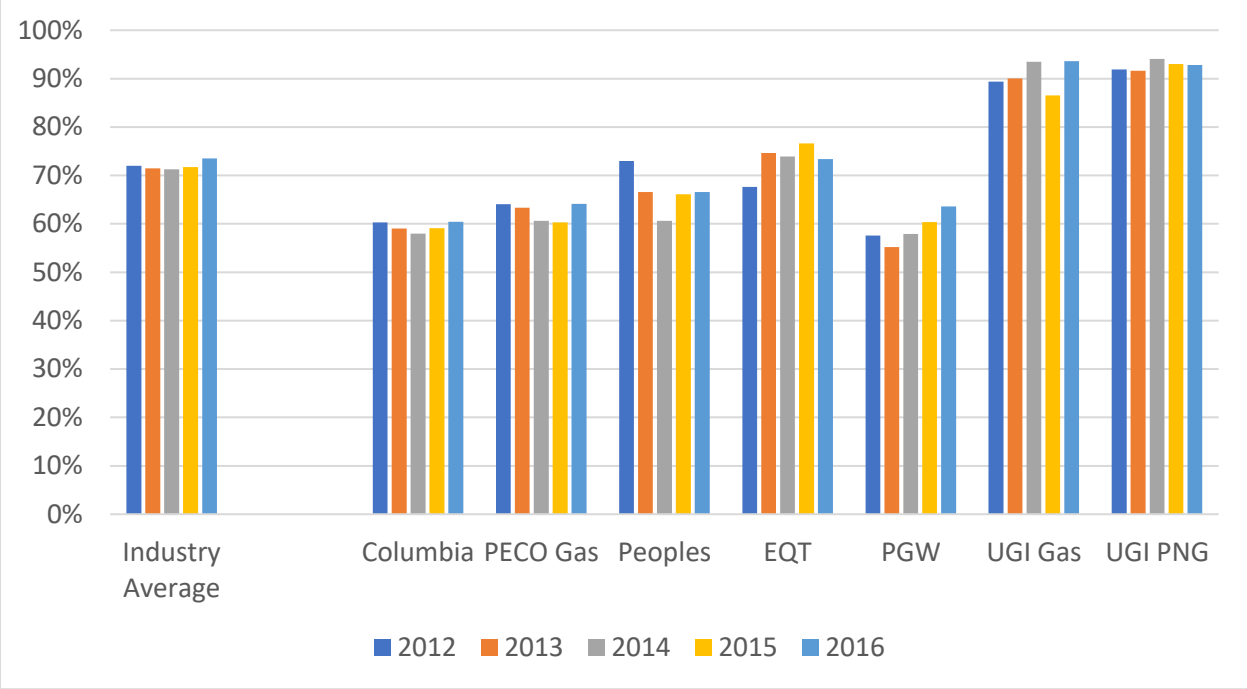
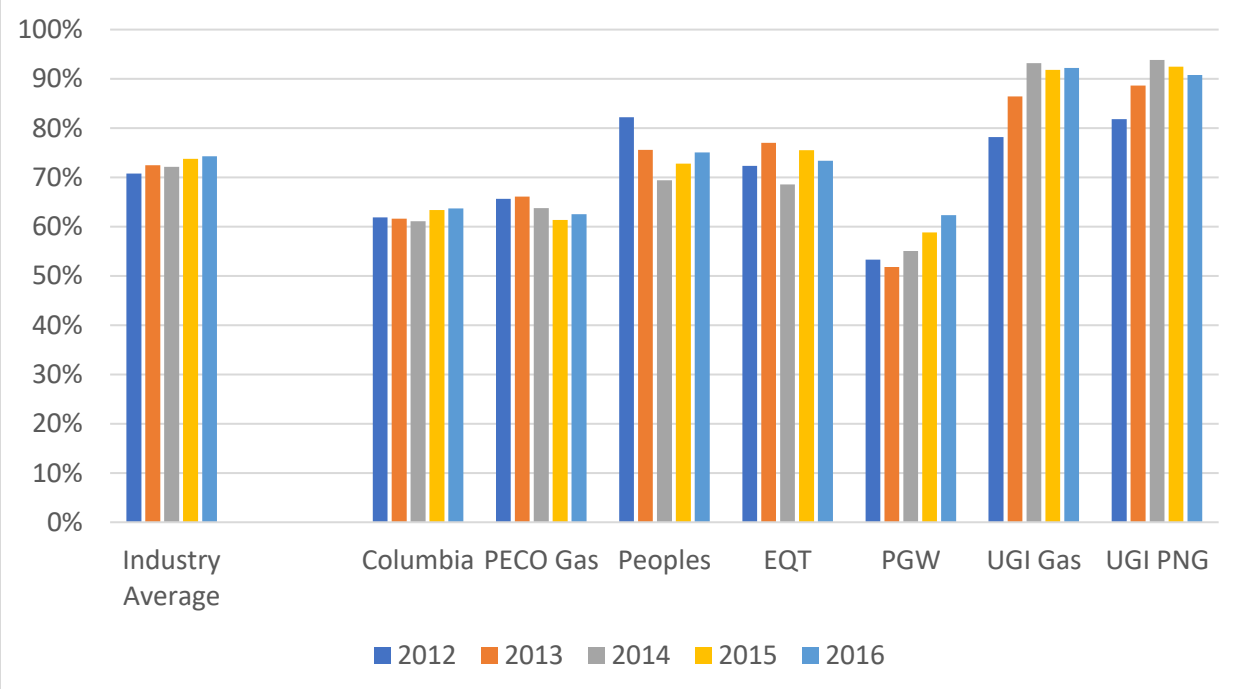


Table 6-8
Percentage of NGDC CAP Bills Paid In-Full
(101-150% FPIG Level)



Tables 6-6, 6-7, and 6-8 include the percent of CAP bills paid for each utility as well as the weighted industry average for CAP NGDC customers at the different FPIG

levels (i.e., 0 to 50%, 51 to 100%, and 101 to 150%) for the period 2012-2016. According to the data shown in Table 6-6, approximately 70% of NGDC CAP bills of customers at the 0 to 50% FPIG level were paid in-full. In examining annual data for each NGDC, the range of NGDC CAP bills paid in-full ranged from a low of 33% to a high of 95%.

In contrast, as seen in Table 6-7, a greater percentage of NGDC CAP bills of customers at the 51 to 100% and 101 to 150% FPIG levels were paid in-full; however, the differences appear to be negligible. Nevertheless, it is particularly noteworthy that several NGDCs showed that a lesser percentage of bills were paid in-full by CAP customers at the 101 to 150% FPIG level in comparison to the percentage of CAP bills paid by customers at the 51 to 100% FPIG level. Thus, the extent to which household income impacts or influences the percent of NGDC CAP utility bills paid in-full is unclear. *See* Table 6-8.

EDCs

Table 6-9
Percentage of EDC CAP Heating Bills Paid In-Full
0-50% FPIG Level

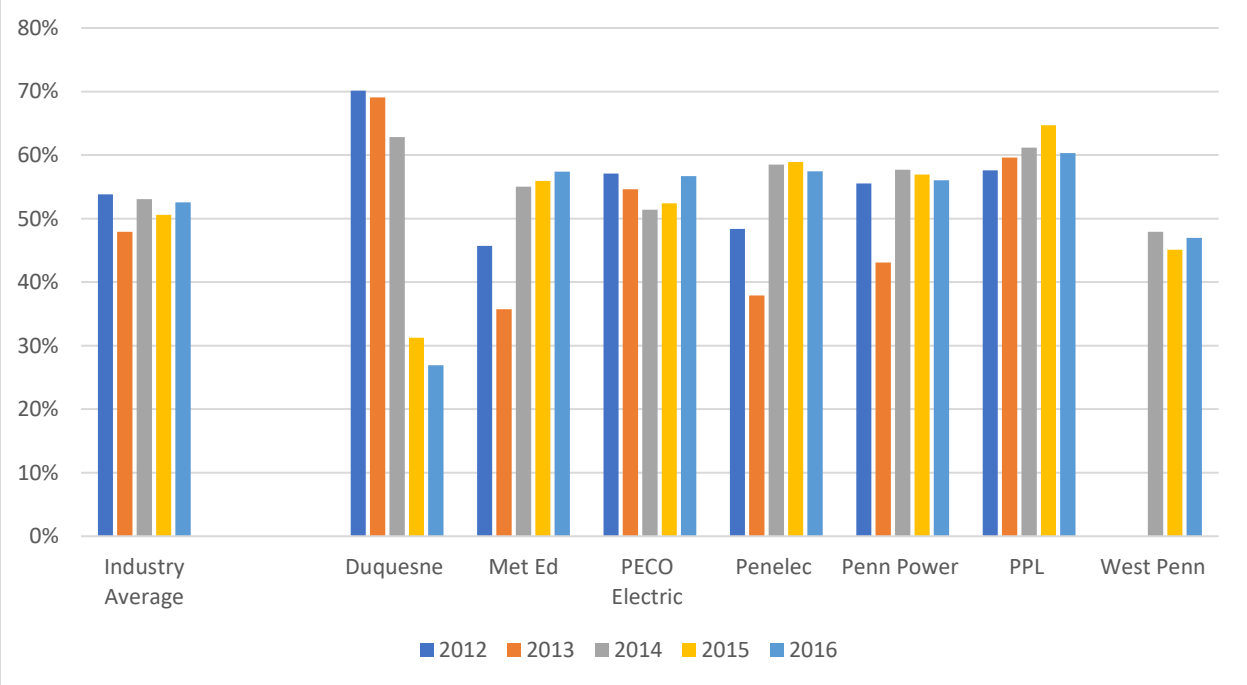


Table 6-10
Percentage of EDC CAP Heating Bills Paid In-Full
(51-100% FPIG Level)

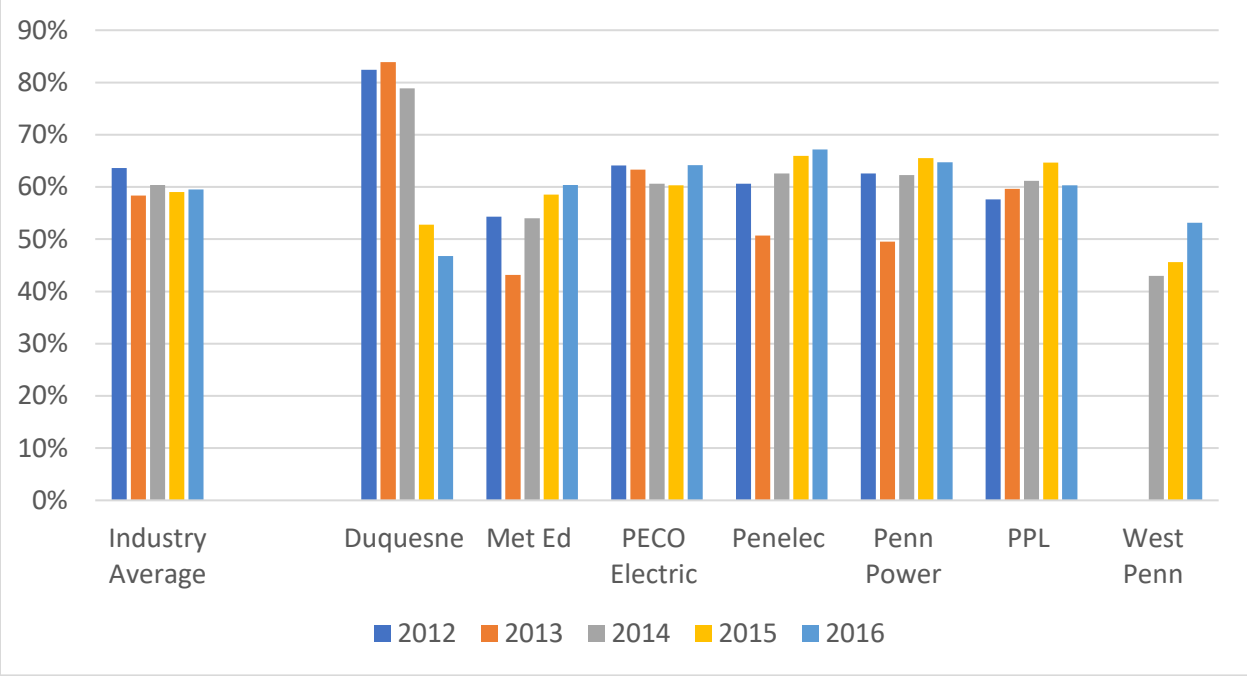
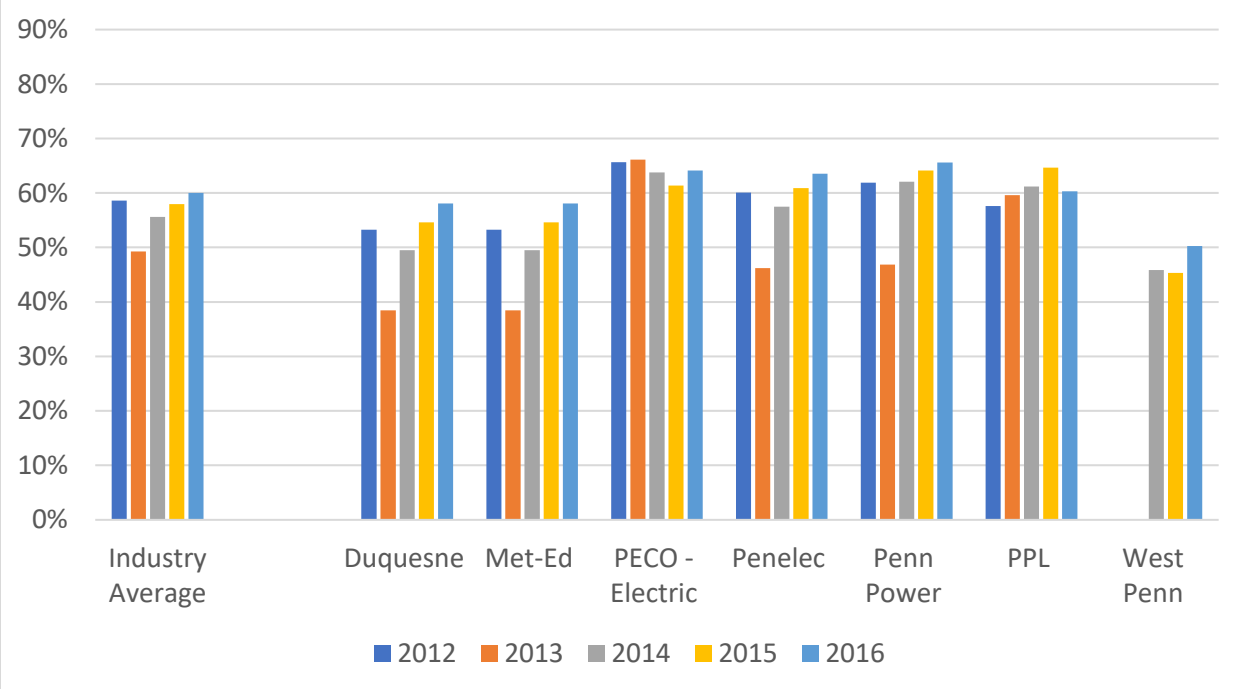


Table 6-11
Percentage of EDC CAP Heating Bills Paid
(101-150% FPIG Level)



Tables 6-9, 6-10, and 6-11 include the percentage of CAP bills paid for each EDC as well as the weighted industry average for CAP electric heating customers at the different FPIG levels for the period 2012 to 2016.

While noticeable variability existed among EDCs, it appeared on average that approximately 50% of electric heating bills are paid by CAP customers at the 0% to 50% FPIG level. This contrasts markedly with the NGDC data, which showed that approximately 70% of bills were paid by CAP customers at the 0% to 50% FPIG level. This difference in the percentage of bills paid could be attributed to the lower price of natural gas in comparison to electricity; however, this point cannot be determined without additional information from the utilities.

In examining annual data for each EDC at the 0 to 50% FPIG level, most EDCs reported that at least 35 to 65% of electric heating bills were paid by CAP customers during this five-year period. Staff notes more variability within the time frame for each EDC than is seen in the industry average. Met-Ed, Penelec, and Penn Power had similar profiles, but the other EDCs display profiles that do not parallel the three FirstEnergy profiles or each other. The data do not provide any explanation for these regional differences or fluctuations.

In contrast, the data at the 51 to 100% and 101 to 150% FPIG levels indicated that a greater percentage of bills were paid by CAP electric heating customers at these FPIG levels in comparison to the percentage of bills paid by CAP electric heating customers at the 0 to 50% FPIG level. Based on weighted industry average data, approximately 60% of CAP bills were paid by CAP electric heating customers at the 51 to 100% and 101 to 150% FPIG levels. While this information showed a positive trend in payments made as household income increases, the increase in the percentage of CAP electric heating bills paid by customers at the 51 to 100% and 101 to 150% FPIG levels was nominal. Particularly noteworthy are the data provided by several EDCs that show *fewer* CAP electric heating customers at the 101 to 150% FPIG level paid their bills in comparison to the percentage of bills paid by CAP electric heating customers at the 51% to 100% FPIG level. Thus, the extent to which household income impacted or influenced the percent of EDC CAP utility bills paid in-full is unclear.

Observations

With the collection and assessment of the data noted above, several observations are offered:

- The billing system changes and upgrades of NGDCs and EDCs appeared to affect CAP monthly billing amounts and thus influenced whether utility bills were paid in-full.

- Some of the data submitted by the NGDCs and NGDCs in response to the data request for this report were inconsistent; therefore staff did not use it.

- Payment behavior of CAP customers did not appear to be strongly or definitively correlated to household income. This observation is particularly applicable to those CAP customers at the 51% to 100% and

101% to 150% FPIG levels where limited variability occurred in payment patterns between the two income levels. This pattern may indicate that other factors – beyond income – may have had an impact on whether CAP utility bills were regularly paid in full.

- At the 0% to 50% FPIG level, a higher percentage of NGDC CAP bills were paid in comparison to the percentage of EDC CAP bills paid at the same FPIG level. Given the low cost of natural gas compared to electricity, this observation may be indicative that the bills of NGDC CAP customers were more affordable in comparison to the bills of EDC CAP customers during this five-year study period; however, to conclusively determine this observation, additional data would need to be obtained from the utilities and evaluated.

VII. CAP Default Exit and Termination Rates

Objective

Evaluate the CAP default exit rates and CAP termination rates as possible affordability indicators to determine customer success in meeting the requirements of CAPs. Determine if a correlation exists between CAP default exit rates and CAP termination rates.

Background

CAP participants are required to, among other things, make timely and in-full monthly payments, allow access to meters, maintain or reduce consumption, participate in LIHEAP, and recertify eligibility information when requested. Failure to meet these program requirements can result in removal from CAP and/or loss of utility service.

The default exit rate is intended to track the number of customers who fail to meet the requirements of CAP. This definition of default exit rate includes all participants who were non-compliant with program requirements, including nonpayment, late payments, missed meter reads, excess consumption, failure to apply for energy assistance if required, and failure to recertify eligibility.[55] A higher default exit rate may indicate affordability issues or that the requirements of the program are not clearly or routinely communicated or understood by the household.

Households that are removed from CAP do not necessarily have their utility service terminated but are often left with debt that includes any non-forgiven PPA which become due as part of the balance when the customer is placed back onto full-tariff rates. Most utilities require customers to pay a balance to re-enroll in CAP. This balance may consist of a CAP catch-up amount (*i.e.*, any in-program arrears and the CAP billing price for the months spent out of the program). Other utilities require CAP customers to pay any in-program arrears and the full-tariff residential rates for any months spent out of the program. When former CAP customers are unable to re-enroll in CAP, pay their balance, or obtain a payment agreement, it can lead to service termination (*i.e.*, loss of utility service).

Service terminations for CAP households are usually a direct result of non-payment. Higher termination rates may indicate that CAP payments are unaffordable or may reflect strong enforcement of collection procedures to ensure customers do not accumulate high in-program arrears. Terminated CAP accounts – or accounts that are terminated after removal from CAP – may add to the amount of uncollectible balances if the customer cannot pay the outstanding balance to get back into CAP and is unable to obtain a payment agreement. In these situations, utility service is terminated, and the debt is eventually written off by utilities and recovered from non-CAP residential ratepayers.

[55] CAP customers who voluntarily leave the program are not counted in the default exit rate.

Methodology

Data regarding the number of CAP default exits are collected as part of the annual universal service and collections reporting (USR). The survey data request called for the number of CAP terminations. Staff anticipated that the number of CAP terminations would be a subset of the default exit number. The intent was to determine the relationship between those CAP customers who default from their CAP responsibilities and those CAP customers who have their service terminated.

To determine the CAP default exit and termination rates per year, the annual number of reported CAP default exits and CAP terminations were each divided by the average number of annual CAP enrollments. This allowed staff to compare these rates across the gas and electric utilities. *See* Appendix 9.C for average NGC and EDC CAP enrollments for 2012 through 2016.

Data Limitations - CAP Default Exits

Upon review of the CAP default exits as documented in the annual USRs and after consulting with several utilities, it became apparent that utilities were not consistently interpreting and reporting these data points. While some utilities counted each default occurrence as part of the default exits total, some utilities did not. Columbia, for example, reported that its system only tracked whether a customer has defaulted from CAP responsibilities during a calendar year (*e.g.*, yes or no). It did not count the number of individual instances a CAP customer was late on a payment or otherwise met the default exit definition. Thus, a Columbia CAP customer who was late with several payments and failed to recertify during a calendar year was only counted once in the utility's number of CAP default exits while other utilities would count each late payment and the failure to timely recertify as a separate occurrence of default exits. Due to the differences in how utilities tracked default exits, this data set could not be evaluated for comparison purposes. However, staff did observe some general trends from the data, as noted below.

Data Limitations - CAP Terminations

The data request called for CAP termination numbers to determine the extent of CAP default exits that eventually ended in termination of service. However, upon review of the reported data, it became apparent that there were inconsistencies in the way CAP terminations were reported. This, in part, appears to be due to the difficulty in determining when a CAP customer is "removed" from CAP versus when a CAP customer has service terminated. Some utilities removed CAP customers from the program but did not immediately terminate service. For example, Met-Ed, Penelec, Penn Power, PPL, and West Penn did not terminate service while a household is enrolled in CAP. Instead, they removed the household from the program if the household failed to meet its CAP payment responsibilities and would terminate service later. Thus, some utilities could only provide an estimate of the number of CAP customers who were removed from the program and subsequently had their service terminated.

In addition to the reporting inconsistencies, several utilities could not provide data due to system limitations. Specifically:

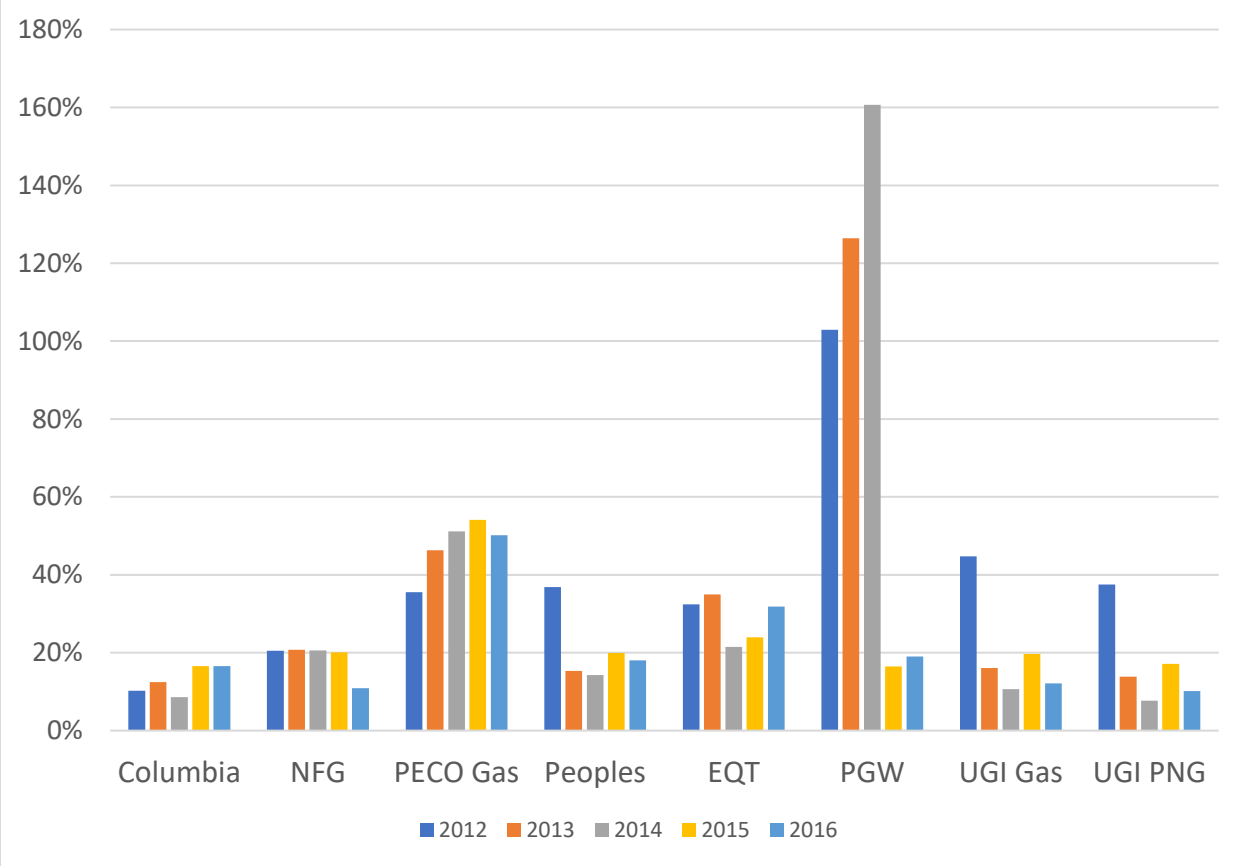
- Met-Ed, Penelec, Penn Power, and West Penn could not provide CAP termination data prior to 2014.

- Peoples Equitable could not provide CAP termination data prior to 2015.

Analysis

NGDCs – Default Exit and CAP Termination Rates

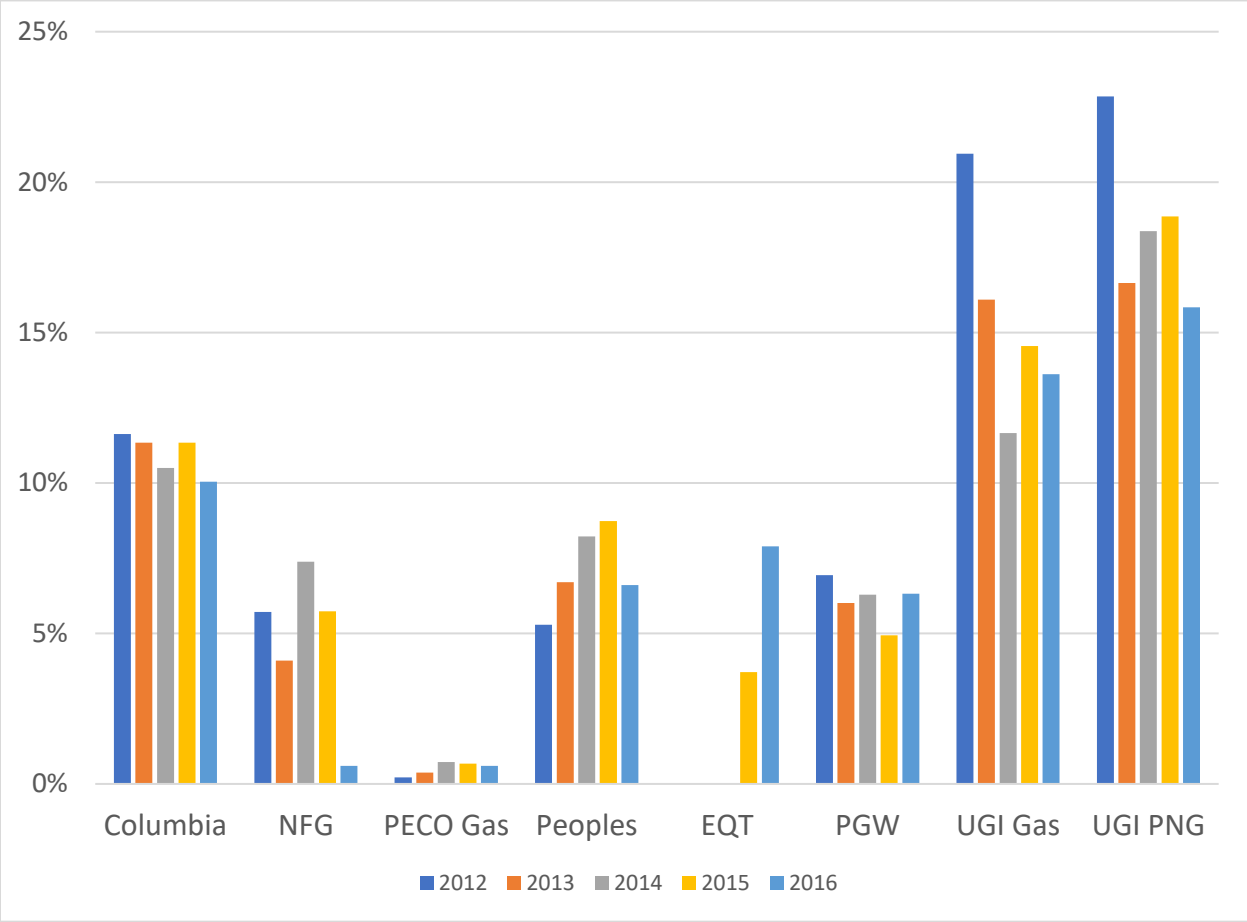
Table 7-1
CAP Gas Heating Default Exit Rates, 2012-2016



Despite the limitations of the reported CAP default exits and CAP termination data, there were some generalized observations that could be made. Table 7-1 shows PGW's default exit rates exceeded 100% of its average annual CAP enrollments from 2012 through 2014. The utility's default exit rate peaked at 161% in 2014 but dropped significantly to 16% and 19% in 2015 and 2016, respectively. PGW's 2015 and 2016 default exit levels were more consistent with the counts reported by other NGDCs.

Columbia reported three years (2012 to 2014) and UGI PNG reported four years (2013 to 2016) where their respective default exit rates exceeded their CAP termination rates; UGI Gas reported its CAP termination rate equaled its default exit rate in 2013 and exceeded this rate in 2016.[56]

Table 7-2
CAP Gas Heating Account Termination Rates, 2012-2016

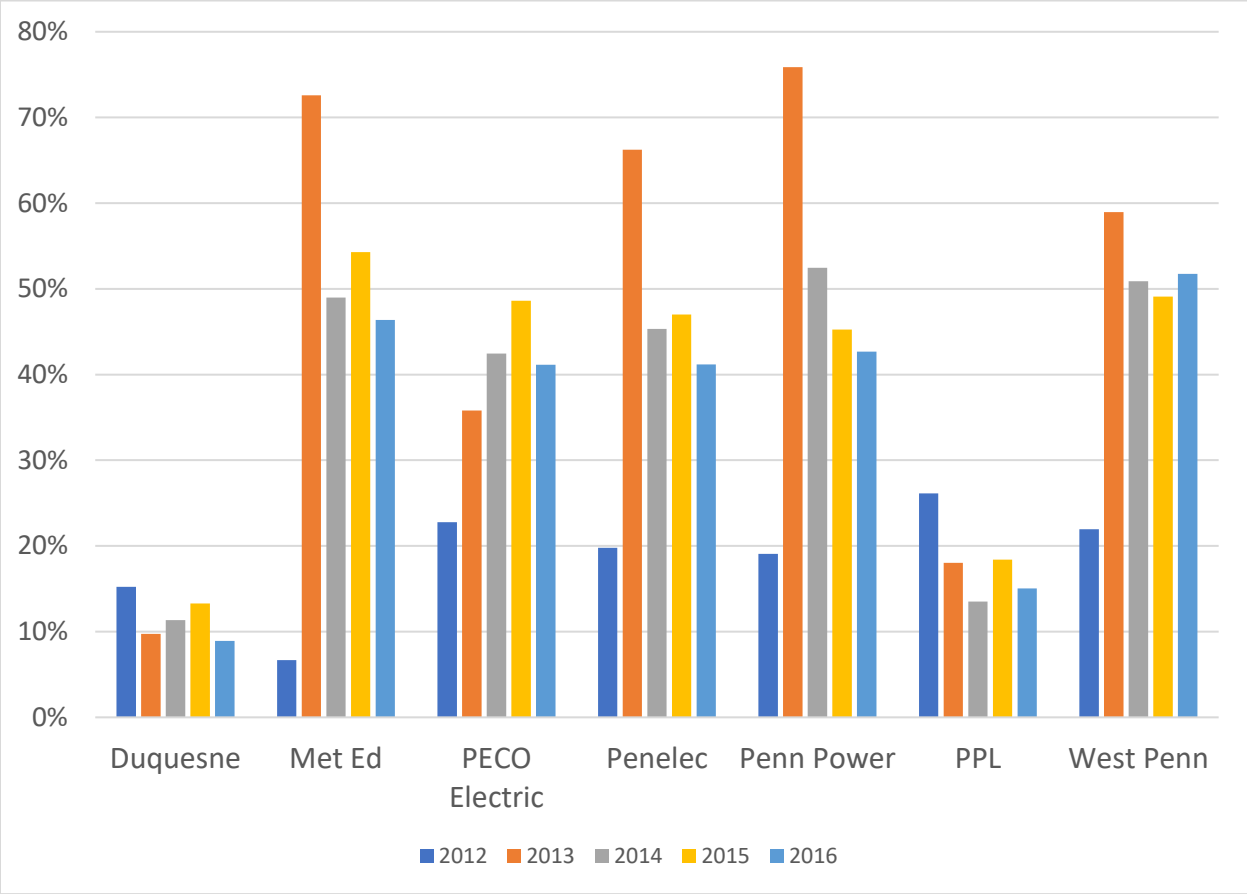


As seen in Table 7-2, UGI Gas and UGI PNG had the highest respective CAP termination rates during the study period, both peaking at 21% and 23% in 2012, respectively. Between 2013 and 2016, CAP termination rates ranged from 12% to 16% for UGI Gas and from 16% to 19% for UGI PNG. Columbia had relatively stable termination rates during this study period, ranging from 10% to 11% annually. Termination rates for half of the NGDCs ranged between 5% and 9%. PECO Gas reported the lowest termination rates, averaging less than 1% annually. This may have been the result of the previous PECO Gas practice (which is shared with PECO Electric) of offering payment arrangements on CAP arrears – instead of issuing termination notices – during this study period.[57]

[56] As explained in *Data Limitations* above, some utilities (*e.g.*, Columbia) do not count each instance of a customer defaulting from their CAP responsibilities. In these situations, the number of times a customer has service terminated could exceed their default exit count.
[57] See Footnote 46.

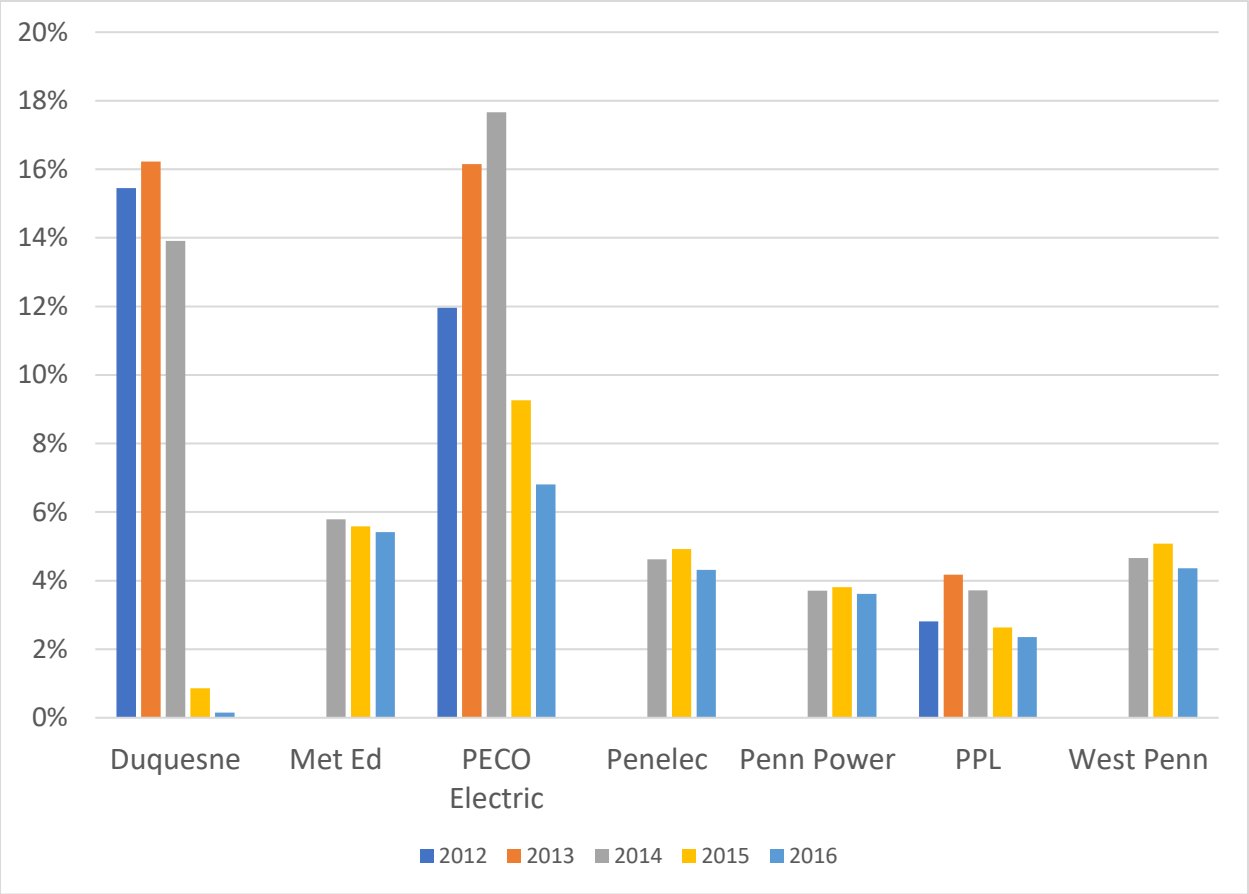
EDCs – Non-Heating Default Exit and CAP Termination Rates

Table 7-3
EDC Non-Heating CAP Default Exit Rates, 2012-2016



As seen in Table 7-3, the default exit rate for Met-Ed and Penelec peaked in 2013, exceeding 50%. However, both utilities' default exit rate declined below 40% for the last three years of this study, which is consistent with PECO Electric. Duquesne and PPL reported CAP default exit rates ranging between 10% to 20% for most years of this study.

Table 7-4
Electric Non-Heating CAP Account Termination Rates, 2012-2016



As seen in Table 7-4, the higher default exit rates reported by Met-Ed and Penelec did not translate into a higher rate of CAP terminations. Both utilities reported CAP termination rates between 4-6% for 2014 to 2016. Duquesne and PECO Electric reported higher CAP termination rates for electric non-heating accounts than other EDCs. Duquesne's termination rates ranged from 14% to 16% from 2012 through 2014 but dropped to less than 1% for 2015 and 2016. This decrease in terminations was likely due to Duquesne's CAP budget billing issues, which caused the utility to place a temporary hold on CAP terminations.[58] PECO Electric's CAP termination rates for non-heating accounts peaked at 18% in 2014 – during the polar vortex – but decreased to 9% and 7% in 2015 and 2016, respectively. Penn Power and PPL reported CAP termination rates of approximately 4% or less. Staff also note a slight increase in CAP terminations for many utilities in 2014, which may be the result of higher usage during the polar vortex.

[58] See Footnote 29.

EDCs – Heating Default Exits and CAP Termination Rates

Table 7-5
EDC Heating CAP Default Exit Rates, 2012-2016

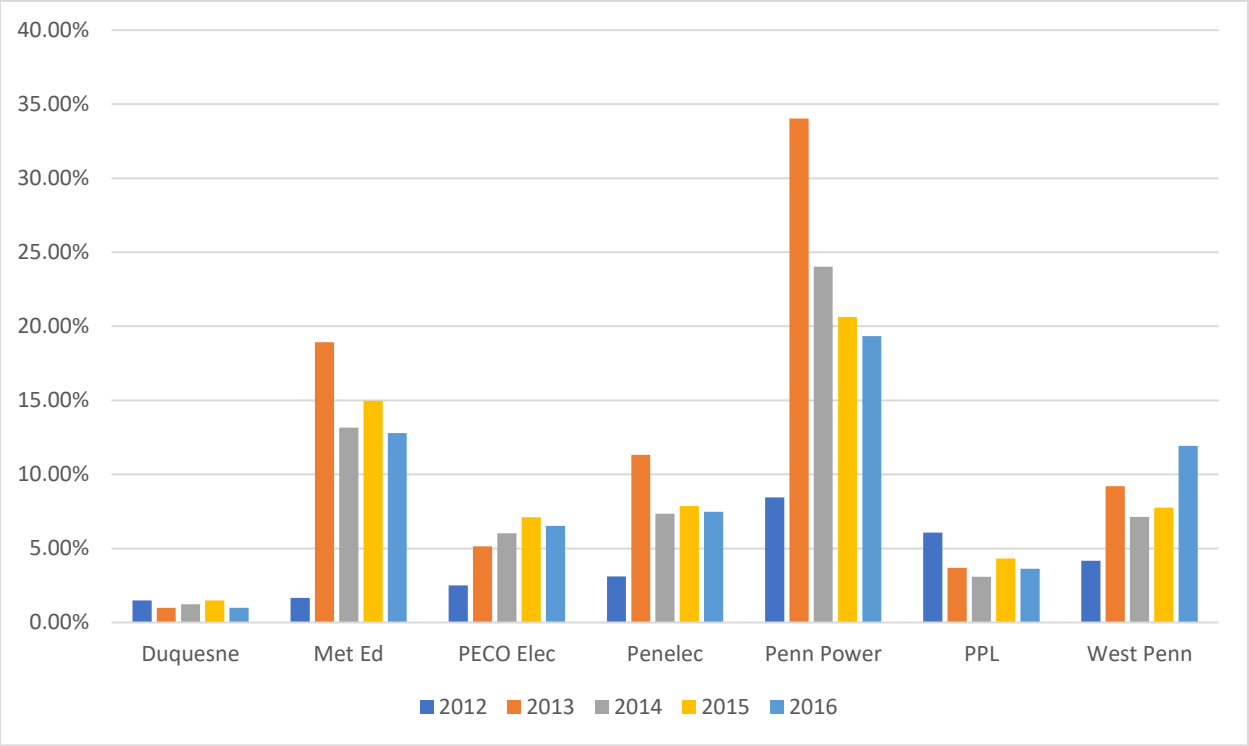


Table 7-5 shows the default exit rates for EDC heating CAP customers. Duquesne reported the lowest default exit rate for these customers at 1% to 2% for the entire five-year period. PECO Electric and Penelec reported default exit rates that ranged between 3% to 7% and 3% to 11%, respectively, for the five-year period. Penn Power reported the highest default exit rate for electric heating CAP customers, peaking at 34% in 2013. However, Penn Power's default exit rate dropped each subsequent year, declining to 19% by 2016.

Table 7-6
Electric Heating CAP Account Termination Rates, 2012-2016

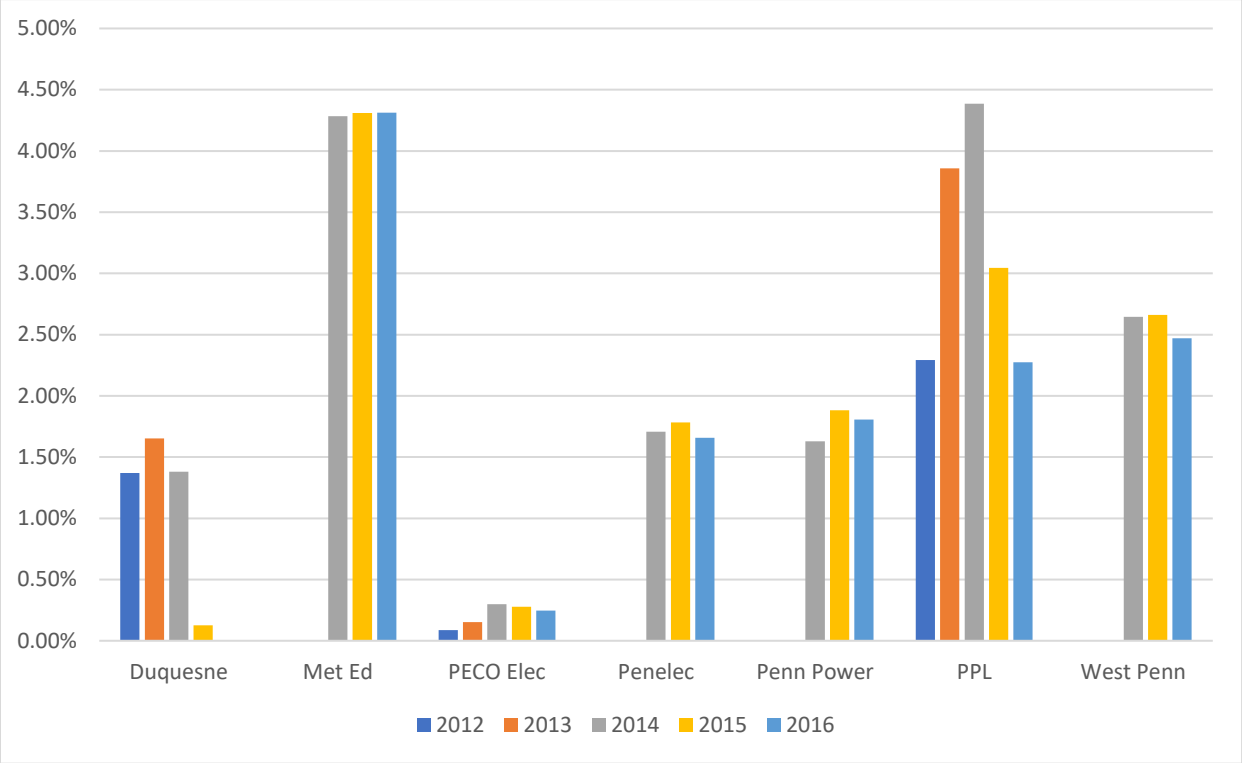


Table 7-6 shows the CAP termination rates for EDC heating CAP customers. Met-Ed had an average termination rate of approximately 4% for electric heating accounts for 2014 to 2016, which is higher than the termination rates for the other FirstEnergy utilities during this time period. West Penn had an average termination rate of less than 3%; Penelec and Penn Power had an average termination rate of less than 2%. This suggests that other factors, besides Met-Ed's CAP design, may have contributed to the higher number of terminations. More than half of the EDCs reported CAP terminations rates of less than 2% for heating customers. PECO Electric's CAP termination rate for electric heating accounts was less than 0.5% for all five years of this study. PECO Electric's low termination rates for CAP heating accounts may be attributable to (1) the utility's previous practice of offering payment agreements on in-program arrears and (2) approximately 80% of PECO Electric CAP customers were non-heating during this time period.[59]

Observations

Given the apparent inconsistencies between how utilities define and track default exits and CAP terminations, staff was unable to compare these data points among utilities or to confidently establish a correlation.

[59] *See* Table 3-2.

Not all customer removals from CAP resulted in service termination, but utilities were and are currently unable to provide the data to gauge to what extent this has occurred.

Higher CAP terminations for EDC non-heating CAP accounts in 2014 were likely the result of higher usage and/or higher bills during the polar vortex.

Differences between the EDC CAP heating termination rates for Met-Ed and the other FirstEnergy companies suggest that other factors – besides CAP design – contributed to a higher termination rates for CAP customers in the Met-Ed service territory.

VIII. Non-CAP Residential and Confirmed Low-Income Customer Debt

Objective

Determine if the percent of debt from confirmed-low income (CLI) customers is an indicator of CAP customer affordability.

Background

Many factors affect the number of customers in debt, including customer income level and ability to pay, utility collection practices, utility termination practices, and the size of customer bills. Utility collection policies vary and therefore also influence the "overdue" or "in debt" categorization.

The USR categorizes the Residential Class of customers as either non-CAP residential or CAP customers. CLI customers are a subset of non-CAP residential ratepayers, comprising all non-CAP customers *identified* as low-income. These CLI customers are financially vulnerable and the most likely to be in debt. Most CLI households are verified through the customer's receipt of a LIHEAP grant, identified when enrolled in a universal service program, or determined during the course of making a payment agreement.

There are also factors beyond customer choice that determine whether a customer may or may not be on a payment agreement. If customers have defaulted on utility and Commission payment agreements and/or their debt consists of CAP (in-program) arrears, they may not qualify for further payment agreements.[60]

Debt that is on a payment agreement is considered active and is often easier to collect than debt not on a payment agreement. Uncollectible debt represents more risk for the utility and often leads to higher gross write-offs, which are recovered from non-CAP residential ratepayers.

Low-income customers who are removed from CAP are less likely to qualify for additional payment agreements, and their balances are more likely to be written off as uncollectible debt. Thus, the amount of CLI debt not on an agreement may indicate affordability issues within a utility's CAP.

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[60] NGDCs and EDCs have discretion in offering payment agreements to customers, but each utility limits the number of payment agreements offered. A utility must offer a payment agreement for restoration or service if the customer has income at or below 300 of the FPIG and has not defaulted on two or more payment agreements. 52 Pa. Code Section 56.191(c)(2). The Commission may establish a payment agreement between the utility and the customer when there is a dispute between the parties. Section 1405(a). However, absent a change in income, a customer cannot receive a second or subsequent payment agreement from the Commission until the most recent one is satisfied. Section 1405(d). The Commission cannot establish a payment agreement on CAP (in-program) arrears. Section 1405(c).

Methodology

For USR reporting, two categories exist for customers overdue and/or in debt. The first includes customers who are on a payment agreement, and the second includes customers who are not on a payment agreement. Those on a payment agreement include customers on both utility and Commission-granted payment agreements.

Consistent with USR reporting, customers enrolled in a CAP have not been counted in this report as part of the number of customers in debt who are on a payment agreement or not on a payment agreement.

The amount of non-CAP residential and CLI debt is shown as a percentage of revenue and is calculated by dividing the total dollars owed for each category by the overall residential revenue of each utility. This is to allow comparison between utilities, regardless of the dollar amount of debt or revenues.

Data Limitations

Two factors affect the uniformity of the data reported regarding the number of overdue customers and the dollars in debt associated with those customers. First, utilities have used, and continue to use, different methods for determining when an account is overdue.

Utilities consider either the due date of the bill or the transmittal date of the bill to be day zero. The transmittal date is 20 days before the due date. For USR reporting and comparative purposes, utilities are requested to consider the due date as day zero and to report debt that is at least 30 days overdue.

Duquesne, Met-Ed, Penelec, Penn Power, West Penn, Columbia, Peoples Equitable, UGI Gas, and UGI PNG reported according to the method requested. The variance among the other EDCs and NGDCs showed a difference of no more than 20 days from that method. PECO Electric and Gas, PPL, Peoples, and PGW report debt that is 10 days old, meaning these utilities are overstating the debt compared to utilities that reported debt as 30 days overdue. NFG reports debt that is about 40 days old, meaning NFG is understating its debt relative to the other utilities. *See* Appendix 2 of the *2016 Report on Universal Service Programs and Collections Performance* (USR) for utility-specific information.[61]

The second factor affecting the arrearage data uniformity is the timing of when a utility moves a terminated or "discontinued" account from active status (included in the USR reporting) to inactive status (excluded from the USR reporting). Utility collection policies and accounting practices affected the timing. *See* Appendix 2 of the *2016* USR for company specific information.

[61] http://www.puc.pa.gov/General/publications_reports/pdf/EDC_NGDC_UniServ_Rpt2016.pdf

Analysis

Non-CAP Residential Debt on Agreement

Table 8-1
NGDC Residential Customers, Debt on Agreement as % of Revenues, 2012-2016

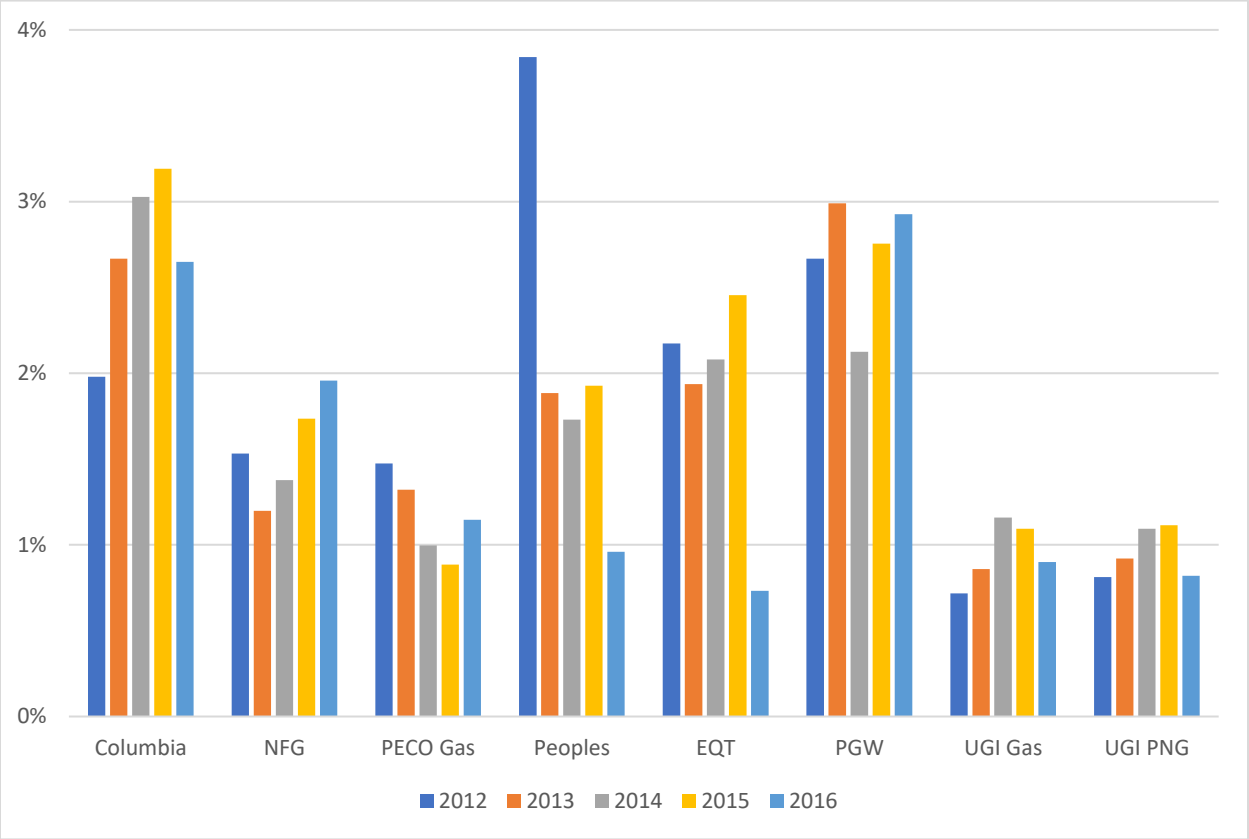
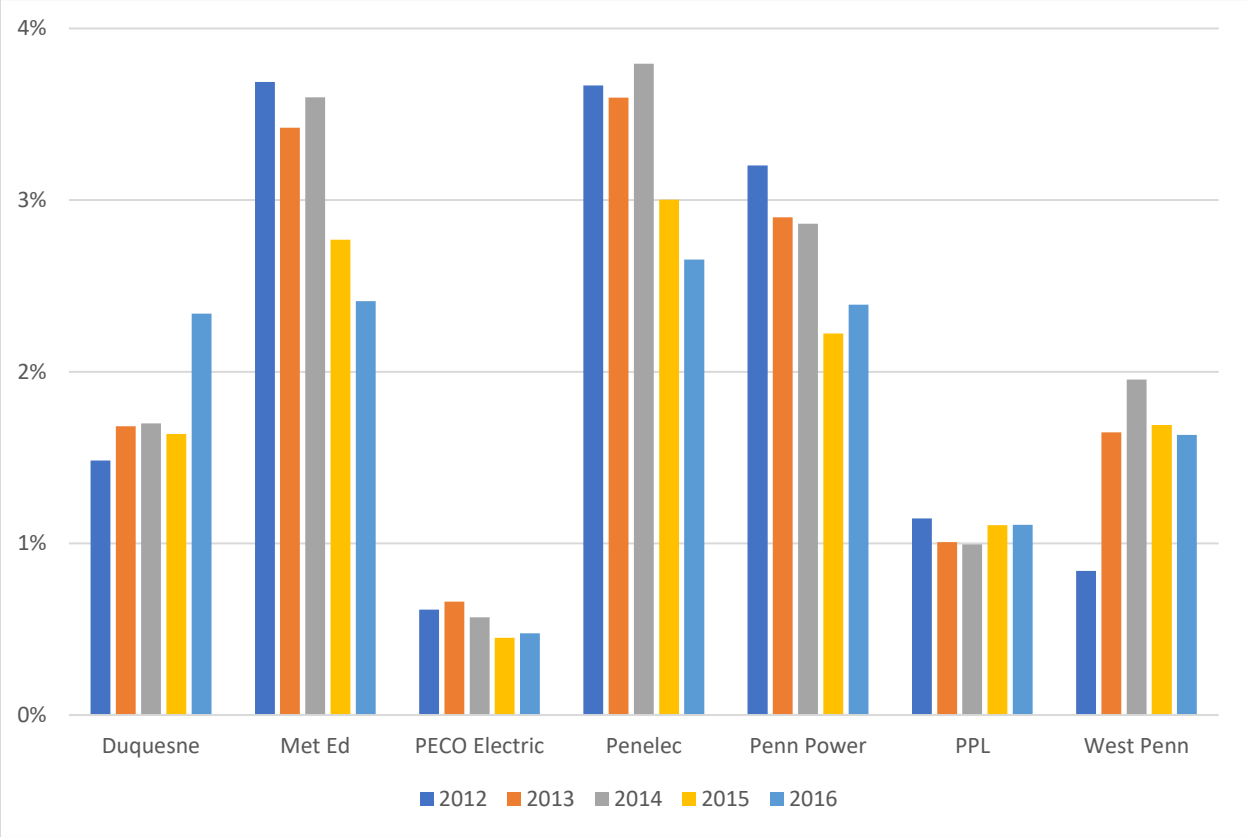


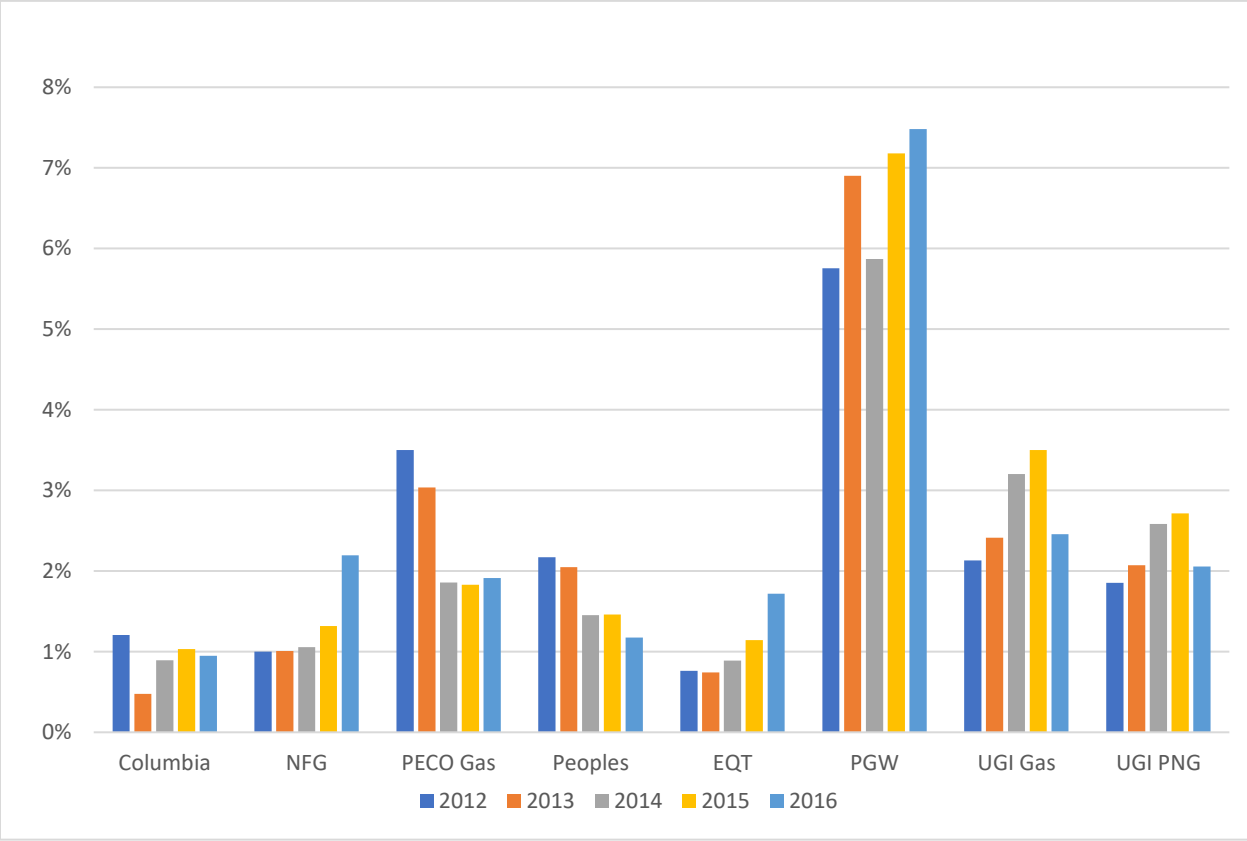
Table 8-2
EDC Residential Customers, Debt on Agreement as % of Revenues, 2012-2016



As seen in Tables 8-1 and 8-2, most NGDCs reported their non-CAP residential debt on agreement comprised less than 2% of revenues. Columbia and PGW's non-CAP residential debt on agreement comprised 2% to 3% of their revenues. Non-CAP residential customer debt on agreement overall for EDCs was less than 3% of residential revenues. Peoples, Peoples Equitable, UGI Gas, and UGI PNG reported decreases in non-CAP residential customer debt on agreement in 2016.

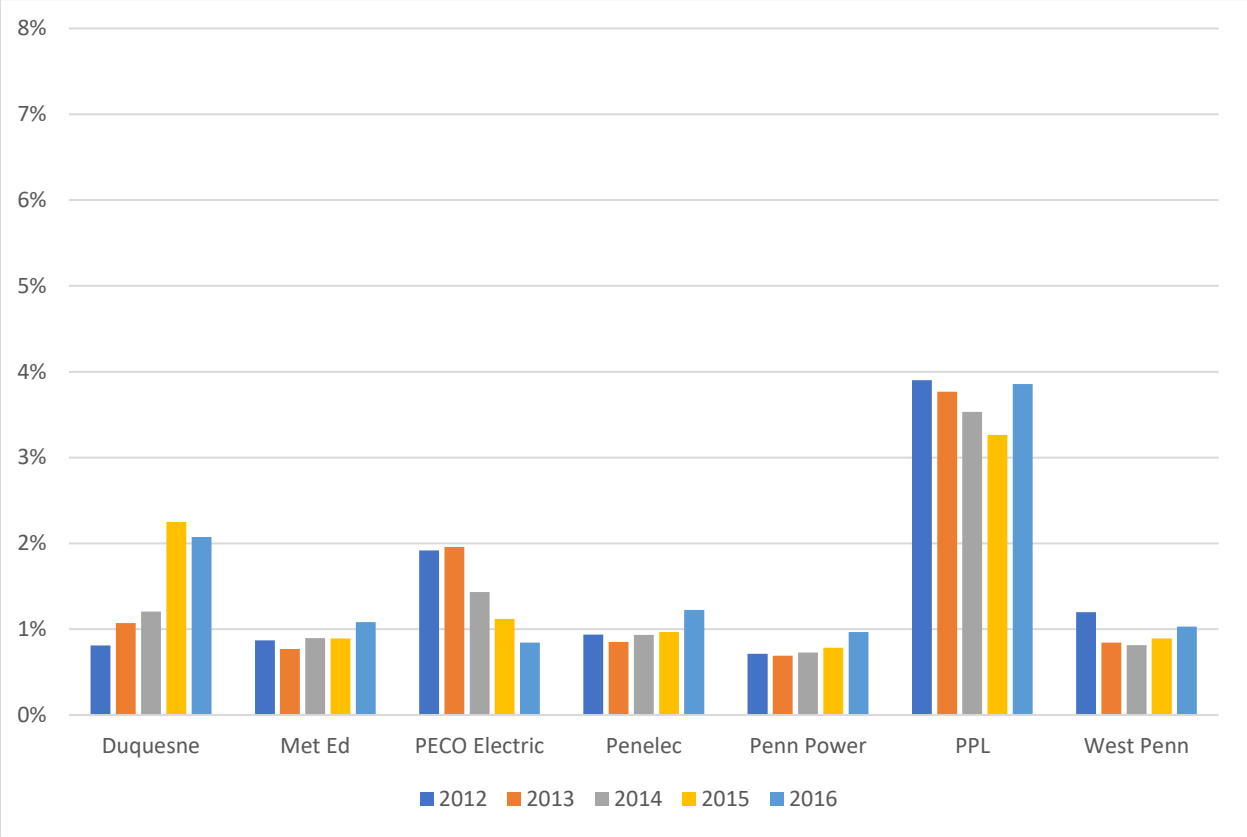
Residential Debt Not On Agreement

Table 8-3
NGDC Residential Customers, Debt not on Agreement as % of Revenues, 2012-2016



As seen in Table 8-3, half of NGDCs reported residential customer debt not on agreements comprised approximately 1% to 2% of their revenues. PECO Gas, UGI Gas, and UGI PNG averaged 2% to 3%, and PGW averaged 6% to 7% for this five-year period.

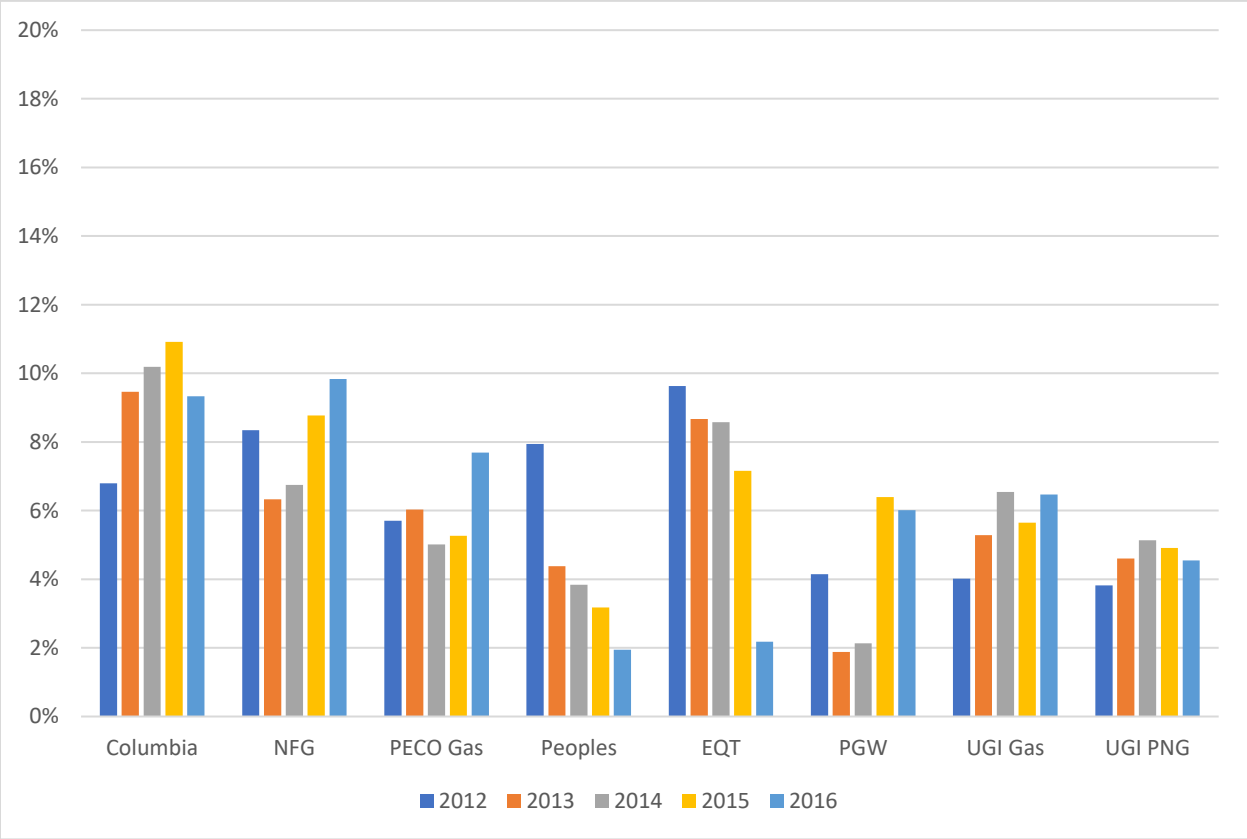
Table 8-4
EDC Residential Customers, Debt not on Agreement as % of Revenues, 2012-2016



As seen in Table 8-4, most EDCs reported that residential customer debt not on agreements comprised approximately 1% to 2% of their revenue. The debt not on agreement for Met-Ed, Penelec, Penn Power, and West Penn was 1% or less for the five-year period. PPL's residential debt not on agreement averaged 3% to 4% of revenue. Met-Ed, Penelec, Penn Power, and PPL reported an increase in residential debt not on agreement in 2016.

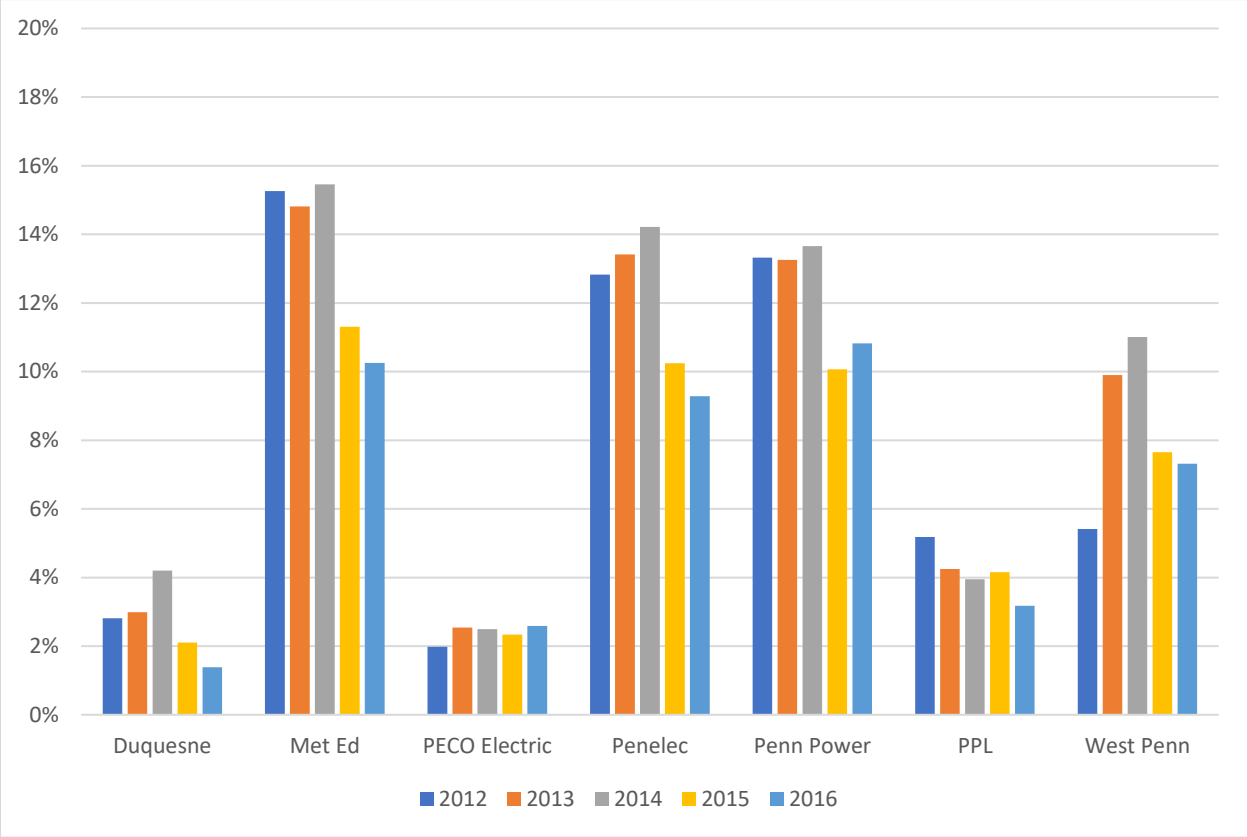
CLI Debt On Agreement

Table 8-5
NGDC CLI Customers, Debt on Agreement as % of Revenues, 2012-2016



As seen in Table 8-5, there appeared to be variability in the amount of CLI customer debt on agreement compared to revenue for NGDCs. Most NGDCs averaged between 4% and 10% of revenue during this five-year period. PGW and UGI Gas gradually increased the number of CLI customers on agreements, compared to revenue.

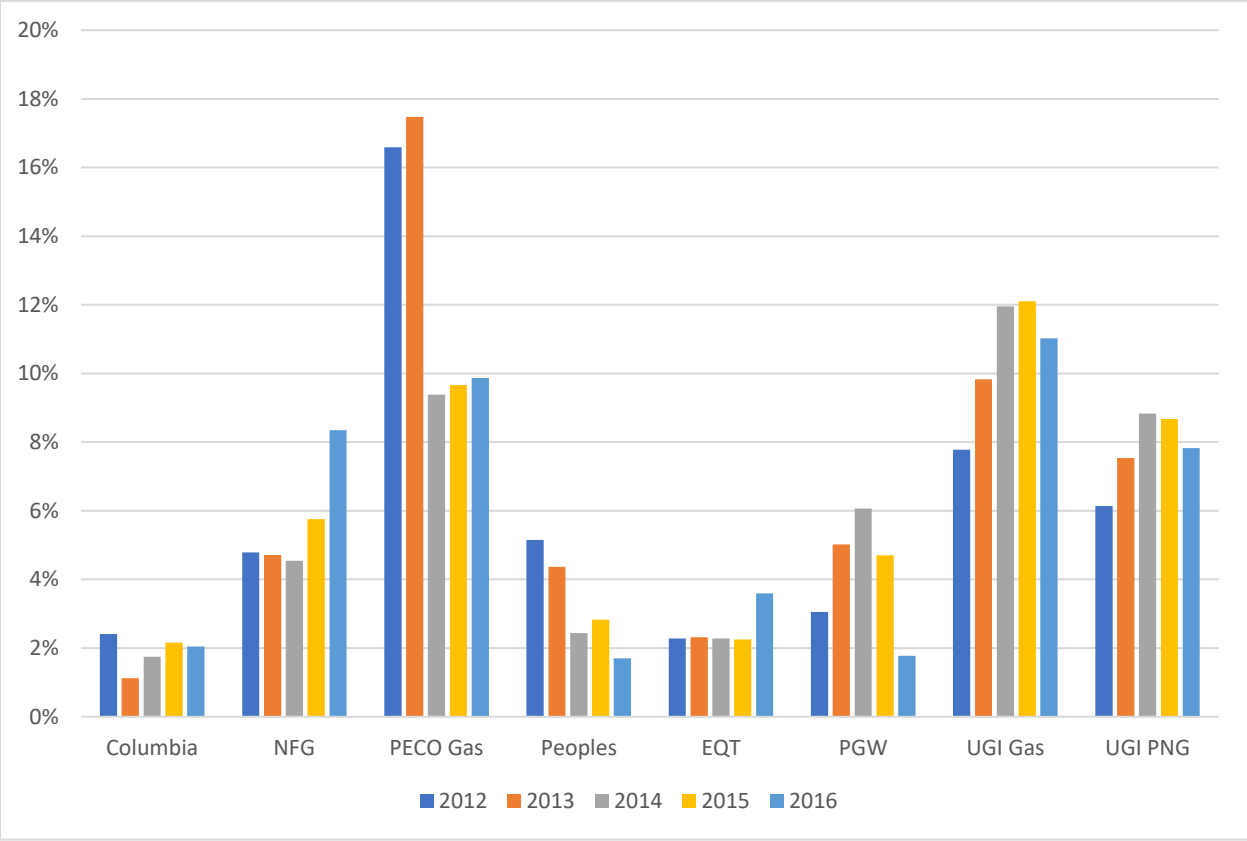
Table 8-6
EDC CLI Customers, Debt on Agreement as % of Revenues 2012-2016



As seen in Table 8-6, the amount of CLI customer debt on agreement compared to revenue also varied by EDC. Met-Ed, Penelec, Penn Power, and West Penn reported CLI debt on agreement as 2% to 3% of revenue. Duquesne's CLI debt on agreement fluctuated between 5% to 9% of revenue during this five-year period. PPL's reported CLI debt on agreement declined annually since 2012, from 17% in 2012 to 10% in 2016.

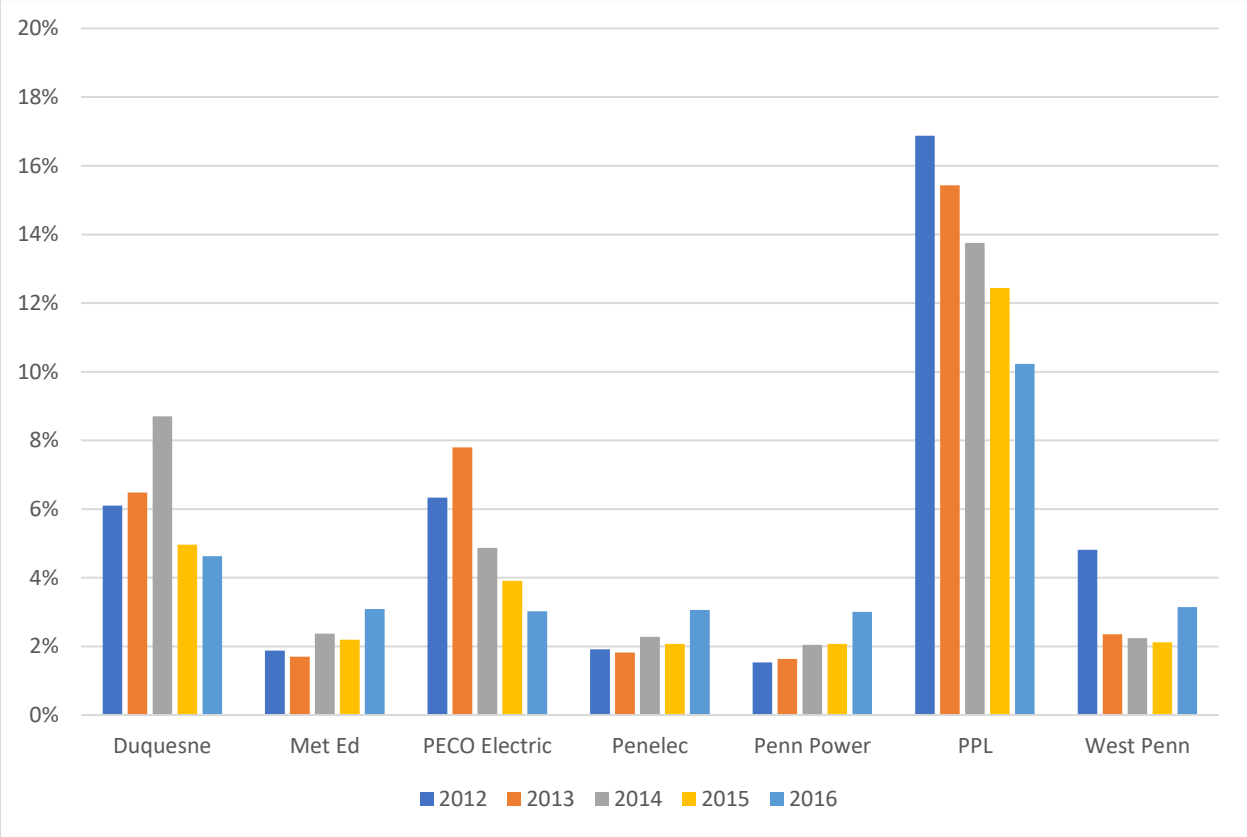
CLI Debt Not On Agreement

Table 8-7
NGDC CLI Customers, Debt not on Agreement as % of Revenues, 2012-2016



As seen in Table 8-7, about half of NGDCs reported their CLI debt not on agreement comprised approximately 2% to 4% of revenues. Columbia had the lowest amount, ranging from 1% to 2% during the five-year period. PECO Gas, UGI Gas, and UGI PNG had the highest amount. PECO Gas' CLI debt not on agreement exceeded 17% of revenue in 2013, but this percentage declined annually after that year; by 2016, the amount was less than 10%. This higher rate could be attributed to affordability issues within PECO Gas and Electric's CAP during this period. *See* Footnote 46. UGI Gas and UGI PNG also experienced increases in CLI debt not on agreement as compared to revenues from 2012-2015, but 2016 showed a decrease in this category for both companies.

Table 8-8
EDC CLI Customers, Debt not on Agreement as % of Revenues 2012-2016



As seen in Table 8-8, the amount of CLI debt not on agreement averaged 4% or less of revenues for most EDCs. PECO Electric and PPL generally reported gradual decreases for this category from 2012 to 2016. Based on a percent of revenue, PECO Electric's CLI debt not on agreement decreased from 6% to 2%, and PPL's decreased from 17% to 10% from 2012 to 2016. The FirstEnergy Companies (Met-Ed, Penelec, Penn Power, and West Penn) reported increases in CLI debt not on agreement in 2016.

Observations

About half of the NGDCs saw a decrease in residential debt on agreements in 2016. However, many of these utilities also saw a decrease in residential debt not on agreements. This could indicate an overall trend of decreasing residential debt carried by NGDC customers.

There did not appear to be a correlation between the different types of CAPs offered by utilities (*e.g.*, percent of income, rate discounts) and the number of CLI customers in debt not on agreement, as compared to income.

The general increases in the percent of CLI debt on agreements corresponded to a decline in the percent of CLI customers not on agreements for many utilities. This may indicate that utilities were having greater success in either enrolling CLI customers in CAPs or establishing payment agreements.

IX. Review of Other State Programs and Relevant Studies

Objective

To understand how other states and the District of Columbia (collectively, states) address energy burdens and affordability issues for their low-income residents and gather information from relevant independent studies.

Background

Pursuant to Commission direction in Docket No. M-2017-2587711, staff developed a survey to gather information on how other states address energy burdens and affordability issues for their low-income residents. The state survey covered an extensive array of factors. The state survey requested information on the jurisdictional utility regulatory low-income programs in each state and collected information on how the utilities treat the relevant variables in their own programs and policies. The state surveys were sent electronically to the various state utility commissions.

Staff worked with the Commission's CSIS Project to collect and collate the results of the state surveys and to review independent studies that may provide further insight into energy affordability issues.

Additionally, several published independent reports and studies were reviewed. Most of the independent reports and studies reviewed were performed by APPRISE[62] or by Fisher, Sheehan, and Colton. The CSIS Project assisted with the review of the published reports and studies.

Methodology

To determine which states most closely resemble Pennsylvania in terms of energy burden, FPIG levels, residential profiles, and other relevant factors, the Commission's CSIS Project collected the following U.S. Census data for each state:

- Urban/Rural population
- Age Distribution
- Education Level
- Fuel Type
- Household Size
- Poverty Status
- Retirement Population
- Substandard Housing

[62] Applied Public Policy Research Institute for Study and Evaluation Inc. (APPRISE). www.appriseinc.org

Information was requested on 27 variables for the past five years. The data were combined into a rating system to calculate overall scores for each state. Seven states and the District of Columbia (D.C.) responded. Each respondent was then compared to Pennsylvania, with the highest possible comparison score being 27. The state most closely resembling Pennsylvania on these factors was Ohio, with a score of 14.

Data Limitations

No respondent answered every survey question. No respondent provided average energy burdens for low-income or non-low-income households or for heating/non-heating households for all five years.

None of the independent reports or studies reviewed considered all of the variables identified for this report. Several studies did, however, examine the relationship between subsets of the identified variables, as well as several studies that dealt with similar topics and had findings related to this study.

Analysis

Energy Burden Levels of Neighboring States

Although respondents to the survey did not provide average energy burden levels for their low-income and residential utility customers, each respondent provided valuable information about its own payment assistance programs.[63]

Information provided by Ohio, a state similar (and geographically close) to Pennsylvania, is of particular interest. Ohio has a mandated Percentage of Income Payment Plan (PIPP Plus)[64] which limits the amount spent on gas and electric service to 10% of the participating household's gross monthly income:

> Ohio's PIPP Plus is an extended payment arrangement that requires regulated gas and electric companies to accept payments based on a percentage of the household income for those customers who are at or below 150% of the federal income guidelines. The PIPP Plus payment amount is based on the household's countable income received during the previous 30 days. If a gas customer qualifies for PIPP Plus, he or she would pay 6% of the household's current gross monthly income to the gas company or a minimum of ten dollars, whichever is greater, year-round. If electricity is not the primary heat source, a customer pays 6% of the household's current gross monthly income to the electric company or a minimum of ten dollars, whichever is greater, year-round. The customer of

[63] A summary of responses is included in Appendix 7.

[64] *See* https://development.ohio.gov/is/is_pipp.htm for further information on Ohio's PIPP Plus.

an all-electric household pays 10% of the household's monthly income or a minimum of ten dollars, whichever is greater, year-round.

Ohio's 10% electric heating energy burden and its combined gas/electric energy burden are the highest levels compared to Pennsylvania's other neighboring states. The maximum energy burden for New York's payment assistance program is 6% for gas and electric service.[65, 66] New Jersey's maximum energy burden for its Universal Service Fund is also 6%.[67, 68] Maryland has an Electric Universal Service Program which provides an annual grant to reduce a low-income customer's budget bill amount based on household income and electric usage over the past 12 months.[69]

Pennsylvania's Home Energy Affordability Gap

Fisher, Sheehan, and Colton compile and publish annually a Home Energy Affordability Gap report for each state annually that reflects energy burden information for each state, using information from several sources, including the U.S. Census and the

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[65] *See* New York Public Service Commission's *Order Adopting Low Income Program Modifications and Directing Utility Filings* at 3, Case 14-M-0565 (effective May 20, 2016). NOTE: New York also limited the budget for each utility's payment assistance program to 2% of revenues for sales to end-use customers. These costs are recovered from all ratepayer classes. May 20 Order at 3-4.

[66] The New York Public Service Commission favored a 6% energy burden level because it appears to be a widely accepted limit for utility payments:

> There is no universal measure of energy affordability; however, a widely accepted principle is that total shelter costs should not exceed 30% of income. For example, this percentage is often used by lenders to determine affordability of mortgage payments. It is further reasonable to expect that utility costs should not exceed 20% of shelter costs, leading to the conclusion that an affordable energy burden should be at or below 6% of household income (20% x 30% = 6%). A 6% energy burden is the target energy burden used for affordability programs in several states (e.g., New Jersey and Ohio), and thus appears to be reasonable. It also corresponds to what U.S. Energy Information Administration data reflects is the upper end of middle and upper income customer household energy burdens (generally in the range of 1 to 5%). The Commission therefore adopts a policy that an energy burden at or below 6% of household income shall be the target level for all low[-]income customers.

May 20 Order at 7-48.

[67] New Jersey requires USF customers to pay 3% for natural gas service, 3% for electric non-heating, and 6% for electric heating. The discount provided to customers is based on the difference between their annual utility bill (after LIHEAP is applied) and required percentage of household income. https://www.state.nj.us/dca/divisions/dhcr/faq/usf.html#q1

[68] Although not a neighboring state, Illinois also administers a PIP that charges customers a maximum of 6% of their income for gas and electric service. The maximum PIP credit is $150 per month or $1,800 annually. Illinois Senate Bill 1918 at 108-109. http://www.ilga.gov/legislation/96/SB/PDF/09600SB1918lv.pdf

[69] *See* http://dhr.maryland.gov/office-of-home-energy-programs/how-are-grants-determined/ for more information about the Maryland grants.

five-year American Community Survey (ACS).[70] Information is compiled for each county in a state which is then used to calculate an statewide energy burden value.[71] Additionally, Fisher, Sheehan and Colton report gross LIHEAP dollars, the number of households at or below 150 percent of the poverty level, and the number of heating/cooling bills covered by LIHEAP.

The energy burden levels in the Fisher, Sheehan, and Colton reports reflect the cost of various household energy sources (*e.g.*, natural gas, electric, propane, oil, coal, etc.). Thus, the energy burdens they calculate for Pennsylvania will not match precisely with the energy burdens reflected in this staff report.

Table 9-1
Energy Burden for Pennsylvania Households, 2012 to 2016[72]

Energy Burden					
Poverty Level	**2012**	**2013**	**2014**	**2015**	**2016**
Below 50%	34%	33%	33%	30%	28%
50-100%	19%	18%	18%	16%	15%
100-125%	13%	12%	12%	11%	10%
125-150%	10%	10%	10%	9%	8%
150-185%	9%	8%	8%	7%	7%
185-200%	7%	7%	7%	7%	6%

Source: *Home Energy Affordability Gap, 2012-2016*

As seen in Table 9-1 above, Pennsylvania households with incomes at or below 50% of the FPIG had energy burden levels ranging from 34% in 2012 to 28% in 2016. Household with incomes between 50-100% and 100-150% had energy burdens ranging from 19% to 15% and from 10% to 8%, respectively, during this five-year period.

[70] Fisher, Sheehan & Colton. "Home Energy Affordability Gap," *Public Finance and General Economics*. Retrieved from http://www.homeenergyaffordabilitygap.com/index.html.
[71] Fisher, Sheehan & Colton explain the affordability gap as *actual home energy bills* minus *affordable home energy bills* (defined as 6% gross household income) equals the *home energy affordability gap* (calculated through segmenting each state's counties into FPIG sections).
[72] Includes households using various heating sources (*e.g.*, natural gas, electric, oil, propane, coal, wood, etc.). This is not restricted to jurisdictional gas and electric customers

Table 9-2
LIHEAP Allocation, Households Below Poverty Level, and Covered Bills for Pennsylvania, 2012-2016

	Gross LIHEAP Allocation (in millions)	# of Households ≤150% FPIG	Average Energy Bills "Covered" by LIHEAP
2012	$209,548	1,034,276	182,533
2013	$184,642	1,063,068	166,644
2014	$175,603	1,080,857	150,862
2015	$204,099	1,092,514	207,840
2016	$182,170	1,085,999	216,354

Source: *Home Energy Affordability Gap*, 2012-2016

Although there appeared to be a decrease in household energy burden levels from 2012 to 2016, the number of LIHEAP-income-eligible Pennsylvania households reportedly increased. Table 9-2 above shows that households with incomes at or below 150% of the FPIG increased from approximately 1 million in 2012 to approximately 1.1 million in 2016.

Table 9-3
Energy Burden for Pennsylvania and Similar States, 2016

Energy Burden 2016				
	Below 50%	50-100%	100-125%	125-150%
Pennsylvania	28%	15%	10%	8%
Ohio	29%	15%	10%	8%
Kansas	29%	16%	11%	9%
Michigan	33%	18%	12%	10%
Virginia	32%	17%	12%	9%
Missouri	27%	15%	10%	8%
Wisconsin	33%	17%	12%	10%
Rhode Island	36%	19%	13%	10%
Delaware	39%	21%	14%	11%
New York	32%	17%	11%	9%
West Virginia	31%	17%	11%	9%

Source: *Home Energy Affordability Gap*, 2012-2016

Table 9-4
LIHEAP Allocation, Households Below Poverty Level, and Covered Bills for Pennsylvania and Similar States, 2016

	Gross LIHEAP Allocation (in millions)	# of Households below 150% FPIG	Heating/Cooling Bills "Covered" by LIHEAP
Pennsylvania	182,170	1,085,999	216,354
Ohio	131,709	1,142,393	181,919
Kansas	28,576	251,395	41,595
Michigan	140,599	995,442	155,015
Virginia	75,278	599,916	74,019
Missouri	65,662	602,511	101,018
Wisconsin	91,667	492,434	103,931
Rhode Island	23,271	91,177	23,365
Delaware	11,280	69,369	8,945
New York	325,976	1,790,231	373,826
West Virginia	25,927	213,221	25,798

Source: *Home Energy Affordability Gap*, 2012-2016

Of those states with similar energy burdens, none have demographic/energy profiles similar to Pennsylvania. However, Ohio is close, with identical energy burden for several poverty categories. Only six states, including Ohio and New York, had a greater number of households at or below 150% of the poverty level. As seen in Table 9-4 above, New York was the only state to receive a larger gross LIHEAP allocation in 2016, and only California (not shown) and New York covered a greater number of heating/cooling bills.

Examining all 50 states (plus the District of Columbia) reveals that Pennsylvania's average energy burdens for all energy sources were among the highest in the country for households below 150% of the poverty level.

Review of Other Relevant Studies

Several independent studies examined relationships between subsets of variables examined in this report. Other studies dealt with similar topics and had findings related to this report. These independent studies are summarized below:

The High Cost of Energy in Rural America (2018)[73]

This study examines the energy burden levels for households living in rural areas in the United States. Rural households have a higher median energy burden (4.4%) than

[73] Ross, L., Drehobl, A., and Stickles B. (July 2018). The High Cost of Energy in Rural America: Household Energy Burdens and Opportunities for Energy Efficiency. Retrieved from https://aceee.org/research-report/u1806

the national median energy burden (3.3%). Low-income households in rural areas spend the highest portion of their income on energy bills. In the Mid-Atlantic states, the median energy burden level for these households is 9.5%. Demographics also pay a factor in energy burden levels. Rural elderly households have a median energy burden 44% higher than non-elderly households; rural renters have a median energy burden 29% higher than owners; and non-white households have a median energy burden 19% higher than white households. Other factors, besides income level, may contribute to higher energy burden levels for rural households such as the condition of the home, a household's ability to invest in energy efficient equipment, and the availability of energy efficiency programs. Energy efficiency upgrades were found to reduce energy burden levels up to 25%. The study recommends, among other things, exploring low-risk or no-risk efficiency financing options, incorporating regional workshop development initiatives, and building relationships with area service providers to enhance program delivery.

Lifting the High Energy Burden in America's Largest Cities (2016)[74]

This study examined the energy burden levels of households living in 48 of the largest cities across the United States, including Philadelphia and Pittsburgh. The median energy burden for all households in this sample was 3.5%, but the median energy burden for low-income households was more than twice as high at 7.2%. The study promotes the use of weatherization programs to help improve housing stock for low-income households, noting that raising household efficiency to the median level could reduce the energy burden level by 35%. Benefits to energy efficiency programs include improved health and safety, reduced risk of rate increases, reduced costs associated with collections and shutoffs, and investment in the local economy. The study recommends that utilities track program participation by income level, renter versus owner, multifamily versus single family, and race/ethnicity to assess the impacts on different segments of the population. It also recommends regulators set goals and guidelines for energy savings, cost recovery, and cost-effectiveness testing.

PPL Electric Evaluation Report (2014) [75]

This study concluded that an energy conservation program, CARES, and a hardship fund can have a positive impact on reducing bills, increasing the ability to pay, and reducing arrearage.

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[74] Drehobl, A and Ross, L. (April 2016). Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities. Retrieved from http://energyefficiencyforall.org/sites/default/files/Lifting%20the%20High%20Energy%20Burden_0.pdf.

[75] The Cadmus Group (November 2014). Process Evaluation Report, PPL Electric, EE&C Plan, Program Year Five. Retrieved from https://www.pplelectric.com/-/media/PPLElectric/Save-Energy-and-Money/Docs/Act129_Phase2/pplpy5processevaluation212015.pdf?la=enE

Opinion Dynamics Low-Income Assistance Program Evaluation (2013)[76]

This study evaluated an anonymous utility's energy assistance program that provided reduced monthly payments and debt forgiveness to payment-troubled households based on family size, income, and electric use. The study noted that customers frequently left and re-entered the program (46% enrolled more than once). Participants who also received LIHEAP had a 14% lower average on-time payment rate than non-LIHEAP participants. Customers with lower PPAs had higher on-time payment rates, and more of these customers had on-time payment rates higher than the average. A sampling of customers found that 81% of the respondents reported taking action to try to reduce their energy usage after enrolling in the program; 70% reported that their electric usage either stayed the same or increased during this period.

UGI Gas and Penn Natural Gas Evaluation Report (2012) [77]

This study concludes that CAP participation has a large impact on energy affordability, decreasing energy burden, and improving payment behavior. On average, energy burdens among CAP participants declined from 15 to 10 percentage points. Compared to the pre-enrollment period, CAP customers were nearly twice as likely to pay their bills in full compared to their payment behavior prior to enrolling in CAP.

Home Energy Affordability in New York: The Affordability Gap (2011)[78]

This study defined an "affordable" energy burden as 6%, based on the theory that shelter costs should not exceed 30% of household income and that utility costs should not exceed 20% of shelter costs. 20% of 30% is 6%. Based on this measure, the study examined the energy affordability of New York households. Among other things, the study found demographic patterns correlated to energy affordability, including age, education, and gender. Elderly households were found to have smaller family sizes and less income; two-thirds of men and women living below the poverty level had only a high school diploma or less; and approximately 11% of men with full-time jobs live in poverty, compared to 6.5% of women.

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[76] Opinion Dynamics Corporation (March 2013). Low Income Assistance Program Evaluation. Retrieved from http://www.opiniondynamics.com/wp-content/uploads/2013/06/Low-Income-Payment-Assistance-Program-Evaluation.pdf..

[77] APPRISE (July 2012). UGI Utilities Universal Service Program Final Evaluation Report. Retrieved from https://www.puc.state.pa.us/general/pdf/USP_Evaluation-UGI.pdf.

[78] Fisher, Sheehan, & Colton. (August 2012). Home Energy Affordability in New York: The Affordability Gap (2011). Retrieved from https://www.nyserda.ny.gov/-/media/Files/EDPPP/LIFE/Resources/2011-affordability-gap.pdf.

Allegheny Power Universal Services Evaluation Report (2010) [79]

This study found that participation in CAP improved payment behavior; the average number of monthly payments per year increased from 8.6 to 9.4, while the coverage of the total bill – from cash and assistance payments - increased from 88% to 111%. While roughly 33% of participants paid their full bill in the prior year, 68% paid their full bill in the year after enrolling in CAP. Other positive results included a reduction in arrearage and the number of customers receiving termination notices; however, the actual termination rate did not change.

The Illinois PIPP Program Impact Evaluation (2009)[80]

This study found that enrollment in a PIP can increase the amount of energy used by households. Increased energy usage generally falls between 0.9% and 3.8%. However, data showed that a significant number of those households that increase their energy usage reported keeping their household temperature at unsafe heating levels prior to enrolling in a PIP. The study recommended coordinating PIP participants with weatherization and other energy conservation programs to offset any increases in energy usage.

LIHEAP Energy Burden Evaluation Study (2005)[81]

This study found that LIHEAP was effectively targeting the highest burden households (62% of LIHEAP recipients had high energy burdens) but that LIHEAP was not as successful in furnishing sufficient benefits to highly burdened and vulnerable households. The distinction was vulnerability. Vulnerable households are sensitive to the characteristics of household members, particularly households with at least one member aged 60 or over or with one or more members who are age 5 or younger. Under certain circumstances, non-low-income households can be vulnerable, and not all low-income households are vulnerable. This highlighted the need to consider other factors in addition to household income and to segment the eligible population to identify certain characteristics, such as the elderly. Geographic location, home ownership, and household size played important roles.

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[79] APPRISE (July 2010). Allegheny Power Universal Service Programs Final Evaluation Report at ES4. Retrieved from http://www.appriseinc.org/wp-content/uploads/2016/05/Final-Allegheny-Universal-Service-Program-Evaluation-Report.pdf

[80] APPRISE (December 2009). Illinois PIPP Program Impact Evaluation. Retrieved from http://appriseinc.org/reports/Illinois%20PIPP%20Impact%20Report%20-%20FINAL.pdf.

[81] APPRISE (July 2005). LIHEAP Energy Burden Evaluation Study. Retrieved from http://www.appriseinc.org/reports/LIHEAP%20BURDEN.pdf.

Measuring LIHEAP's Results: Responding to Home Energy Unaffordability (1999)[82]

This study tested empirically whether it would be accurate to equate "unaffordability" and "bill nonpayment" and concluded that the two are not the same. According to this study, paying utility bills in full and on time does not mean that these bills are affordable. Households may strive to make these utility payments and then struggle to afford other things such as food or medical care. The authors concluded that payment rates did not necessarily reflect the affordability of utility bills and recommended that "the concept of bill affordability should be replaced with a concept of bill sustainability" when evaluating the impact of energy assistance programs such as LIHEAP.

Determining the Cost-Effectiveness of Utility Late Payment Charges (1994)[83]

This study, which included analysis of households in Columbia Gas' Budget Plus Plan, determined that late charges for non-payment do not necessarily provide an incentive for more timely payments.

Observations

Pennsylvania's maximum energy burdens for CAPs, which range from 5% to 17% of household income, are much higher than neighboring states. Ohio has the second highest energy burden level for its utility payment assistance programs at 10% of household income. New York and New Jersey's utility payment assistance programs both have a maximum energy burden of 6%.

Pennsylvania households with incomes at or below 150% of the FPIG experience some of the highest energy burdens in the country. When counting the costs of all sources of energy, Pennsylvania residents with incomes at or below 50% of the FPIG had energy burden levels at 30% or higher for four of the five years of this study. Households that use electric non-heating may have higher energy burden levels than those reflected in this study if they use more expensive heating fuels, such as oil or propane.

A review of the other independent studies referenced above provides the following guidance:

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[82] Fisher, Sheehan, & Colton. (May 1999). "Measuring LIHEAP's Results: Responding to Home Energy Unaffordability," *Public Finance and General Economics*. Retrieved from http://www.fsconline.com/downloads/Papers/1999%2005%20measure-liheap.pdf. Measuring LIHEAP's Results at i.

[83] Fisher, Sheehan, & Colton. (June 1994). "Determining the Cost-Effectiveness of Utility Late Payment Charges," *Public Finance and General Economics*. Retrieved from http://www.fsconline.com/downloads/Papers/1994%2007%20LATE-FEE.pdf. Determining the Cost-Effectiveness of Utility Late Payment Charges at 15.

- Although nearly eight-in-ten Pennsylvanians live in an urban area (78.7%),[84] households in rural areas may experience the highest energy burden levels due to poor housing stock in these areas. Focusing energy-efficiency education and weatherization services can help to reduce the energy burden disparity in these areas and help make CAPs more effective.

- Policymakers should not confuse unaffordability with non-payment behavior. Customers can make payments in full and on time, yet their bills may still not be affordable when other (possibly neglected) household expenses are taken into account.

- Not every household in poverty or with high energy burdens will automatically experience energy bill payment problems.

- Although LIHEAP does serve the lowest income households with the highest energy burden, the concept of vulnerability must also be considered. Some populations, such as the elderly and families with young children or members with certain medical conditions, are more vulnerable than others.

- Knowing the characteristics of the intended population enables prioritization according to need. Demographic patterns – including age, education, and gender – may correlate to energy affordability. Elderly households may be more vulnerable to high energy burdens because they are more likely to live in smaller family sizes and with limited and fixed income.

- Factors other than income and customer characteristics will play a role in determining the effectiveness of an assistance program. Program design is important, including the application process and leveraging of resources.

- The ability to coordinate multiple programs so that the strengths and goals of one can offset or compensate for weaknesses of another is crucial.

- Customers enrolled in CAPs with lower arrearages are more likely to successfully improve their payment behavior. Lower PPAs at the time of entry into a program result in a greater likelihood of making payments in full and on time. The average account balance can potentially predict the likelihood that program participants will be successful or unsuccessful.

- CAPs can reduce energy burdens and improve payment behavior. Customers in a CAP will be more likely to pay their bills in full or on time.

[84] Pennsylvania State Data Center, Penn State Harrisburg. (October 2012). Pennsylvania's Urban and Rural Population. Retrieved from http://pasdc.hbg.psu.edu/sdc/pasdc_files/researchbriefs/Urban_Rural_SF1_RB.pdf.

- Negative penalties such as late charges have little impact on encouraging more timely payment behavior.

X. CAP Costs and Forecasts

Objective

To identify the cost components of CAP and forecast the future costs of the program under current conditions and with adjustments to CAP enrollment numbers and energy burdens.

Background

The Univeral Service Reporting Requirements (USRR)[85] require the major gas and electric utilities to report data on the three components of CAP program costs: CAP administration and monitoring, CAP credits, and arrearage forgiveness.

Administrative costs include: contract and utility staffing, account monitoring, intake, outreach, consumer education and conservation training, recertification processing, computer programming, program evaluation, and other fixed overhead costs. Account monitoring costs include collection expenses, as well as other operation and maintenance expenses.

Of the three CAP cost components, CAP credits comprise the largest portion. CAP credits are the difference between the cost of utility service at tariff rates and price of utility service that CAP participants are asked to pay. Another key factor that drives the total cost of a CAP is the average CAP enrollment.

The cost of arrearage forgiveness is dependent on the PPAs of households when they enroll in CAPs and their adherence to CAP requirements. The more frequently the CAP customers pay their bills in full and on-time, the greater the amount of PPA forgiveness.

Methodology

To perform the analysis of total CAP costs, staff reviewed the total gross cost of all CAP components, average CAP enrollments, and the average number of residential customers for each of the EDC and NGDC utilities as reported in the *Universal Service Programs and Collection Performance Reports* (USRs) from 2012-2017.[86]

CAP budgets from approved or proposed utility USECPs were used to determine cost projections four years into the future, until 2021.[87] These projections are shown two

[85] 52 Pa. Code § 62.5 (2)(ii)(C)(III) for NGDCs and 52 Pa. Code § 54.75(2)(ii)(C)(III) for EDCs.

[86] http://www.puc.pa.gov/filing_resources/universal_service_reports.aspx

[87] Staff used projected CAP costs for 2018 to 2021 from the utilities' USECPs, rather than using regression to forecast CAP costs from the 2012-2016 data. Staff determined that the USECP

ways: (1) the total CAP costs from utility USECPs and (2) the impact of the CAP costs per non-CAP residential customer. Staff forecast the 2018-2021 average CAP enrollment and residential customer numbers. Staff then adjusted the costs to show a range of potential increases and decreases (+10%, +5%, +1%, -1%, -5%, -10%) to the 2018-2021 projected residential non-CAP costs.

Finally, staff created a model based on actual 2012-2016 CAP costs and energy burden levels. Staff was able to adjust the energy burden levels, holding the other variables static, and estimate the incremental CAP costs based on potential new percent-of-income energy burden levels. The model can be used to examine other potential percent-of-income energy burdens.

Data Limitations

The total CAP cost data and cost components were reviewed in aggregate for each utility, as the utilities do not report costs broken down by heating/non-heating or by poverty level as part of the USR.

Analysis

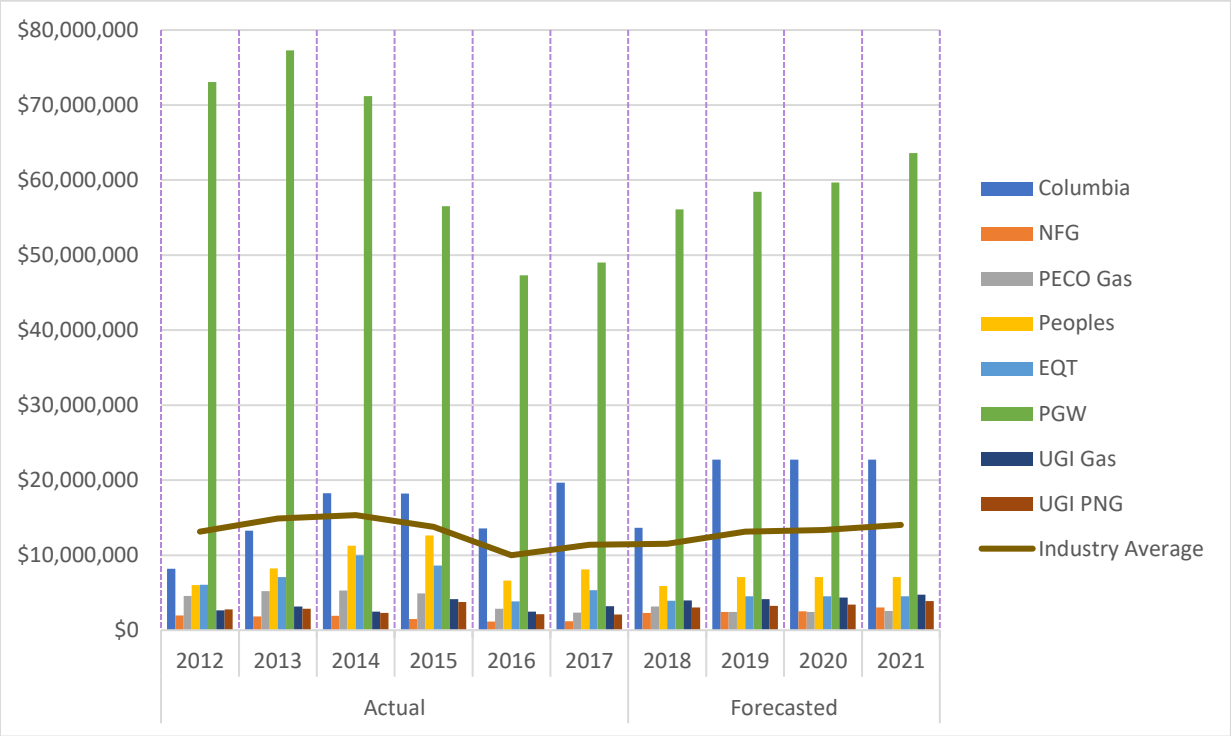
Staff analyzed the actual 2012-2017 costs of CAPs, number of residential customers, and average CAP enrollments from USR data in order to determine the costs of CAPs per non-CAP residential customer, calculated: CAP costs/(residential customers-average CAP enrollment). Staff used approved and proposed USECP CAP budgets for 2018-2021 and then forecast the 2018-2021 residential customer and average CAP enrollment levels using a regression analysis (when necessary).

Staff also created a separate model to estimate the impacts of adjusting the energy burden levels going forward.

CAP budgets were approximately 7% higher than actual CAP costs for 2015 through 2017. *See* Appendix 9.M.1: Variance between USECP CAP Cost Projections and Actual CAP Costs – Energy Industry as a Whole. Staff did not factor this variance into the model.

NGDC CAP Costs

Table 10-1
NGDC - CAP Totals With 4-Year Forecasting
(2018-2021)

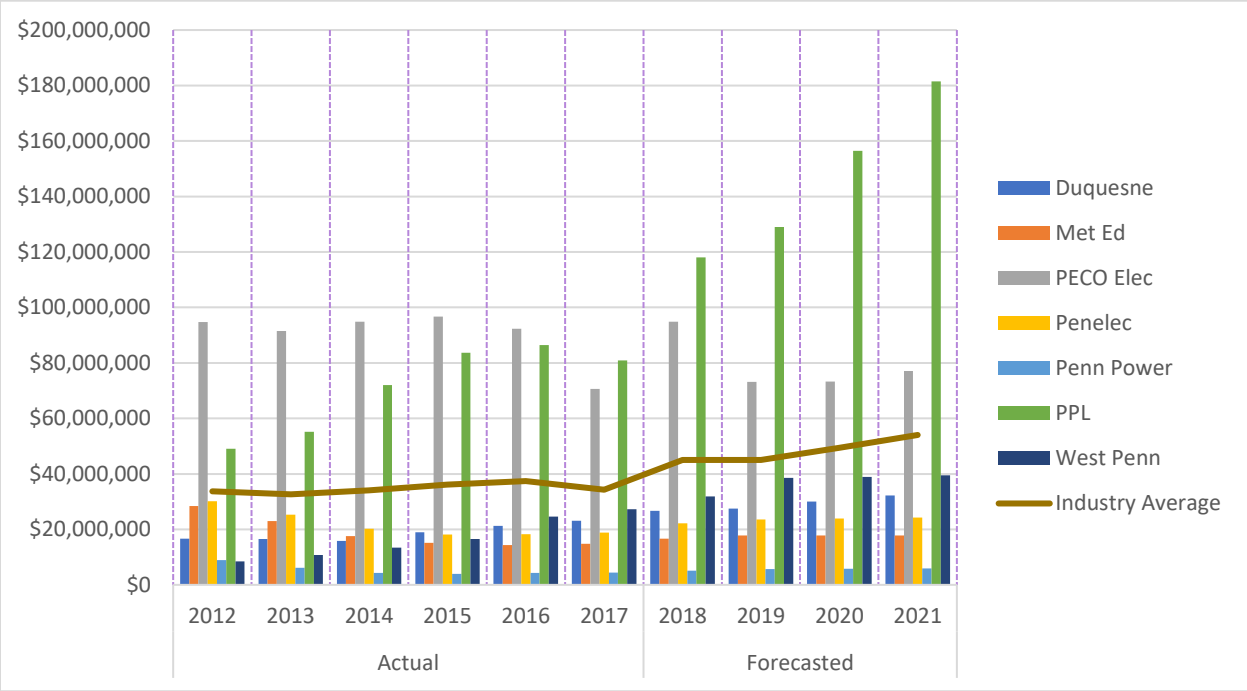


The historic CAP cost data show that PGW had the highest CAP costs of the NGDCs. PGW's CAP costs are recovered from rate classes other than just residential.[88] While CAP costs for PGW were still much higher than any other NGDC, they decreased from a peak of over $77.2 million in 2013 to $47.3 million in 2016. However, based on PGW's projected CAP budgets in its 2017-2020 USECP, PGW's CAP costs are anticipated to increase annually, growing to $63.6 million by 2021. Peoples' CAP costs have remained fairly steady since 2012 and are projected to remain fairly constant. Columbia Gas' CAP costs have risen from $8.1 million in 2012 and may reach a projected cost of over $22.7 million in 2021; Columbia Gas has the second highest NGDC CAP costs overall. NFG's CAP costs are forecast to increase from $1.2 million in 2017 to just over $3 million in 2021. The forecasting model projects the overall industry average for NGDC CAP costs will increase annually over the next four years, from $11.4 million in 2017 to over $14 million in 2021. *See* Table 10-1.

[88] PGW, as a city NGDC, is able to recover its CAP and other universal service program costs from the following classes, at different allocation percentages each year: residential, commercial, industrial, municipal service, and the Philadelphia Housing Authority (PHA).

EDC CAP Costs

Table 10-2
EDC - Total Gross CAP Totals With 4-Year Forecasting
(2018-2021)



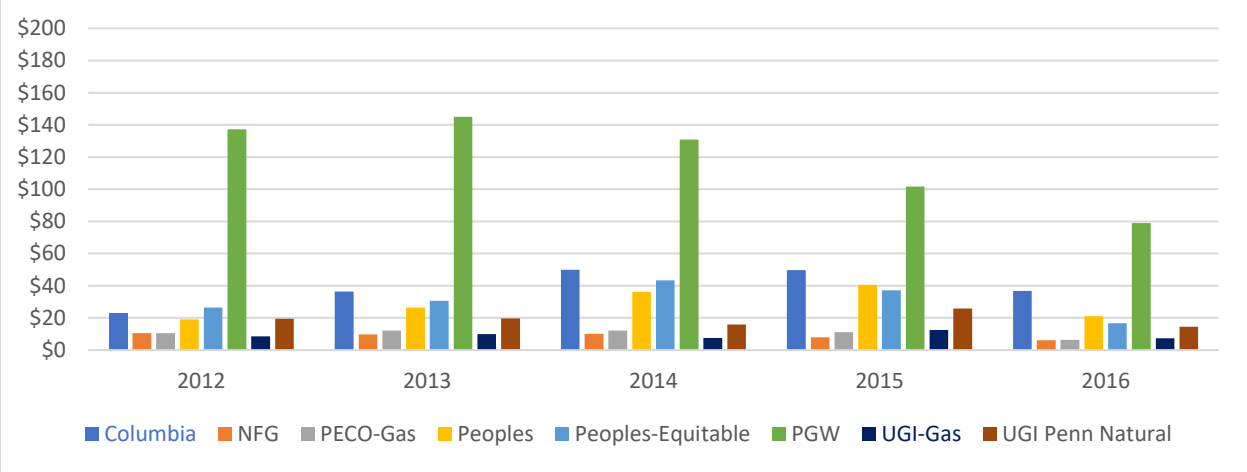
The historic CAP cost data show that PECO Electric and PPL had the highest CAP costs of the EDCs. PECO Electric's CAP costs remained fairly steady (between $92 to 96 million) from2012 through 2016. However, PECO Electric changed from a rate discount to a percent of income (PIP) CAP billing structure in October 2016, and this change is reflected in the lower projected CAP costs (between $73 to $77 million) through 2021. PPL's CAP costs have risen from $49.1 million in 2012 and may reach a projected cost of over $181.4 million in 2021. While PPL's 2020 and 2021 CAP costs are based on staff forecasting that does not take into account all possible factors, PPL's costs will likely continue to increase.

Forecasting shows the overall industry average for electric CAP costs will experience a sizeable increase over the next four years; from $34.3 million in 2017 to over $54 million by 2021. *See* Table 10-2.

Costs of CAP per Non-CAP Residential Customer

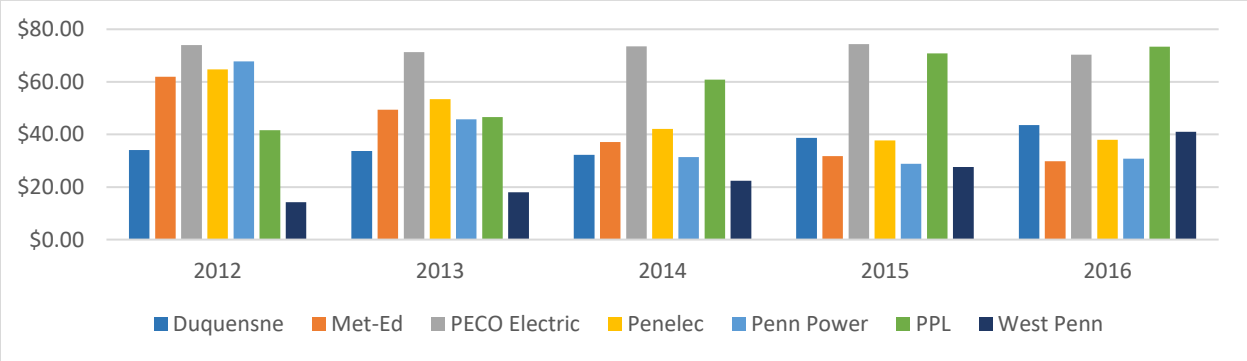
Another way to show the impact of CAP costs is to calculate costs per non-CAP residential customer. To do this, staff subtracted the average CAP enrollment from the number of residential customers to obtain the non-CAP residential customer totals. Staff then divided the total CAP cost by the average number of non-CAP residential customers for each utility: (*i.e.*, Total CAP Costs/Residential Customers-Average CAP Enrollment).

Table 10-3
Annual NGDC CAP Costs per Non-CAP Residential Customer 2012-2016



Based on historic data from 2012 to 2016, PGW had significantly higher costs per non-CAP residential customer than other NGDCs, even though PGW recovered its universal service program costs from other rate classes in addition to its residential class. The costs in the table above reflect only the historic residential portion of CAP costs for all utilities. *See* Table 10-3.

Table 10-4
Annual EDC CAP Costs per Non-CAP Residential Customer 2012-2016



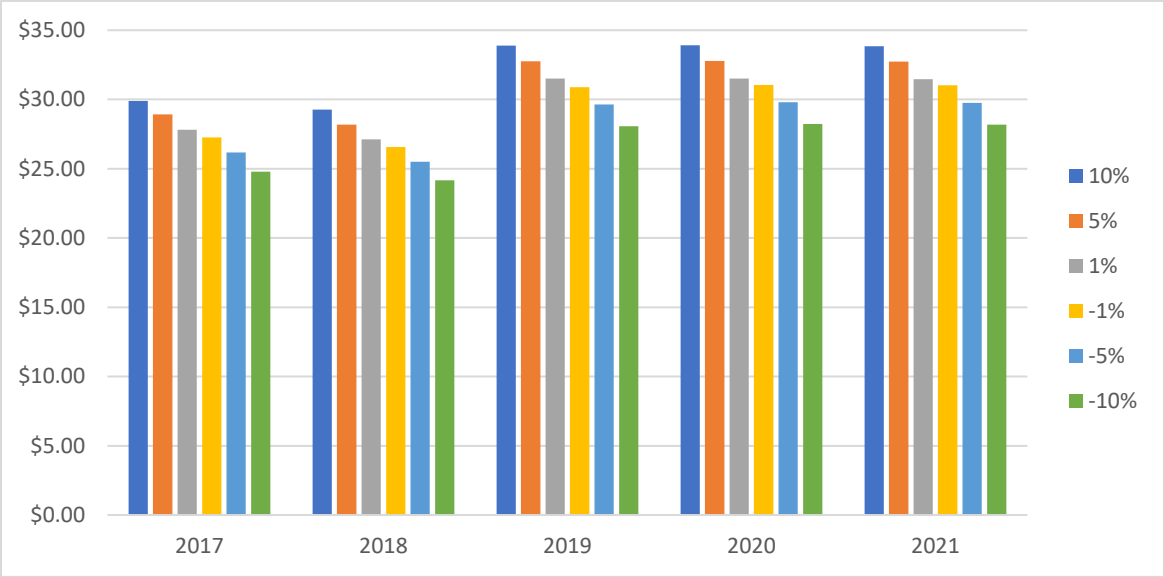
PECO Electric had the highest annual cost per non-CAP residential customer throughout the first four years of the study and was second highest in 2016. PPL's costs rose steadily and by the end of the study period were higher than PECO Electric's. Met-Ed's and Duquesne's annual CAP costs appear to have declined over the five-year period while West Penn's appear to have increased. *See* Table 10-4.

Projected Costs of CAPs Per Non-CAP Residential Customers with Cost Adjustments

Staff used projected CAP budgets from utility USECPs and regression analysis (for years in which no projected CAP budget was available) to forecast CAP costs for

2018 to 2021. Staff used the following adjustments to the costs per non-CAP residential customer: +10%, +5%, +1%, -1%, -5%, -10%. Due to the wide range in individual utility CAP costs, staff chose to perform this forecast at the EDC and NGDC industry level. The tables below show the energy industry CAP costs to non-CAP residential customers, as forecast for 2018 to 2021, but include the actual CAP costs for 2017, which were obtained from USR data. Staff has included the individual utility forecasts for non-CAP residential costs in the Appendix.[89]

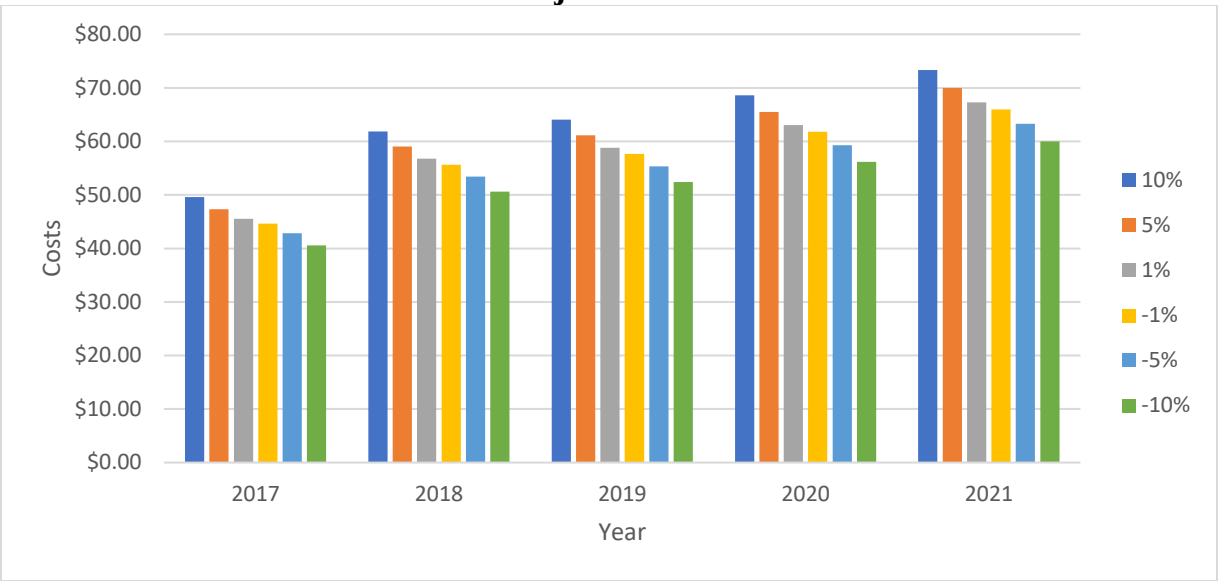
Table 10-5
NGDC Industry Predictions per Non-CAP Residential Customer with Cost Adjustments 2017-2021



By presenting the NGDC forecast at the industry level in Table 10-5 above, staff notes NGDC CAP costs per non-CAP residential customer will increase slightly by 2019, but otherwise remain relatively stable through 2021.

[89] See Appendices 9.D and 9.E.

Table 10-6
EDC Industry Predictions per Non-CAP Residential Customer with Cost Adjustments 2017-2021



By presenting the EDC forecast at the industry level in Table 10-6 above, staff notes an overall slightly increasing annual trend in the CAP costs per non-CAP residential customer. This increasing trend is consistent with the forecast trend noted above in the forecast for each individual EDC's CAP costs from 2018 to 2021.

Energy Burden Model

Staff developed a model that estimates the incremental costs to a CAP if energy burdens are adjusted. As noted earlier, most of Pennsylvania's neighboring states use lower maximum energy burdens. Ohio has a maximum energy burden of 10%, New York and New Jersey have maximums of 6%. For comparison purposes, staff projected the impact to Pennsylvania's CAP costs as if it adopted Ohio's 10% maximum energy burden based on the following levels: 10% for electric heating accounts, 4% for electric non-heating accounts, and 6% for gas heating accounts.

This model is based on the data collected from the utilities for this report from 2012 to 2016. The components used included the 2012 to 2016 calculated energy burdens by FPIG level for each utility, the 2012 to 2016 average annual CAP bill amounts, the 2012 to 2016 average annual CAP customer income, and the 2012 to 2016 average annual number of CAP accounts billed.

Staff did not incorporate any national energy prices[90] or usage forecasts into the model, as that data would be outdated by the time this report is released. Staff has,

[90] **Source:** U.S. Energy Information Administration (EIA)

however, included a summary table and links to the most recent NGDC and EDC forecasts, published in their respective reports on the PUC website.[91]

Additionally, staff's energy burden model does not take into consideration: (1) any possible reductions in CAP costs if some CAP customers are required to pay more at the selected energy burdens; (2) whether rate discount pricing might be better for some CAP customers; (3) CAP costs borne by PGW's non-residential ratepayers; (4) utility CAP credit limits; (5) system/administrative costs associated with adopting new energy burdens; and (6) factors specific to each utility.

The average energy burdens during the study period were calculated by dividing the average annual CAP bill by the average annual CAP income. New average annual CAP bills (by FPIG level), tied to a percent of income, were calculated using average annual CAP income.

Staff used Columbia Gas data to demonstrate this energy burden model. Dollar amounts and numbers may have been rounded to nearest whole amounts for the following example:

Step 1: Columbia Gas' Average Annual CAP Bill by FPIG Level

AVG 2012-2016		
50	100	150
$585.40	$694.00	$725.40

Step 2: Columbia Gas' Average Annual CAP Income by FPIG Level

AVG 2012-2016		
50	100	150
$5,582	$12,505	$22,354

Step 3: Columbia Gas' Calculated Average Energy Burden by FPIG Level

AVG 2012-2016		
50	100	150
10.49	5.55	3.24

https://www.eia.gov/outlooks/aeo/data/browser/#/?id=3-AEO2018&region=1-0&cases=ref2018&start=2016&end=2030&f=A&linechart=&map=ref2018-d121317a.4-3-AEO2018.1-0&ctype=linechart&sourcekey=0

[91] *See* Appendix 9.L.

Step 4: Columbia Gas' Estimated Average Annual CAP Bill at 6% by FPIG Level

AVG 2012-2016		
50	100	150
$334.93	$750.29	$1,341.26

The model compares the resulting estimated average CAP bill amounts to the corresponding actual annual average CAP bill amounts, by FPIG level, for 2012 to 2016. Some FPIG levels showed the difference as a negative number – which represents the amount of discount/CAP Credit/LIHEAP that would be needed to ***decrease*** the average annual CAP bill to the new estimated average CAP bill amount. Some FPIG levels show the difference as a positive number – which means that the average CAP bill is already below the selected energy burdens. This would not add directly to the CAP costs in this model, as CAP customers would have to pay the incremental increases in the bill. Staff set the estimated average CAP bills for those FPIG levels to $0 in the model and then calculated the change needed to obtain the average cost of change for each FPIG level.

Step 5: Columbia Gas' Change Needed to Reach 6% CAP Bill by FPIG Level

Columbia Gas	AVG 2012-2016		
	50	100	150
Estimated 6% CAP Bill	$334.93	$750.29	$1,341.26
Average CAP Bill	$585.40	$694.00	$725.40
Change to Reach 6%	-$250.47	$0.00	$0.00

Staff then multiplied the average estimated change in CAP billing by the average number of CAP accounts billed from 2012 to 2016 for each FPIG level.

Step 6: Columbia Gas' Incremental CAP Cost for Customers in < 50% FPIG

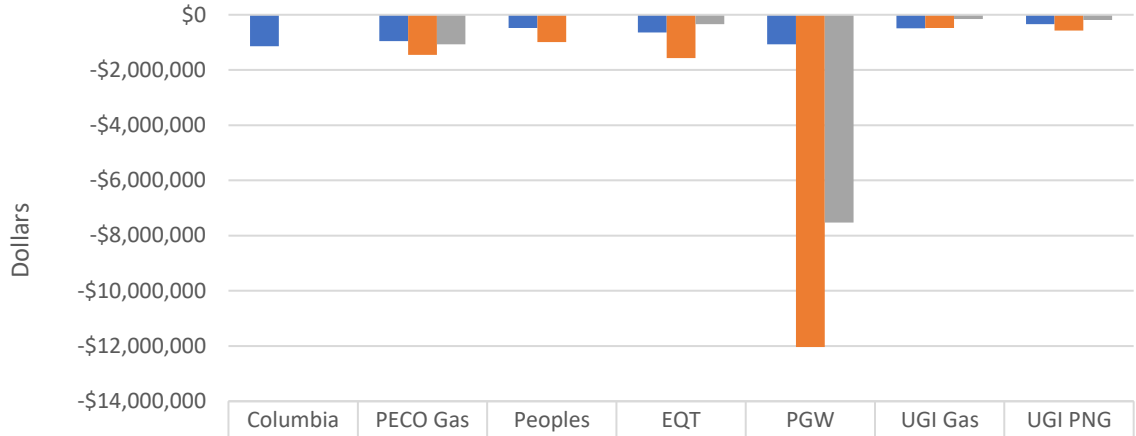
50		50		50
-$250.47	X	4558.15	=	-$1,141,680

The resulting dollar amounts represent the incremental cost that would be necessary to bring the average CAP bills in each FPIG level to the selected energy burdens. The dollar amounts are presented in the graphs below by individual utility and are expressed as negative numbers because they represent the additional discount (*i.e.*, CAP credits). The customers in the FPIG levels that were currently under the selected energy burdens are represented with $0 and may see an increase in average CAP bills.

The cost projections presented in the following graphs do not take into account any administrative or programming costs that the utilities would incur to transition the CAP customers to new energy burdens. In addition, these estimated costs do not consider any limits placed on CAP credits by individual utilities. The model does not consider the possibility of a reduction in CAP credits resulting from increased payments from those

CAP customers who currently have less than a 10% energy burden. Further, this model does not consider rate discount pricing. The estimates in this model are not meant to be inclusive of all costs or factors but are provided to give an approximation of costs and are based on the data reported by the utilities for this study.

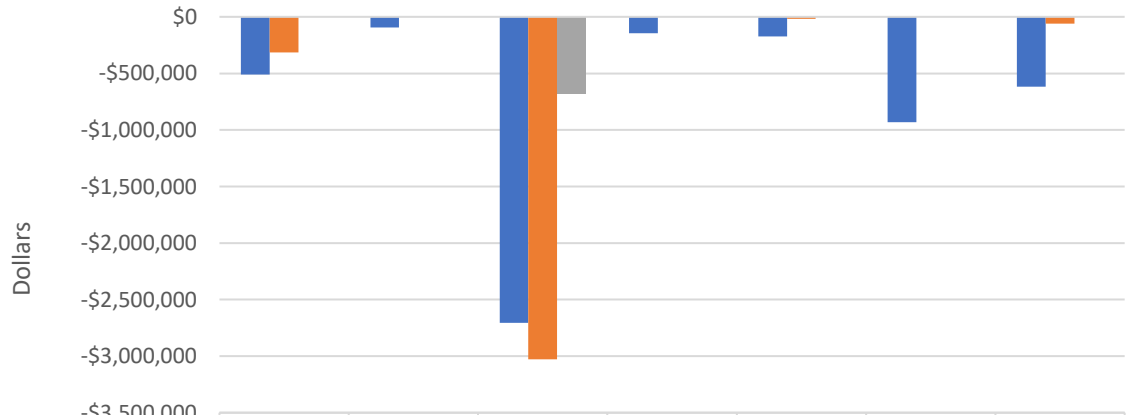
Table 10-7
NGDC CAP Heating – Discount Needed To Reach 6% Energy Burden



	Columbia	PECO Gas	Peoples	EQT	PGW	UGI Gas	UGI PNG
Poverty Level 0-50%	-$1,141,671	-$949,472	-$482,898	-$644,602	-$1,070,907	-$495,780	-$340,481
Poverty Level 51-100%	$0	-$1,455,171	-$988,893	-$1,571,350	-$12,030,42	-$473,414	-$576,603
Poverty Level 101-150%	$0	-$1,071,488	$0	-$338,627	-$7,526,891	-$156,751	-$191,032

Columbia Gas would only incur costs in this model for customers at the 0 to 50% FPIG level. Peoples Gas would incur costs from the 0 to 50% and 51 to 100% FPIG levels but not from the 101 to 150% FPIG level. PGW would incur the costliest transition, particularly in the 51 to 100% FPIG level. *See* Table 10-7.

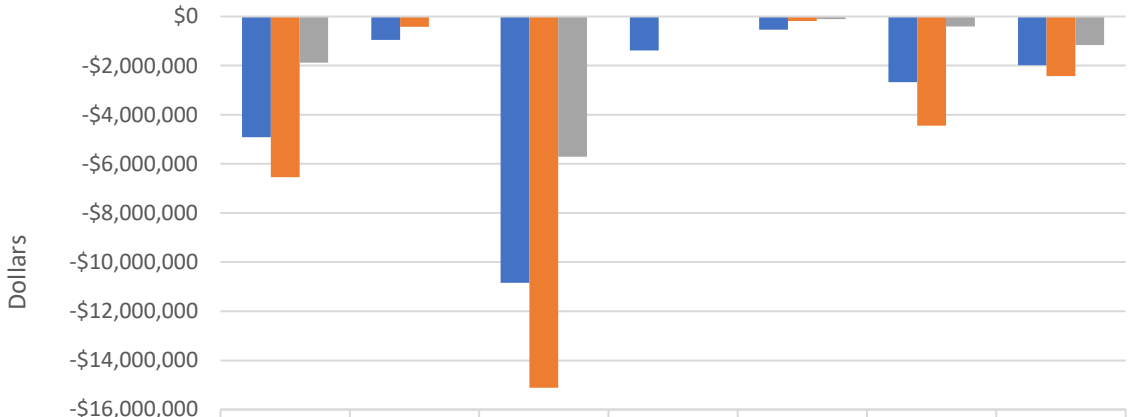
Table 10-8
EDC CAP Electric Heating – Additional Discount Needed for 10% Energy Burden



	Duquesne	Met Ed	PECO Electric	Penelec	Penn Power	PPL	West Penn
Poverty Level 0-50%	-$508,936	-$94,059	-$2,704,923	-$145,120	-$173,337	-$931,182	-$617,331
Poverty Level 51-100%	-$314,354	$0	-$3,027,842	$0	-$17,530	$0	-$60,351
Poverty Level 101-150%	$0	$0	-$680,776	$0	$0	$0	$0

All EDCs would incur costs at the 0 to 50% FPIG level to bring all of the CAP electric heating customers to a 10% energy burden. PECO Electric and PPL would incur the largest overall costs to align all heating customers to a 10% energy burden. However, all the EDCs except for PECO Electric would have no incremental change of costs in the 101 to 150% FPIG level. *See* Table 10-8.

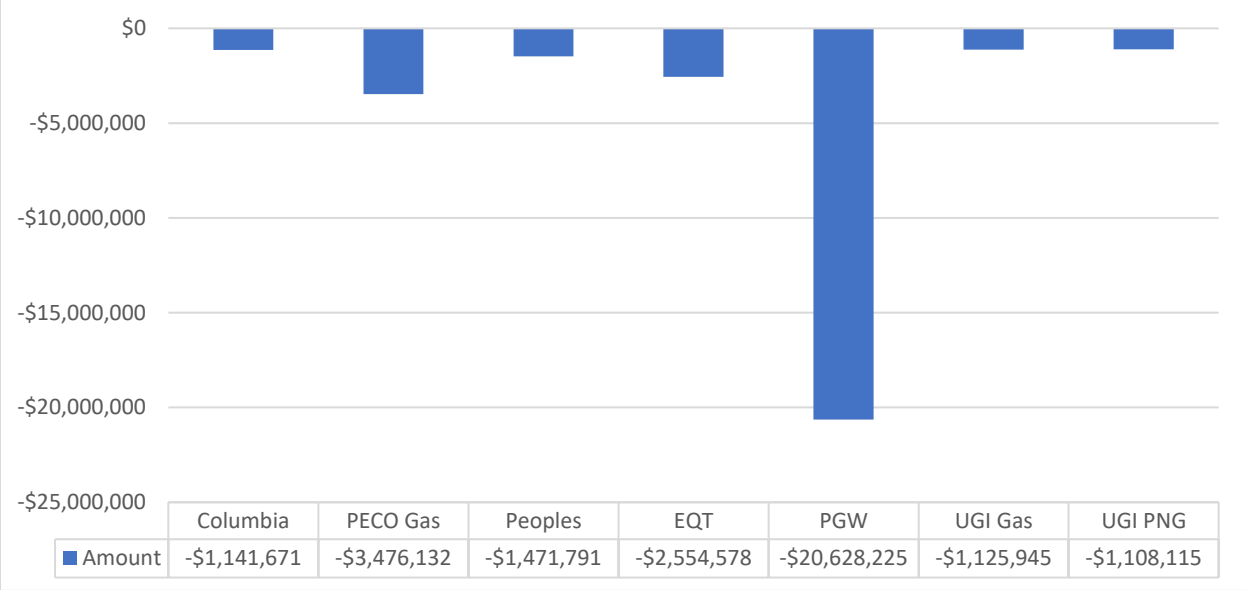
Table 10-9
EDC CAP Electric Non-Heat – Discount Needed To Reach 4% Energy Burden



	Duquesne	Met Ed	PECO Electric	Penelec	Penn Power	PPL	West Penn
Poverty Level 0-50%	-$4,912,741	-$952,977	-$10,837,68	-$1,381,508	-$542,033	-$2,676,214	-$1,979,613
Poverty Level 51-100%	-$6,543,038	-$414,068	-$15,107,48	$0	-$187,418	-$4,442,829	-$2,430,374
Poverty Level 101-150%	-$1,872,303	$0	-$5,708,105	$0	-$108,075	-$402,887	-$1,158,215

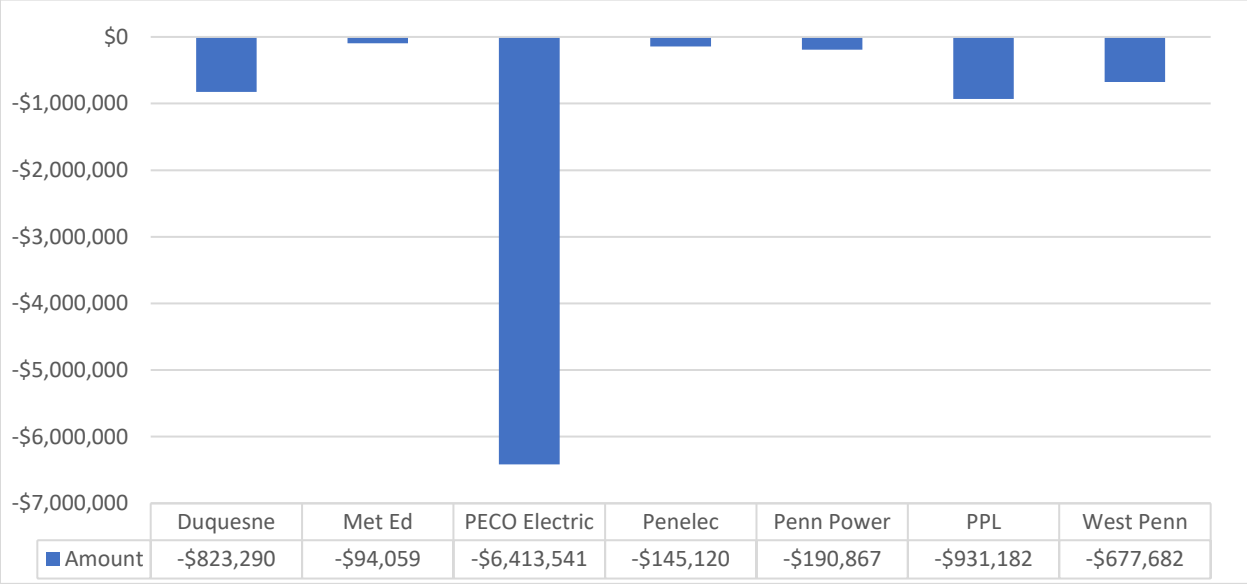
The CAP electric non-heating customers make up the costliest of the account types to transition to a lower energy burden. Currently, the majority of EDC non-heating CAP customers have energy burdens that would exceed 4%. Penelec would have the fewest CAP customers to transition and would only incur increased costs from the 0 to 50% FPIG level. *See* Table 10-9.

Table 10-10
Estimated Total Cost to Change All FPIG Levels of CAP Gas Heating Customers to Energy Burdens of 6%



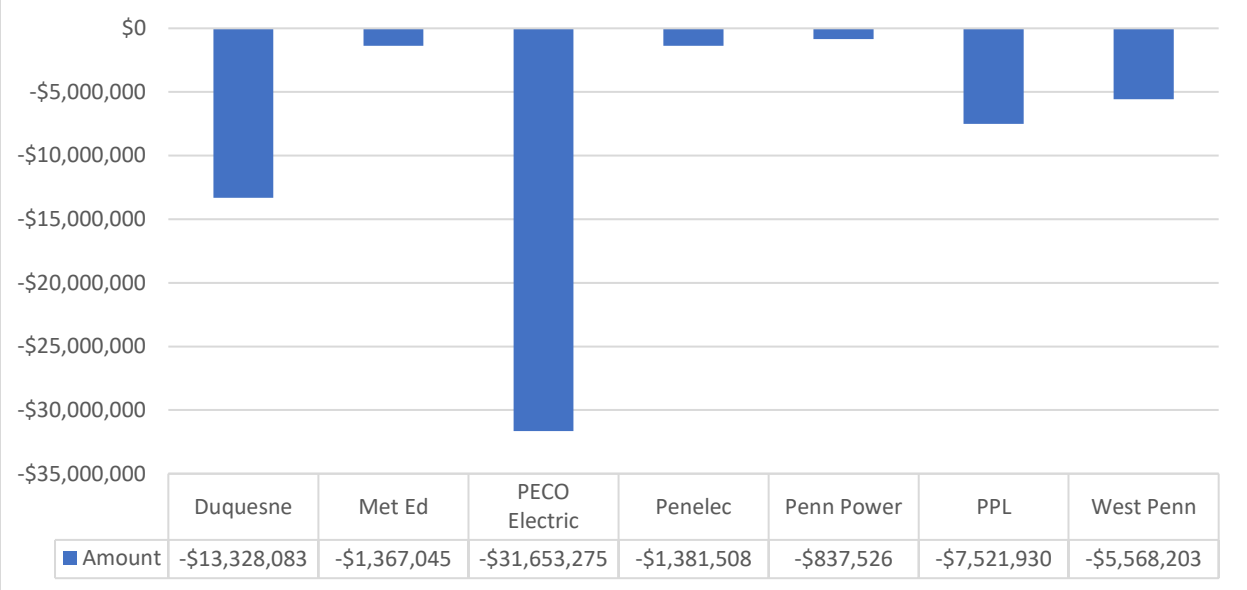
	Columbia	PECO Gas	Peoples	EQT	PGW	UGI Gas	UGI PNG
Amount	-$1,141,671	-$3,476,132	-$1,471,791	-$2,554,578	-$20,628,225	-$1,125,945	-$1,108,115

Table 10-11
Estimated Total Cost to Change All FPIG Levels of CAP Electric Heating Customers to Energy Burdens of 10%



	Duquesne	Met Ed	PECO Electric	Penelec	Penn Power	PPL	West Penn
Amount	-$823,290	-$94,059	-$6,413,541	-$145,120	-$190,867	-$931,182	-$677,682

Table 10-12
Estimated Total Cost to Change All FPIG Levels of CAP Electric Non-Heating Customers to Energy Burdens of 4%



The total costs for each utility within the respective CAP segment are illustrated in the previous tables presented in Tables 10-10 to 10-12.

Most NGDCs would see CAP cost increases of approximately $1 million. PGW's CAP budget, however, would increase by approximately $21 million. The EDCs would have more overall costs because of the need to transition both heating and non-heating CAP customers from current energy burdens to new lower energy burdens. *See* Table 10-10

Most EDCs would see CAP cost increases of less than $9 million. Met-Ed, Penn Power, and Penelec CAP costs would increase between $1 to 2 million. PECO Electric would experience a $38 million increase to its CAP costs. *See* Table 10-11 and 10-12.

The total cost to change all CAP customers in each segment represented in Tables 10-10 to 10-12 are summarized in Table 10-13 below.

Table 10-13
Incremental Cost to Change Current CAP Customers in Each Segment with Energy Burdens Higher than 10%, 6%, 4%, to the Targeted Energy Burdens Levels

CAP Customer Segment	Segment Cost	Incremental Additional Cost per Non-CAP Residential Customer	2012-2016	
			Average Number Residential Customers	Average CAP Enrollment
EDC Heating Segment (10%)	$9,275,741	$2.00	4,938,754	293,023
EDC Non-Heating Segment (4%)	$61,657,570	$13.27		
EDC Total		$15.27		
Gas Heating Segment (6%)	$31,506,457	$13.08	2,574,806	165,392
Total for EDC and NGDC Segments (10%, 4%, 6%)	$102,439,768		7,513,560	458,415
Weighted Average of Annual Cost Impact to Each EDC and NGDC Residential Non-CAP Customer		$14.52		

The incremental cost to non-CAP residential customers is calculated by first subtracting the average CAP enrollment from the average number of residential customers to get the non-CAP customer number. Then, the segment cost is divided by the non-CAP residential customer number to produce an incremental cost for each segment. The weighted cost represents the incremental cost across all EDC and NGDC non-CAP residential customers.

The additional CAP discounts, based on the 2012 to 2016 data used in the staff model, would have resulted in a weighted average annual increase of $14.52 to non-CAP residential ratepayer energy bills for the utilities in this study based on average customer counts from 2012 through 2016.[92]

Observations

Depending on the utility, NGDC non-CAP residential customers have paid between $10 and $145 annually to cover CAP costs over the study period. This does not factor in how much PGW commercial and industrial customers paid to cover CAP costs.

Depending on the utility, EDC non-CAP residential customers have paid between $15 and nearly $80 annually to cover CAP costs over the study period.

Despite an industry drop in CAP expenditures from 2012-2016, NDGC and EDC CAP costs are projected to increase annually through 2021.

[92] The results of this model are not projections of future CAP costs at a maximum energy burden of 10%. To use this model to forecast future CAP costs at various energy burden maximums would require additional data from the utilities.

The overall average costs per non-CAP residential customer are also anticipated to increase through 2021, varying by CAP enrollments levels. EDC customers will experience the biggest increase, with average annual CAP costs recovered from non-CAP residential customers increasing by approximately $20 from 2017 to 2021.

Based on average CAP bill and income levels, the total amount of additional discounts (*i.e.*, CAP credits) needed to establish maximum energy burdens of 6% for gas heating, 4% for electric non-heating, and 10% for electric heating would be approximately $102 million. This amount breaks down to approximately $32 million for gas heating, $62 million for electric non-heating, and $9 million for electric heating. This additional CAP cost would increase gas and electric bills for non-CAP residential ratepayers by approximately $15 as a statewide average for customers of the larger energy utilities.

The energy burden model, developed by staff, used in this study does not take into consideration: (1) any possible reductions in CAP costs if some CAP customers are required to pay more at the selected energy burdens; (2) whether rate discount pricing might be better for some CAP customers; (3) CAP costs borne by PGW's non-residential ratepayers; (4) utility CAP credit limits; (5) system/administrative costs associated with adopting new energy burdens; and (6) factors specific to each utility.

XI. Conclusion

The Commission initiated a study of energy affordability for low-income customers in Pennsylvania in its Order at Docket No. M-2017-2587711 entered on May 5, 2017. This staff report, notice of which will be published in the *Pennsylvania Bulletin* with provisions for comment and reply comment periods as necessary, will be published to the Commission's website. This report is a staff work product and is not binding on the Commission. Nor is this staff report indicative of how the Commission may decide to act on universal service matters in this or other dockets. 52 Pa. Code § 1.96. The legal, policy, and procedural issues regarding energy burdens remain under Commission review and may be factored into a subsequent order at this or other dockets.

This study serves as a starting point for the Commission's review of energy burdens.[93] It provides insight into the effectiveness of CAPs in serving Pennsylvania's low-income population. Although this study does not identify an "affordable" energy burden level for customers enrolled in customer assistance programs, it attempts to measure whether the various CAP payment designs met universal service goals such as reducing debt, improving customer payment habits, reducing defaults and terminations, and reducing the number of customers in debt who are not on payment agreements.

Staff identified inconsistencies and limitations in the reported data that impacted the analysis. Reasons for data variations included policy and procedure changes implemented by the utilities during the five-year time frame, specific enhancements to their systems, changes to their low-income programs, and mergers/acquisitions. Staff also found many utilities interpreted, tracked, and reported information differently.

The report notes a wide disparity in the average percent of household income spent on natural gas and electric services by non-CAP residential and CAP customers. Non-CAP residential accounts had an average energy burden of 4% for gas heating and electric non-heating or 4% for electric heating. In comparison, CAP customers with gas heating and electric non-heating had a combined average energy burden of 12% to 14%,[94] and CAP customers with electric heat have an average energy burden of 8 to 10%.

Many CAP customers with incomes in the 0% to 50% FPIG level were billed, on average, at energy burdens higher than the maximum ranges in the CAP Policy Statement. This pattern was not as apparent for CAP customers at the higher FPIG levels.

[93] In regard to energy burdens for all low-income customers, the utilities that were queried for this study were unable to identify or provide income information on low-income households that did not participate in their CAPs or other universal service programs.

[94] The average energy burden was 7 to 8% for NGDC CAP heating customers and 5 to 6% for EDC non-heating CAP customers.

Despite the LIHEAP impacts on energy burdens for CAP customers across all FPIG levels and energy types, average CAP households at 0 to 50% FPIG level had average energy burdens that exceeded the CAP Policy Statement guidelines.

Utilities with CAP enrollment restrictions beyond income-qualifications reported higher PPA balances. EDCs reported *fewer* CAP heating customers at the 101 to 150% FPIG level paid their bills in comparison to the percentage of bills paid by customers at the 51 to 100% FPIG level.

There was little consistency in the way the utilities report, track, and respond to CAP defaults. Further, utilities varied in how they tracked and reported CAP terminations.

The number of CLI customers in debt and not on a payment agreement generally decreased across utilities during this study period, which suggests that CLI customers were enrolling in CAPs or payment agreements and were thus less vulnerable to service termination.

Despite an industry drop in CAP expenditures from 2012-2016, NDGC and EDC CAP costs are projected to increase annually through 2021. The overall average costs per non-CAP residential customer are also anticipated to increase through 2021, varying by CAP enrollments levels. EDC customers will experience the biggest increase, with average annual CAP costs recovered from non-CAP residential customers increasing by approximately $20 from 2017 to 2021.

Historically, non-CAP residential customers have paid on average between approximately $10/year and $145/year to cover CAP costs over the study period. CAP costs borne by PGW non-residential customers have not been factored in.

Pennsylvania's maximum energy burdens in the CAP Policy Statement are higher than maximum energy burdens used by neighboring states. Ohio – a state with similar climate, energy use, and demographics – has a maximum energy burden of 10% for its payment assistance program. Based on a model developed by staff, adopting a 10% maximum energy burden[95] across all FPIG levels in Pennsylvania would increase CAP discounts (*i.e.*, the costs borne by non-CAP residential customers) by approximately $102 million per year. This staff forecast, however, does not factor in all the impacts associated with an energy burden change (*e.g.*, costs of implementing a system change, whether rate discount pricing might be better for some CAP customers, etc.). Further, the staff forecast does not consider the possibility of a reduction in CAP credits resulting from increased payments from those CAP customers who currently have less than a 10% energy burden.

Staff further notes that, in addition to changes implemented during the study time frame, utilities have also implemented changes in their CAPs and other universal service

[95] Specifically, 10% for electric heating, 6% for gas heating, and 4% for electric non-heating.

programs since 2016. Such changes are on-going and may have an impact on the observations drawn by this study. Inspection of future data may substantiate trends as well as identify the aspects of CAPs that appear to work well or that produce better customer outcomes. Collection of valid data that can be compared across income levels, within industry groups, and between industry groups would increase the reliability of projections and better evaluate the success of CAPs.

The appendices that follow provide more details on the data, third-party articles, staff models, and demographics referenced in this staff report.

XII. Appendices

Table of Appendices

Appendix 1 – NGDC and EDC Demographic Profiles

Appendix 1.A: NGDC Service Territory Demographic Profiles

This Appendix provides a demographic profile of each EDC and NGDC service territory. In many cases, the jurisdictional boundary of a utility's service territory does not match municipal and county boundaries. The demographic data is not based on utility service area boundaries

Staff worked with Pennsylvania Spatial Data Access (PASDA) to create a census-based profile for each utility, based on a service area Geographic Information System (GIS) layer provided to the Commission by the utilities. PASDA utilized the GIS service area layers along with data from the Environmental Systems Research Institute (Esri) and the American Community Survey (ACS). The demographic data provided for each utility is data from the latest ACS survey (2012-2016) unless otherwise noted. The ACS demographic data is presented by households and/or population.[96]

Each service area profile is specific to the utility, although staff recognizes that the utility service areas overlap and, therefore, some demographic data will be counted in multiple service areas. This section also includes data about median and *per capita* incomes.[97]

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[96] As defined by ACS, a household is composed of one or more people who occupy a housing unit. See https://www.census.gov/programs-surveys/acs/technical-documentation/code-lists.html. Population is defined as the whole number of inhabitants of a particular town, area, or country.

[97] "*Per capita* income" is defined as the average income earned by each person in a given area. Example, two income earners in the same household would be counted separately when measuring *per capita* income.

Appendix 1.A.1: **Columbia Service Territory Demographic Profile**

Columbia	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
64.20%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
297,900	31.0%	2		<0.5	122,979	5.3%	<$15,000	98,960	10.0%
141,398	14.7%	3		0.50-0.99	146,419	6.3%	$15,000-$24,999	99,195	10.1%
113,212	11.8%	4		1.00-1.24	85,423	3.7%	$25,000-$34,999	94,579	9.6%
43,564	4.5%	5		1.25-1.49	88,530	3.8%	$35,000-$49,999	129,768	13.2%
13,827	1.4%	6		1.50-1.84	131,701	5.7%	$50,000-$74,999	186,287	18.9%
6,464	0.7%	7		1.85-1.99**	58,502	2.5%	$75,000-$99,999	128,863	13.1%
35.80%	**Non-Family**			2.00+	1,674,040	72.5%	$100,000-$149,999	144,832	14.7%
285,067	29.7%	1	29.7%		**2,307,594**		$150,000-$199,999	54,475	5.5%
47,804	5.0%	2	36.0%				$200,000 or greater	48,942	5.0%
7,037	0.7%	3	15.5%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**985,901**	
3,191	0.3%	4	12.1%	Utility Gas	619,353	64.5%	**Median Income**	$57,222	
800	0.1%	5	4.6%	Bottled/Tank/LP Gas	32,160	3.3%	**Average Income**	$78,414	
144	0.0%	6	1.5%	Electricity	174,950	18.2%	**Per Capita Income**	$32,380	
152	0.0%	7	0.7%	Fuel Oil/Kerosene	95,151	9.9%	**Columbia Service Area 2012-2016 ACS**		
960,561				Coal	5,762	0.6%	**Households**	**Population Age:**	**%**
Columbia Service Area - 2012-2016 ACS				Wood	24,013	2.5%	260,904	With < 18	**37.3%**
Households	**Poverty (100% FPIG)**			Solar	189	0.0%	699,655	W/No < 18	62.7%
109,903	11.4%	Below Poverty Level		Other	6,191	0.6%	294,787	With Age 65+	**44.3%**
850,656	88.6%	At/Above Poverty		No Fuel Used	2,791	0.3%	665,772	W/No Age 65+	55.7%
960,559					**960,560**		**960,559**		

Appendix 1.A.2: **NFG Service Territory Demographic Profile**

NFG	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
62.50%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
501,413	30.9%	2		<0.5	224,686	5.9%	<$15,000	194,181	11.8%
229,798	14.2%	3		0.50-0.99	279,535	7.4%	$15,000-$24,999	185,379	11.2%
177,621	11.0%	4		1.00-1.24	154,805	4.1%	$25,000-$34,999	170,317	10.3%
69,664	4.3%	5		1.25-1.49	162,221	4.3%	$35,000-$49,999	227,295	13.8%
22,867	1.4%	6		1.50-1.84	240,025	6.3%	$50,000-$74,999	307,008	18.6%
11,519	0.7%	7		1.85-1.99**	100,664	2.7%	$75,000-$99,999	204,399	12.4%
37.50%	**Non-Family**			2.00+	2,636,607	69.4%	$100,000-$149,999	213,949	13.0%
505,705	31.2%	1	31.2%		**3,798,543**		$150,000-$199,999	75,661	4.6%
83,070	5.1%	2	36.1%				$200,000 or greater	70,353	4.3%
11,593	0.7%	3	14.9%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**1,648,542**	
5,142	0.3%	4	11.3%	Utility Gas	1,085,439	67.0%	**Median Income**	$52,662	
1,332	0.1%	5	4.4%	Bottled/Tank/LP Gas	44,815	2.8%	**Average Income**	$72,608	
245	0.0%	6	1.4%	Electricity	240,348	14.8%	**Per Capita Income**	$30,649	
175	0.0%	7	0.7%	Fuel Oil/Kerosene	163,326	10.1%	**NFG Service Area 2012-2016 ACS**		
1,620,145				Coal	16,933	1.0%	**Households**	**Population Age:**	**%**
NFG Service Area - 2012-2016 ACS				Wood	51,423	3.2%	421,154	With < 18	**35.1%**
Households	**Poverty (100% FPIG)**			Solar	235	0.0%	1,198,991	W/No < 18	64.9%
212,600	13.12%	Below Poverty Level		Other	13,043	0.8%	505,617	With Age 65+	**45.4%**
1,407,546	86.88%	At/Above Poverty		No Fuel Used	4,582	0.3%	1,114,529	W/No Age 65+	54.6%
1,620,146					**1,620,144**		**1,620,146**		

Appendix 1.A.3: **Peoples Service Territory Demographic Profile**

Peoples	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
61.90%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
282,341	30.6%	2		<0.5	118,930	5.5%	<$15,000	106,088	11.3%
131,207	14.2%	3		0.50-0.99	141,784	6.6%	$15,000-$24,999	99,777	10.6%
101,053	10.9%	4		1.00-1.24	78,484	3.7%	$25,000-$34,999	91,634	9.8%
39,202	4.2%	5		1.25-1.49	83,273	3.9%	$35,000-$49,999	121,631	12.9%
12,297	1.3%	6		1.50-1.84	121,762	5.7%	$50,000-$74,999	169,983	18.1%
5,405	0.6%	7		1.85-1.99**	52,308	2.4%	$75,000-$99,999	117,131	12.5%
38.10%	**Non-Family**			2.00+	1,546,825	72.2%	$100,000-$149,999	131,274	14.0%
294,208	31.9%	1	31.9%		**2,143,366**		$150,000-$199,999	51,807	5.5%
47,721	5.2%	2	35.8%				$200,000 or greater	50,231	5.3%
6,436	0.7%	3	14.9%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**939,556**	
2,445	0.3%	4	11.2%	Utility Gas	669,291	72.5%	**Median Income**	$55,534	
516	0.1%	5	4.3%	Bottled/Tank/LP Gas	16,958	1.8%	**Average Income**	$78,189	
159	0.0%	6	1.3%	Electricity	130,845	14.2%	**Per Capita Income**	$33,384	
93	0.0%	7	0.6%	Fuel Oil/Kerosene	76,684	8.3%	**Peoples Service Area 2012-2016 ACS**		
923,084				Coal	6,046	0.7%	**Households**	**Population Age:**	**%**
Peoples Service Area - 2012-2016 ACS				Wood	15,162	1.6%	235,713	With < 18	**34.3%**
Households	**Poverty (100% FPIG)**			Solar	91	0.0%	687,370	W/No < 18	65.7%
115,250	12.49%	Below Poverty Level		Other	5,455	0.6%	289,898	With Age 65+	**45.8%**
807,832	87.51%	At/Above Poverty		No Fuel Used	2,552	0.3%	633,185	W/No Age 65+	54.2%
923,082					**923,084**		**923,083**		

Appendix 1.A.4: **Peoples Equitable Service Territory Demographic Profile**

EQT	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
60.00%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
191,872	29.2%	2		<0.5	84,109	5.6%	<$15,000	76,358	11.4%
92,921	14.1%	3		0.50-0.99	100,023	6.6%	$15,000-$24,999	69,354	10.3%
71,876	10.9%	4		1.00-1.24	52,672	3.5%	$25,000-$34,999	63,283	9.4%
26,640	4.0%	5		1.25-1.49	56,022	3.7%	$35,000-$49,999	84,300	12.5%
8,310	1.3%	6		1.50-1.84	81,143	5.4%	$50,000-$74,999	119,670	17.8%
3,579	0.5%	7		1.85-1.99**	35,603	2.4%	$75,000-$99,999	83,337	12.4%
40.00%	**Non-Family**			2.00+	1,103,565	72.9%	$100,000-$149,999	95,691	14.2%
219,049	33.3%	1	33.3%		**1,513,137**		$150,000-$199,999	40,222	6.0%
36,751	5.6%	2	34.7%				$200,000 or greater	40,515	6.0%
4,750	0.7%	3	14.8%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**672,730**	
1,772	0.3%	4	11.2%	Utility Gas	530,197	80.6%	**Median Income**	$56,881	
396	0.1%	5	4.1%	Bottled/Tank/LP Gas	8,606	1.3%	**Average Income**	$81,139	
150	0.0%	6	1.3%	Electricity	86,007	13.1%	**Per Capita Income**	$35,192	
63	0.0%	7	0.6%	Fuel Oil/Kerosene	21,314	3.2%	**EQT Service Area 2012-2016 ACS**		
658,130				Coal	771	0.1%	**Households**	**Population Age:**	**%**
EQT Service Area - 2012-2016 ACS				Wood	5,895	0.9%	169,447	With < 18	**34.7%**
Households	**Poverty (100% FPIG)**			Solar	31	0.0%	488,684	W/No < 18	65.3%
81,511	12.39%	Below Poverty Level		Other	3,418	0.5%	196,039	With Age 65+	**42.4%**
576,620	87.61%	At/Above Poverty		No Fuel Used	1,893	0.3%	462,093	W/No Age 65+	57.6%
658,131					**658,132**		**658,132**		

Appendix 1.A.5: **PGW Service Territory Demographic Profile**

PGW	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
53.30%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
127,582	21.9%	2		<0.5	183,208	12.1%	<$15,000	120,095	19.3%
80,726	13.9%	3		0.50-0.99	209,148	13.8%	$15,000-$24,999	78,242	12.6%
56,658	9.7%	4		1.00-1.24	89,098	5.9%	$25,000-$34,999	69,545	11.2%
27,168	4.7%	5		1.25-1.49	85,794	5.7%	$35,000-$49,999	83,827	13.5%
11,453	2.0%	6		1.50-1.84	111,039	7.3%	$50,000-$74,999	100,542	16.2%
7,142	1.2%	7		1.85-1.99**	45,712	3.0%	$75,000-$99,999	61,623	9.9%
46.70%	**Non-Family**			2.00+	793,070	52.3%	$100,000-$149,999	63,232	10.2%
225,587	38.7%	1	38.7%		**1,517,069**		$150,000-$199,999	23,317	3.8%
36,661	6.3%	2	28.2%				$200,000 or greater	21,142	3.4%
6,264	1.1%	3	14.9%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**621,565**	
2,189	0.4%	4	10.1%	Utility Gas	441,669	75.8%	**Median Income**	$41,506	
744	0.1%	5	4.8%	Bottled/Tank/LP Gas	5,794	1.0%	**Average Income**	$62,170	
262	0.0%	6	2.0%	Electricity	101,885	17.5%	**Per Capita Income**	$24,833	
158	0.0%	7	1.3%	Fuel Oil/Kerosene	27,472	4.7%	**PGW Service Area 2012-2016 ACS**		
582,595				Coal	332	0.1%	**Households**	**Population Age:**	**%**
PGW Service Area - 2012-2016 ACS				Wood	758	0.1%	157,858	With < 18	**37.2%**
Households	**Poverty (100% FPIG)**			Solar	100	0.0%	424,736	W/No < 18	62.8%
139,782	23.99%	Below Poverty Level		Other	1,446	0.2%	144,664	With Age 65+	**33.0%**
442,812	76.01%	At/Above Poverty		No Fuel Used	3,138	0.5%	437,930	W/No Age 65+	67.0%
582,594					**582,594**		**582,594**		

Appendix 1.A.6: **UGI Gas Service Territory Demographic Profile**

UGI Gas	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
67.50%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
263,089	30.2%	2		<0.5	115,384	5.2%	<$15,000	77,251	8.5%
135,314	15.5%	3		0.50-0.99	144,445	6.5%	$15,000-$24,999	76,829	8.5%
111,164	12.8%	4		1.00-1.24	85,763	3.9%	$25,000-$34,999	80,520	8.9%
48,630	5.6%	5		1.25-1.49	93,233	4.2%	$35,000-$49,999	115,440	12.8%
18,435	2.1%	6		1.50-1.84	134,524	6.0%	$50,000-$74,999	175,964	19.5%
11,194	1.3%	7		1.85-1.99**	55,268	2.5%	$75,000-$99,999	127,049	14.1%
32.50%	**Non-Family**			2.00+	1,595,288	71.7%	$100,000-$149,999	147,363	16.3%
232,255	26.7%	1	26.7%		**2,223,905**		$150,000-$199,999	56,770	6.3%
42,948	4.9%	2	35.2%				$200,000 or greater	46,543	5.2%
5,080	0.6%	3	16.1%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**903,729**	
1,895	0.2%	4	13.0%	Utility Gas	303,201	34.8%	**Median Income**	$62,021	
369	0.0%	5	5.6%	Bottled/Tank/LP Gas	38,580	4.4%	**Average Income**	$82,471	
133	0.0%	6	2.1%	Electricity	280,280	32.2%	**Per Capita Income**	$32,143	
113	0.0%	7	1.3%	Fuel Oil/Kerosene	210,903	24.2%	**UGI Service Area 2012-2016 ACS**		
870,620				Coal	10,358	1.2%	**Households**	**Population Age:**	**%**
UGI Service Area - 2012-2016 ACS				Wood	17,935	2.1%	270,495	With < 18	**45.1%**
Households	**Poverty (100% FPIG)**			Solar	410	0.0%	600,124	W/No < 18	54.9%
92,287	10.60%	Below Poverty Level		Other	6,111	0.7%	255,037	With Age 65+	**41.4%**
778,332	89.40%	At/Above Poverty		No Fuel Used	2,842	0.3%	615,582	W/No Age 65+	58.6%
870,619					**870,620**		**870,619**		

Appendix 1.A.7: **UGI PNG Service Territory Demographic Profile**

UGI PNG	Households 2012-2016 ACS		Population 2012-2016 ACS	Household Income Range - Esri

62.20%	Family	# in Household	Combined # in Household	Income to Poverty Ratio		%	2018 Estimated Income Data		%
86,322	29.8%	2		<0.5	47,570	6.9%	<$15,000	38,108	12.8%
41,576	14.4%	3		0.50-0.99	55,949	8.1%	$15,000-$24,999	35,859	12.1%
32,685	11.3%	4		1.00-1.24	30,928	4.5%	$25,000-$34,999	32,977	11.1%
12,530	4.3%	5		1.25-1.49	33,386	4.8%	$35,000-$49,999	42,347	14.2%
4,515	1.6%	6		1.50-1.84	48,458	7.0%	$50,000-$74,999	55,024	18.5%
2,348	0.8%	7		1.85-1.99**	20,259	2.9%	$75,000-$99,999	36,137	12.2%
37.80%	**Non-Family**			2.00+	452,768	65.7%	$100,000-$149,999	35,800	12.0%
92,507	32.0%	1	32.0%		**689,318**		$150,000-$199,999	10,867	3.7%
13,972	4.8%	2	34.7%				$200,000 or greater	10,089	3.4%
1,831	0.6%	3	15.0%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**297,208**	
652	0.2%	4	11.5%	Utility Gas	145,950	50.4%	**Median Income**	$49,673	
206	0.1%	5	4.4%	Bottled/Tank/LP Gas	12,997	4.5%	**Average Income**	$67,154	
123	0.0%	6	1.6%	Electricity	64,503	22.3%	**Per Capita Income**	$27,753	
112	0.0%	7	0.9%	Fuel Oil/Kerosene	48,144	16.6%	**UGI PNG Service Area 2012-2016 ACS**		
289,380				Coal	7,117	2.5%	**Households**	**Population Age:**	**%**
UGI PNG Service Area - 2012-2016 ACS				Wood	8,083	2.8%	76,697	With < 18	**45.1%**
Households	**Poverty (100% FPIG)**			Solar	125	0.0%	212,682	W/No < 18	54.9%
41,731	14.42%	Below Poverty Level		Other	1,645	0.6%	94,502	With Age 65+	**41.4%**
247,647	85.58%	At/Above Poverty		No Fuel Used	815	0.3%	194,877	W/No Age 65+	58.6%
289,378					**289,379**		**289,379**		

Appendix 1.B: EDC Service Territory Demographic Profiles

Appendix 1.B.1: **Duquesne Service Territory Demographic Profile**

Duquesne	**Households 2012-2016 ACS**		**Combined # in Household**	**Population 2012-2016 ACS**			**Household Income Range - Esri**		
55.80%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
130,220	27.5%	2		<0.5	68,666	6.5%	<$15,000	62,010	12.9%
63,804	13.5%	3		0.50-0.99	79,258	7.5%	$15,000-$24,999	53,857	11.2%
44,829	9.5%	4		1.00-1.24	43,392	4.1%	$25,000-$34,999	48,790	10.1%
17,122	3.6%	5		1.25-1.49	42,228	4.0%	$35,000-$49,999	63,058	13.1%
5,315	1.1%	6		1.50-1.84	61,396	5.8%	$50,000-$74,999	85,800	17.8%
2,644	0.6%	7		1.85-1.99**	26,686	2.5%	$75,000-$99,999	58,403	12.1%
44.20%	**Non-Family**			2.00+	730,750	69.4%	$100,000-$149,999	62,756	13.0%
172,945	36.6%	1	36.6%		**1,052,376**		$150,000-$199,999	23,719	4.9%
29,793	6.3%	2	33.8%				$200,000 or greater	24,143	5.0%
4,186	0.9%	3	14.4%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**482,536**	
1,366	0.3%	4	9.8%	Utility Gas	390,142	**82.5%**	**Median Income**	$52,773	
394	0.1%	5	3.7%	Bottled/Tank/LP Gas	5,673	1.2%	**Average Income**	$75,024	
128	0.0%	6	1.2%	Electricity	60,902	**12.9%**	**Per Capita Income**	$33,673	
59	0.0%	7	0.6%	Fuel Oil/Kerosene	9,870	2.1%	**Duquesne Service Area 2012-2016 ACS**		
472,806				Coal	316	0.1%	**Households**	**Population Age:**	**%**
Duquesne Service Area - 2012-2016 ACS				Wood	2,010	0.4%	112,377	With < 18	**31.2%**
Households	**Poverty (100% FPIG)**			Solar	36	0.0%	360,429	W/No < 18	68.8%
66,319	**14.03%**	Below Poverty Level		Other	2,203	0.5%	138,890	With Age 65+	**41.6%**
406,486	**85.97%**	At/Above Poverty		No Fuel Used	1,652	0.3%	333,915	W/No Age 65+	58.4%
472,805					**472,804**		**472,805**		

Appendix 1.B.2: **Met-Ed Service Territory Demographic Profile**

Met-Ed	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
69.70%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
157,779	31.3%	2		<0.5	65,671	5.0%	<$15,000	41,454	8.1%
82,714	16.4%	3		0.50-0.99	84,021	6.4%	$15,000-$24,999	44,425	8.6%
65,906	13.1%	4		1.00-1.24	50,976	3.9%	$25,000-$34,999	46,330	9.0%
28,192	5.6%	5		1.25-1.49	50,168	3.8%	$35,000-$49,999	65,555	12.8%
11,112	2.2%	6		1.50-1.84	76,218	5.8%	$50,000-$74,999	105,259	20.5%
5,978	1.2%	7		1.85-1.99**	34,515	2.6%	$75,000-$99,999	75,728	14.7%
30.30%	**Non-Family**			2.00+	950,693	72.4%	$100,000-$149,999	87,931	17.1%
124,202	24.6%	1	24.6%		**1,312,262**		$150,000-$199,999	23,238	4.5%
24,249	4.8%	2	36.1%				$200,000 or greater	24,143	4.7%
2,727	0.5%	3	16.9%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**514,063**	
1,255	0.2%	4	13.3%	Utility Gas	186,045	**36.9%**	**Median Income**	$62,473	
314	0.1%	5	5.6%	Bottled/Tank/LP Gas	36,307	7.2%	**Average Income**	$80,923	
167	0.0%	6	2.2%	Electricity	119,815	**23.7%**	**Per Capita Income**	$30,956	
74	0.0%	7	1.2%	Fuel Oil/Kerosene	130,035	25.8%	**Met-Ed Service Area 2012-2016 ACS**		
504,670				Coal	6,126	1.2%	**Households**	**Population Age:**	**%**
Duquesne Service Area - 2012-2016 ACS				Wood	19,526	3.9%	157,458	With < 18	**45.3%**
Households	**Poverty (100% FPIG)**			Solar	236	0.0%	347,211	W/No < 18	54.7%
52,556	10.41%	Below Poverty Level		Other	4,889	1.0%	150,558	With Age 65+	**42.5%**
452,113	89.59%	At/Above Poverty		No Fuel Used	1,689	0.3%	354,110	W/No Age 65+	57.5%
504,669					**504,668**		**504,668**		

Appendix 1.B.3: **PECO Electric/Gas Service Territory Demographic Profile**

PECO	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
62.80%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
380,161	26.2%	2		<0.5	262,641	6.9%	<$15,000	172,224	11.4%
220,307	15.2%	3		0.50-0.99	302,734	8.0%	$15,000-$24,999	131,420	8.7%
183,519	12.7%	4		1.00-1.24	146,755	3.9%	$25,000-$34,999	126,181	8.3%
81,357	5.6%	5		1.25-1.49	148,933	3.9%	$35,000-$49,999	170,172	11.2%
28,398	2.0%	6		1.50-1.84	203,076	5.3%	$50,000-$74,999	239,114	15.8%
16,724	1.2%	7		1.85-1.99	87,309	2.3%	$75,000-$99,999	178,274	11.8%
37.20%	**Non-Family**			2.00+	2,648,613	69.7%	$100,000-$149,999	240,367	15.9%
449,457	31.0%	1	31.0%		**3,800,061**		$150,000-$199,999	122,604	8.1%
73,919	5.1%	2	31.3%				$200,000 or greater	136,010	9.0%
10,826	0.7%	3	15.9%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**1,516,366**	
4,087	0.3%	4	12.9%	Utility Gas	854,361	58.9%	**Median Income**	$64,465	
1,236	0.1%	5	5.7%	Bottled/Tank/LP Gas	44,545	3.1%	**Average Income**	$94,559	
357	0.0%	6	2.0%	Electricity	313,847	21.6%	**Per Capita Income**	$36,515	
279	0.0%	7	1.2%	Fuel Oil/Kerosene	214,214	14.8%	**PECO Service Area 2012-2016 ACS**		
1,450,628				Coal	2,038	0.1%	**Households**	**Population Age:**	**%**
PECO Service Area - 2012-2016 ACS				Wood	8,461	0.6%	437,333	With < 18	**43.2%**
Households	**Poverty (100% FPIG)**			Solar	428	0.0%	1,013,294	W/No < 18	56.8%
205,429	14.16%	Below Poverty Level		Other	6,514	0.4%	399,725	With Age 65+	**38.0%**
1,245,198	85.84%	At/Above Poverty		No Fuel Used	6,218	0.4%	1,050,901	W/No Age 65+	62.0%
1,450,627					**1,450,626**		**1,450,626**		

Appendix 1.B.4: **Penelec Service Territory Demographic Profile**

Penelec	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
65.30%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
189,949	32.6%	2		<0.5	85,594	6.1%	<$15,000	74,921	12.7%
82,882	14.2%	3		0.50-0.99	124,857	8.9%	$15,000-$24,999	74,694	12.7%
64,392	11.0%	4		1.00-1.24	70,731	5.0%	$25,000-$34,999	68,316	11.6%
27,632	4.7%	5		1.25-1.49	75,459	5.4%	$35,000-$49,999	88,825	15.1%
9,627	1.7%	6		1.50-1.84	103,382	7.4%	$50,000-$74,999	115,741	19.7%
6,171	1.1%	7		1.85-1.99**	44,388	3.2%	$75,000-$99,999	70,989	12.1%
34.70%	**Non-Family**			2.00+	896,218	64.0%	$100,000-$149,999	64,699	11.0%
169,244	29.0%	1	29.0%		**1,400,629**		$150,000-$199,999	16,742	2.8%
27,439	4.7%	2	37.3%				$200,000 or greater	13,867	2.4%
3,589	0.6%	3	14.8%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**588,794**	
1,707	0.3%	4	11.3%	Utility Gas	278,187	47.7%	**Median Income**	$47,283	
402	0.1%	5	4.8%	Bottled/Tank/LP Gas	31,432	5.4%	**Average Income**	$62,173	
41	0.0%	6	1.7%	Electricity	77,576	13.3%	**Per Capita Income**	$25,492	
60	0.0%	7	1.1%	Fuel Oil/Kerosene	123,687	21.2%	**Penelec Service Area 2012-2016 ACS**		
583,136				Coal	17,676	3.0%	**Households**	**Population Age:**	**%**
Penelec Service Area - 2012-2016 ACS				Wood	45,125	7.7%	157,357	With < 18	**37.0%**
Households	**Poverty (100% FPIG)**			Solar	183	0.0%	425,778	W/No < 18	63.0%
84,510	14.49%	Below Poverty Level		Other	7,307	1.3%	189,674	With Age 65+	**48.2%**
498,625	85.51%	At/Above Poverty		No Fuel Used	1,962	0.3%	393,461	W/No Age 65+	51.8%
583,135					**583,135**		**583,135**		

Appendix 1.B.5: **Penn Power Service Territory Demographic Profile**

Penn Power	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
67.90%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
53,346	32.2%	2		<0.5	16,765	4.2%	<$15,000	14,792	8.8%
25,169	15.2%	3		0.50-0.99	22,868	5.7%	$15,000-$24,999	16,363	9.7%
21,766	13.1%	4		1.00-1.24	13,609	3.4%	$25,000-$34,999	16,056	9.5%
8,393	5.1%	5		1.25-1.49	14,548	3.6%	$35,000-$49,999	21,641	12.8%
2,508	1.5%	6		1.50-1.84	24,178	6.0%	$50,000-$74,999	30,391	18.0%
1,384	0.8%	7		1.85-1.99**	9,002	2.2%	$75,000-$99,999	21,059	12.5%
32.10%	**Non-Family**			2.00+	301,663	74.9%	$100,000-$149,999	25,209	15.0%
46,118	27.8%	1	27.8%		**402,633**		$150,000-$199,999	10,968	6.5%
6,408	3.9%	2	36.0%				$200,000 or greater	12,015	7.1%
557	0.3%	3	15.5%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**168,494**	
185	0.1%	4	13.2%	Utility Gas	111,763	67.4%	**Median Income**	$60,283	
17	0.0%	5	5.1%	Bottled/Tank/LP Gas	3,826	2.3%	**Average Income**	$86,487	
7	0.0%	6	1.5%	Electricity	29,869	18.0%	**Per Capita Income**	$35,231	
5	0.0%	7	0.8%	Fuel Oil/Kerosene	13,707	8.3%	**Penn Power Service Area 2012-2016 ACS**		
165,864				Coal	468	0.3%	**Households**	**Population Age:**	**%**
Penn Power Service Area - 2012-2016 ACS				Wood	4,793	2.9%	48,123	With < 18	**40.9%**
Households	**Poverty (100% FPIG)**			Solar	17	0.0%	117,738	W/No < 18	59.1%
16,911	10.20%	Below Poverty Level		Other	1,107	0.7%	52,743	With Age 65+	**46.6%**
148,951	89.80%	At/Above Poverty		No Fuel Used	311	0.2%	113,119	W/No Age 65+	53.4%
165,862					**165,861**		**165,862**		

Appendix 1.B.6: **PPL Service Territory Demographic Profile**

PPL	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
66.20%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
367,396	30.8%	2		<0.5	159,904	5.4%	<$15,000	119,336	9.7%
177,668	14.9%	3		0.50-0.99	203,496	6.8%	$15,000-$24,999	120,434	9.8%
145,656	12.2%	4		1.00-1.24	121,023	4.1%	$25,000-$34,999	119,585	9.7%
61,298	5.1%	5		1.25-1.49	135,725	4.6%	$35,000-$49,999	168,890	13.7%
22,724	1.9%	6		1.50-1.84	196,254	6.6%	$50,000-$74,999	241,492	19.6%
14,926	1.3%	7		1.85-1.99**	80,290	2.7%	$75,000-$99,999	166,732	13.5%
33.80%	**Non-Family**			2.00+	2,083,847	69.9%	$100,000-$149,999	180,535	14.6%
334,490	28.1%	1	28.1%		**2,980,539**		$150,000-$199,999	63,086	5.1%
58,059	4.9%	2	35.7%				$200,000 or greater	52,366	4.2%
6,597	0.6%	3	15.5%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**1,232,456**	
2,614	0.2%	4	12.4%	Utility Gas	381,987	32.0%	**Median Income**	$56,876	
639	0.1%	5	5.2%	Bottled/Tank/LP Gas	61,365	5.1%	**Average Income**	$76,148	
151	0.0%	6	1.9%	Electricity	365,875	30.7%	**Per Capita Income**	$30,256	
230	0.0%	7	1.3%	Fuel Oil/Kerosene	295,170	24.8%	**PPL Service Area 2012-2016 ACS**		
1,192,449				Coal	34,414	2.9%	**Households**	**Population Age:**	**%**
PPL Service Area - 2012-2016 ACS				Wood	40,210	3.4%	347,645	With < 18	**41.2%**
Households	**Poverty (100% FPIG)**			Solar	620	0.1%	844,801	W/No < 18	58.8%
136,351	11.43%	Below Poverty Level		Other	9,044	0.8%	367,166	With Age 65+	**44.5%**
1,056,095	88.57%	At/Above Poverty		No Fuel Used	3,760	0.3%	825,280	W/No Age 65+	55.5%
1,192,446					**1,192,445**		**1,192,446**		

Appendix 1.B.7: **West Penn Service Territory Demographic Profile**

West Penn	Households 2012-2016 ACS		Combined # in Household	Population 2012-2016 ACS			Household Income Range - Esri		
65.20%	**Family**	**# in Household**		**Income to Poverty Ratio**		**%**	**2018 Estimated Income Data**		**%**
193,278	32.7%	2		<0.5	78,883	5.6%	<$15,000	64,792	10.7%
85,766	14.5%	3		0.50-0.99	92,617	6.5%	$15,000-$24,999	64,386	10.6%
68,845	11.6%	4		1.00-1.24	51,552	3.6%	$25,000-$34,999	59,747	9.9%
25,594	4.3%	5		1.25-1.49	56,807	4.0%	$35,000-$49,999	82,636	13.6%
8,726	1.5%	6		1.50-1.84	84,419	6.0%	$50,000-$74,999	115,379	19.0%
3,450	0.6%	7		1.85-1.99**	35,452	2.5%	$75,000-$99,999	78,147	12.9%
34.80%	**Non-Family**			2.00+	1,018,280	71.8%	$100,000-$149,999	85,125	14.1%
170,696	28.9%	1	28.9%		**1,418,010**		$150,000-$199,999	30,726	5.1%
27,325	4.6%	2	37.3%				$200,000 or greater	24,889	4.1%
4,387	0.7%	3	15.2%	**Household Fuel Type**	**2011-2015 ACS**	**%**		**605,827**	
2,328	0.4%	4	12.0%	Utility Gas	335,838	56.8%	**Median Income**	$54,946	
646	0.1%	5	4.4%	Bottled/Tank/LP Gas	17,561	3.0%	**Average Income**	$74,259	
107	0.0%	6	1.5%	Electricity	125,957	21.3%	**Per Capita Income**	$30,709	
91	0.0%	7	0.6%	Fuel Oil/Kerosene	78,979	13.4%	**West Penn Service Area 2012-2016 ACS**		
591,240				Coal	4,088	0.7%	**Households**	**Population Age:**	**%**
West Penn Service Area - 2012-2016 ACS				Wood	22,863	3.9%	156,215	With < 18	**35.9%**
Households	**Poverty (100% FPIG)**			Solar	86	0.0%	435,024	W/No < 18	64.1%
70,708	11.96%	Below Poverty Level		Other	4,308	0.7%	190,465	With Age 65+	**47.5%**
520,531	88.04%	At/Above Poverty		No Fuel Used	1,560	0.3%	400,775	W/No Age 65+	52.5%
591,239					**591,240**		**591,240**		

Appendix 2 –Energy Burdens for Gas and Electric Service

Appendix 2.A: Non-CAP Residential NGDC and EDC Average Energy Burdens

The average energy burdens of gas and electric non-CAP customers are shown as a percentage, to include heat type and FPIG levels for the period from 2012 through 2016.

Appendix 2.A.1: **NGDC Non-CAP Residential Heating Average Energy Burdens**

NGDC Non-CAP Residential Heating Accounts Average Energy Burdens (%)					
Total by Year	**2012**	**2013**	**2014**	**2015**	**2016**
	**	**	**	**	**
GAS Industry Average	1.86	2.07	2.29	2.06	1.75
Columbia	1.47	1.81	2.14	2.03	1.89
NFG	1.49	1.62	1.78	1.41	1.18
PECO Gas	3.58	3.73	3.85	3.71	3.37
Peoples	1.53	1.81	2.16	1.89	1.47
Peoples EQT	1.61	1.76	2.03	1.75	1.33
PGW	2.67	2.90	3.08	2.70	2.36
UGI Gas	1.18	1.30	1.42	1.26	0.99
UGI PNG	2.09	2.32	2.53	2.34	1.76

Appendix 2.A.2: **EDC Non-CAP Residential Average Energy Burdens**

EDC Non-CAP Residential Heating and Non-Heating Average Energy Burden (%)										
Total by Year	**2012**		**2013**		**2014**		**2015**		**2016**	
	Heat	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**
	*	*	**	**	**	**	**	**	**	**
Electric Industry			3.02	2.02	3.23	2.06	3.33	2.24	3.21	2.27
Duquesne			2.17	1.43	2.17	1.47	2.60	1.78	2.42	1.83
Met-Ed			2.50	2.12	3.05	2.07	2.99	2.16	2.83	2.11
PECO			3.73	1.95	3.85	1.95	3.71	1.99	3.37	1.97
Penelec			2.70	2.29	3.35	2.35	3.35	2.46	3.31	2.5
Penn			2.34	1.8	3.12	1.9	3.32	2.15	3.57	2.28
PPL			2.42	2.42	2.55	2.55	2.91	2.91	2.92	2.92
West Penn			2.11	1.72	2.80	1.82	2.91	2.01	3.02	2.14

*No data available for the year.

**Median Annual Income for Residential cases is from the ESRI (Environmental Systems Research Institute) system and does not distinguish between heat and non-heat accounts and is an average from 2012-2016. Since the Number of Bills Issued and Billings are available for heating and non-heating accounts for all of the years, the total Median Annual Income is used as the base for calculating Energy Burden by heating status and year.

Appendix 2.B: CAP Industry Average NGDC and EDC Energy Burdens

The industry average energy burdens of gas and electric CAP customers are shown as a percentage, to include heating type and FPIG levels for the period from 2012 through 2016.

Appendix 2.B.1: **NGDC CAP Heating Average Energy Burdens**

NGDC CAP Heating Average Energy Burdens (%)					
Total by Year	**2012**	**2013**	**2014**	**2015**	**2016**
Gas Industry Average	7.93	7.89	7.57	7.00	6.93
Columbia	5.09	5.13	5.16	5.04	4.78
NFG	5.57	6.05	6.57	5.20	4.14
PECO Gas	12.37	12.30	12.31	11.20	9.36
Peoples	6.98	6.34	6.41	6.94	6.22
Peoples EQT	8.16	7.21	6.13	4.38	6.74
PGW	8.06	8.08	8.50	8.60	8.45
UGI Gas	7.02	6.81	6.07	5.99	5.04
UGI PNG	7.78	7.76	7.11	7.20	6.03

Appendix 2.B.2: **EDC CAP Heating and Non-Heating Average Energy Burdens**

EDC CAP Heating and Non-Heating Average Energy Burdens (%)										
Total by Year	**2012**		**2013**		**2014**		**2015**		**2016**	
	Heat	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**	**Heat**	**Non Heat**
Electric Industry	8.38	5.39	8.18	5.18	9.02	5.5	9.75	5.89	8.87	6.04
Duquesne	11.15	7.52	11.12	6.95	7.29	4.79	14.48	7.27	12.68	9.06
Met-Ed	3.47	2.92	3.73	2.37	8.85	4.95	8.78	5.19	5.62	5.88
PECO	14.43	6.47	14.34	6.51	14.36	6.65	13.07	6.45	11.38	6.39
Penelec	3.88	3.02	3.86	2.40	7.62	3.92	7.30	4.03	8.04	3.75
Penn	11.98	6.65	9.62	5.29	8.84	6.73	8.56	4.14	9.57	4.03
PPL	6.70	6.52	6.44	6.23	6.74	6.46	6.81	6.54	7.18	6.90
West Penn	10.65	7.01	9.77	6.34	10.58	6.72	10.82	6.76	9.27	5.18

Appendix 2.C: Tables 3-3 to 3-5 NGDC CAP Energy Burdens

The average energy burdens of gas CAP heating customers are shown as a percentage by FPIG level for the period from 2012 through 2016.

Appendix 2.C.1: **NGDC CAP Energy Burdens for Heating Customers by FPIG Level**

2012 NGDC CAP Energy Burdens for Heating Customers by FPIG Level (%)			
FPIG Level	**50%**	**100%**	**150%**
Gas Industry Average	8.60	8.07	6.92
Columbia	10.42	5.54	3.27
PECO Gas	21.43	11.65	9.51
Peoples	8.03	7.29	5.64
Peoples EQT	9.45	9.63	8.75
PGW	5.82	8.64	10.38
UGI Gas	9.81	8.35	8.15
UGI PNG	11.43	8.55	8.35

Appendix 2.C.2: **NGDC CAP Energy Burdens by FPIG Levels**

2013 NGDC CAP Energy Burdens for Heating Customers by FPIG Levels (%)			
FPIG Level	**50%**	**100%**	**150%**
Gas Industry Average	8.55	7.90	6.90
Columbia	10.73	5.69	3.27
PECO Gas	20.76	11.72	9.46
Peoples	7.21	6.73	5.15
Peoples EQT	9.31	9.25	7.60
PGW	6.07	8.73	10.35
UGI Gas	9.33	7.77	7.69
UGI PNG	9.95	7.90	8.05

Appendix 2.C.3: **NGDC CAP Energy Burdens by FPIG Levels**

2014 NGDC CAP Energy Burdens for Heating Customers by FPIG Levels (%)			
FPIG Level	**50%**	**100%**	**150%**
Gas Industry Average	8.64	7.51	6.21
Columbia	10.55	5.70	3.35
PECO Gas	21.81	11.77	9.37
Peoples	7.27	6.75	5.26
Peoples EQT	8.01	7.33	6.54
PGW	6.60	9.02	10.52
UGI Gas	9.51	6.70	5.09
UGI PNG	9.99	7.98	5.81

Appendix 2.C.4: **NGDC CAP Energy Burdens by FPIG Levels**

2015 NGDC CAP Energy Burdens for Heating Customers by FPIG Levels (%)			
FPIG Level	**50%**	**100%**	**150%**
Gas Industry Average	8.26	6.98	5.74
Columbia	10.36	5.55	3.27
PECO Gas	19.95	10.68	8.64
Peoples	8.28	7.31	5.61
Peoples EQT	5.29	5.13	4.52
PGW	7.20	9.21	10.58
UGI Gas	9.17	6.54	4.82
UGI PNG	9.89	7.32	5.99

Appendix 2.C.5: **NGDC CAP Energy Burdens by FPIG Levels**

2016 NGDC CAP Energy Burdens for Heating Customers by FPIG Levels (%)			
FPIG Level	**50%**	**100%**	**150%**
Gas Industry Average	8.87	7.08	5.44
Columbia	10.37	5.27	3.06
PECO Gas	17.17	9.05	7.23
Peoples	8.18	6.62	4.76
Peoples EQT	8.63	7.58	5.70
PGW	7.82	9.22	10.48
UGI Gas	7.39	5.65	4.07
UGI PNG	7.50	6.43	5.10

Appendix 2.D: Tables 3-6 to 3-11 EDC CAP Energy Burdens

The average energy burdens of electric CAP heating and non-heating customers are shown as a percentage by FPIG level for the period from 2012 through 2016.

Appendix 2.D.1: **EDC CAP Energy Burdens by FPIG Level**

2012 EDC CAP Energy Burdens by FPIG Level (%)						
	Heat			Non Heat		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Electric Industry Average	17.67	7.93	6.27	11.39	5.33	3.93
Duquesne	25.90	11.00	7.29	15.36	7.81	4.95
Met-Ed	4.80	3.42	3.25	5.16	2.75	2.41
PECO Electric	24.39	13.99	10.99	11.64	6.81	5.04
Penelec	10.62	3.35	3.37	8.76	2.86	2.18
Penn Power	41.75	11.01	7.97	22.38	6.28	4.14
PPL	13.96	7.07	4.26	13.57	6.75	4.20
West Penn	30.51	10.37	7.84	19.85	6.59	5.33

Appendix 2.D.2: **EDC CAP Energy Burdens by FPIG Level**

2013 EDC CAP Energy Burdens by FPIG Level (%)						
	Heat			Non Heat		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Electric Industry Average	16.3	7.93	6.07	10.5	4.64	4.06
Duquesne	24.87	11.27	7.17	14.67	7.14	4.54
Met-Ed	5.48	3.85	3.19	4.14	2.28	1.88
PECO Electric	23.61	14.09	10.92	12.08	6.86	5.01
Penelec	9.13	3.52	3.17	5.81	2.18	1.82
Penn Power	31.29	8.94	6.36	16.20	3.13	5.46
PPL	13.36	6.80	4.10	12.70	6.49	4.02
West Penn	20.27	9.97	7.31	12.47	6.28	5.10

Appendix 2.D.3: **EDC CAP Energy Burdens by FPIG Level**

2014 EDC CAP Energy Burdens by FPIG Level (%)						
	Heat			Non Heat		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Electric Industry Average	17.79	8.9	6.53	11.49	5.31	4.07
Duquesne	14.08	7.78	4.80	9.92	4.89	3.18
Met-Ed	11.92	9.06	7.68	9.34	4.75	3.68
PECO Electric	24.80	14.14	10.81	12.95	6.94	5.04
Penelec	17.61	6.73	6.51	10.04	3.48	2.89
Penn Power	23.15	7.58	7.22	9.95	3.37	2.84
PPL	14.06	7.11	4.29	13.18	6.75	4.16
West Penn	24.28	10.45	8.03	13.15	6.72	5.33

Appendix 2.D.4: **EDC CAP Energy Burdens by FPIG Level**

2015 EDC CAP Energy Burdens by FPIG Level (%)						
	Heat			Non Heat		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Electric Industry Average	21.61	9.38	6.98	13.05	5.6	4.41
Duquesne	40.36	13.41	9.99	16.52	6.88	5.68
Met-Ed	12.27	8.80	7.58	9.97	4.90	3.84
PECO Electric	22.71	12.84	9.98	13.11	6.86	4.76
Penelec	16.64	6.42	6.19	10.72	3.59	2.91
Penn Power	24.51	7.47	6.79	11.63	3.61	2.99
PPL	14.09	7.18	4.35	13.32	6.86	4.21
West Penn	28.33	10.12	8.02	14.65	6.53	5.26

Appendix 2.D.5: **EDC CAP Energy Burdens by FPIG Level**

2016 EDC CAP Energy Burdens by FPIG Level (%)						
	Heat			Non Heat		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Electric Industry Average	20.37	8.47	6.25	14.23	5.72	4.37
Duquesne	36.00	11.91	8.53	22.41	8.47	6.67
Met-Ed	12.52	5.16	4.42	15.43	4.11	5.98
PECO Electric	20.13	11.38	8.47	11.50	7.12	4.72
Penelec	18.44	7.18	6.68	10.28	3.29	2.76
Penn Power	23.69	8.62	7.61	12.46	3.57	2.75
PPL	14.82	7.55	4.58	14.08	7.23	4.43
West Penn	27.23	8.24	7.16	17.19	4.74	3.54

Appendix 3 – Impact of LIHEAP Grants on Energy Burden Levels

Appendix 3.A: Tables 4-1 to 4-9 Impact of LIHEAP Grants on Energy Burdens for CAP Customers

The impact of LIHEAP on energy burdens is shown for gas and electric heating and non-heating LIHEAP recipients for all FPIG levels using the average dollar amount of LIHEAP grants applied and the average CAP bill. The utilities that did not provide all three of the data points (LIHEAP Recipient CAP Bill, LIHEAP Dollars and LIHEAP Recipient CAP Income) necessary for this analysis by heat type or poverty level are excluded. Some utilities provided estimates for some data points.

Appendix 3.A.1: **NGDC Energy Burden of CAP LIHEAP Recipients at 0-50% FPIG**

NGDC Energy Burden of CAP LIHEAP Recipients at 0-50% FPIG										
	Without LIHEAP Dollars Applied					With LIHEAP Dollars Applied				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Columbia	15.54	17.79	19.88	17.66	13.95	9.77	14.43	16.08	13.79	7.82
Peoples	21.36	26.00	25.03	26.41	12.39	13.85	19.13	18.34	19.46	7.82
Peoples EQT	13.20	16.77	16.79	12.49	11.45	7.07	12.47	12.70	8.43	7.17
PGW	16.37	17.93	20.13	18.97	18.24	11.25	12.76	14.76	13.30	12.69

Appendix 3.A.2: **NGDC Energy Burden of CAP LIHEAP Recipients at 51-100% FPIG**

NGDC Energy Burden of CAP LIHEAP Recipients at 51-100% FPIG										
	Without LIHEAP Dollars Applied					With LIHEAP Dollars Applied				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Columbia	7.73	8.72	9.67	8.72	6.87	5.32	7.48	8.24	7.25	4.45
Peoples	13.98	16.42	14.61	18.57	8.92	10.26	13.48	11.43	16.57	5.68
Peoples EQT	9.06	10.92	11.43	8.40	7.66	5.75	8.75	9.30	6.25	4.91
PGW	13.05	13.99	15.19	14.20	13.26	9.91	10.92	12.24	11.00	9.96

Appendix 3.A.3: **NGDC Energy Burden of CAP LIHEAP Recipients at 101-150% FPIG**

NGDC Energy Burden of CAP LIHEAP Recipients at 101-150% FPIG										
	Without LIHEAP Dollars Applied					With LIHEAP Dollars Applied				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Columbia	4.68	5.22	5.66	5.33	4.19	3.36	4.58	4.89	4.56	2.85
Peoples	11.97	15.45	10.32	13.81	5.90	9.78	13.68	7.99	12.91	4.06
Peoples EQT	8.76	7.66	7.96	5.96	5.33	6.81	6.43	6.69	4.67	3.58
PGW	10.61	11.34	12.32	11.67	11.17	8.53	9.44	10.53	9.66	8.85

Appendix 3.A.4: **NGDC CAP LIHEAP Recipients at 0-50% FPIG**

NGDC CAP LIHEAP Recipients at 0-50% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Columbia	$1,132.63	$1,273.17	$1,154.95	$876.05	$214.25	$242.62	$253.15	$385.43
Peoples	$1,264.90	$1,422.06	$1,111.98	$1,025.44	$323.66	$345.90	$362.16	$383.22
Peoples EQT	$1,596.00	$1,540.08	$1,618.72	$1,018.48	$422.25	$412.31	$425.61	$375.31
PGW	$1,634.64	$1,741.74	$1,548.10	$1,418.20	$471.12	$465.16	$462.78	$430.77

Appendix 3.A.5: **NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG**

NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG				
	2013	2014	2015	2016
Columbia	$6,370	$6,405	$6,539	$6,280
Peoples	$7,544	$8,471	$8,902	$8,955
Peoples EQT	$6,138	$6,152	$6,131	$8,219
PGW	$9,120	$8,652	$8,160	$7,776

Appendix 3.A.6: **NGDC CAP LIHEAP Recipients at 51-100% FPIG**

NGDC CAP LIHEAP Recipients at 51-100% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Columbia	$1,119.30	$1,279.16	$1,154.26	$896.09	$159.21	$189.26	$195.34	$316.25
Peoples	$1,265.87	$1,390.92	$1,060.26	$981.24	$251.13	$259.34	$271.00	$351.70
Peoples EQT	$1,617.66	$1,565.75	$1,979.98	$1,009.70	$289.50	$340.64	$213.45	$367.37
PGW	$1,587.60	$1,697.41	$1,527.55	$1,398.60	$347.75	$328.54	$343.85	$347.88

Appendix 3.A.7: **NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG**

NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG				
	2013	2014	2015	2016
Columbia	$12,831	$13,229	$13,233	$13,046
Peoples	$11,595	$12,168	$12,622	$12,808
Peoples EQT	$9,854	$10,716	$10,664	$11,328
PGW	$11,352	$11,172	$10,764	$10,548

Appendix 3.A.8: **NGDC CAP LIHEAP Recipients at 101-150% FPIG**

NGDC CAP LIHEAP Recipients at 101-150% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Columbia	$1,104.06	$1,222.55	$1,117.46	$883.47	$136.28	$166.96	$162.08	$282.96
Peoples	$1,303.82	$1,390.92	$1,051.64	$954.72	$209.01	$221.78	$227.28	$313.89
Peoples EQT	$2,158.02	$1,632.71	$2,220.11	$992.58	$247.98	$368.72	$145.31	$309.56
PGW	$1,724.31	$1,880.45	$1,738.53	$1,649.20	$288.36	$272.92	$298.92	$342.69

Appendix 3.A.9: **NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 101-150% FPIG**

NGDC CAP LIHEAP Recipients – Average Annual CAP Income at 101-150% FPIG				
	2013	**2014**	**2015**	**2016**
Columbia	$21,134	$21,589	$20,943	$21,086
Peoples	$17,031	$17,471	$17,656	$17,909
Peoples EQT	$13,964	$15,822	$16,077	$16,819
PGW	$15,204	$15,264	$14,904	$14,760

Appendix 3.A.10: **EDC Non-Heating Energy Burden of CAP LIHEAP Recipients at 0-50% FPIG**

EDC Non-Heating Energy Burden of CAP LIHEAP Recipients at 0-50% FPIG								
	Without LIHEAP Dollars Applied				**With LIHEAP Dollars Applied**			
	2013	**2014**	**2015**	**2016**	**2013**	**2014**	**2015**	**2016**
Duquesne	33.21	33.21	29.83	37.18	22.64	22.64	21.17	24.91
Met-Ed	9.44	16.78	16.59	16.98	3.96	11.78	11.59	12.32
PECO Electric	11.92	12.17	12.12	11.29	1.29	2.49	2.78	3.58
Penelec	10.10	22.49	20.22	19.84	4.14	15.30	13.91	14.14
Penn Power	7.92	19.02	20.17	20.21	2.88	12.74	13.71	13.78
PPL	19.78	19.91	19.24	16.74	15.03	15.46	14.13	12.27
West Penn	10.12	23.80	22.08	23.20	3.04	16.49	15.93	17.76

Appendix 3.A.11: **EDC Non-Heating Energy Burden of CAP LIHEAP Recipients at 51-100% FPIG**

EDC Non-Heating Energy Burden of CAP LIHEAP Recipients at 51-100% FPIG								
	Without LIHEAP Dollars Applied				**With LIHEAP Dollars Applied**			
	2013	**2014**	**2015**	**2016**	**2013**	**2014**	**2015**	**2016**
Duquesne	12.83	12.83	12.35	13.33	9.33	9.33	9.48	9.45
Met-Ed	5.73	8.31	8.10	8.35	3.44	6.09	5.70	6.11
PECO Electric	6.66	6.57	6.50	6.69	3.34	3.61	3.61	3.77
Penelec	6.69	13.10	10.69	10.37	3.87	10.90	8.41	8.14
Penn Power	6.37	10.81	10.61	11.63	3.93	8.73	8.36	8.97
PPL	11.33	11.26	12.68	10.06	8.85	8.94	9.97	7.73
West Penn	4.81	10.33	10.59	10.80	2.27	8.09	8.39	8.75

Appendix 3.A.12: **EDC Non-Heating Energy Burden of CAP LIHEAP Recipients at 101-150% FPIG**

EDC Energy Burden of Non-Heating CAP LIHEAP Recipients at 101-150% FPIG								
	Without LIHEAP Dollars Applied				With LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne	7.60	7.60	7.18	8.05	5.44	5.44	5.62	5.57
Met-Ed	4.05	5.90	5.42	5.69	2.57	4.43	4.02	4.31
PECO Electric	3.86	3.85	3.70	3.73	2.36	2.57	2.39	2.26
Penelec	4.52	8.19	6.67	6.36	3.11	6.93	5.48	5.14
Penn Power	4.17	7.46	6.91	7.26	2.97	6.23	5.72	5.88
PPL	6.64	8.02	8.76	6.83	5.04	6.54	7.09	5.38
West Penn	3.14	7.07	6.48	6.64	1.51	5.65	5.26	5.33

Appendix 3.A.13: **EDC CAP Non-Heating LIHEAP Recipients 0-50% FPIG**

EDC CAP Non-Heating LIHEAP Recipients 0-50% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$1,181.	$1,181.46	$1,148.98	$1,213.94	$375.87	$375.87	$333.50	$400.55
Met-Ed	$825.1	$1,155.83	$1,139.06	$1,185.08	$478.84	$344.77	$343.20	$325.05
PECO Electric*	$644.1	$644.14	$644.14	$644.14	$574.30	$512.27	$496.46	$439.97
Penelec	$839.7	$1,495.78	$1,393.98	$1,362.06	$495.19	$477.84	$435.39	$391.23
Penn Power	$708.9	$1,378.63	$1,310.04	$1,427.53	$451.36	$455.29	$419.71	$454.63
PPL	$1,479.	$1,540.08	$1,450.80	$1,260.00	$355.42	$344.38	$385.41	$336.36
West Penn	$637.8	$1,324.60	$1,498.97	$1,695.72	$446.17	$406.93	$417.64	$397.55

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.14: **EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG**

EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG				
	2013	2014	2015	2016
Duquesne*	$3,558	$3,558	$3,852	$3,265
Met-Ed	$8,739	$6,888	$6,865	$6,979
PECO Electric	$5,406	$5,291	$5,316	$5,704
Penelec	$8,317	$6,652	$6,893	$6,864
Penn Power	$8,951	$7,250	$6,495	$7,062
PPL	$7,480	$7,736	$7,541	$7,528
West Penn	$6,301	$5,565	$6,790	$7,308

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 3.A.15: **EDC Non-Heating LIHEAP Recipients at 51-100% FPIG**

EDC Non-Heating LIHEAP Recipients at 51-100% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$1,115.70	$1,115.70	$1,099.20	$1,132.05	$303.83	$303.83	$255.24	$329.69
Met-Ed	$802.10	$1,184.95	$1,127.88	$1,191.84	$319.81	$317.32	$335.02	$320.00
PECO	$713.25	$713.25	$713.25	$713.25	$354.84	$321.17	$316.82	$311.79
Penelec	$838.74	$1,768.78	$1,434.86	$1,425.90	$353.50	$296.83	$305.93	$306.36
Penn Power	$851.84	$1,384.68	$1,379.76	$1,478.62	$325.82	$265.59	$292.87	$338.39
PPL	$1,628.40	$1,671.84	$1,798.80	$1,452.00	$355.38	$344.56	$385.37	$336.26
West Penn	$650.79	$1,438.90	$1,480.49	$1,499.30	$343.40	$311.63	$307.39	$283.82

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.16: **EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG**

EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG				
	2013	2014	2015	2016
Duquesne*	$8,699	$8,699	$8,904	$8,494
Met-Ed	$14,010	$14,252	$13,921	$14,269
PECO Electric	$10,716	$10,854	$10,978	$10,656
Penelec	$12,539	$13,503	$13,427	$13,748
Penn Power	$13,379	$12,813	$13,000	$12,715
PPL	$14,378	$14,851	$14,182	$14,431
West Penn	$13,541	$13,934	$13,981	$13,885

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 3.A.17: **EDC Non-Heating LIHEAP Recipients at 101-150% FPIG**

EDC Non-Heating LIHEAP Recipients at 101-150% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$990.00	$990.00	$955.95	$1,023.90	$282.02	$282.02	$207.24	$315.07
Met-Ed	$835.77	$1,301.95	$1,218.23	$1,296.49	$306.11	$325.90	$314.50	$313.97
PECO Electric*	$819.96	$819.96	$819.96	$819.96	$318.68	$272.88	$290.81	$323.44
Penelec	$924.98	$1,675.31	$1,488.76	$1,419.60	$289.60	$257.81	$264.10	$271.73
Penn Power	$852.20	$1,502.40	$1,470.84	$1,461.20	$244.86	$247.79	$254.62	$278.29
PPL	$1,474.2	$1,867.32	$2,015.64	$1,576.08	$355.29	$344.57	$385.27	$336.15
West Penn	$708.57	$1,503.00	$1,526.91	$1,514.26	$367.30	$301.21	$286.46	$297.32

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.18: **EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 101-150% FPIG**

EDC Non-Heating LIHEAP Recipients – Average Annual CAP Income at 101-150% FPIG				
	2013	2014	2015	2016
Duquesne*	$13,021	$13,021	$13,319	$12,722
Met-Ed	$20,629	$22,054	$22,480	$22,773
PECO Electric	$21,238	$21,273	$22,167	$22,011
Penelec	$20,463	$20,457	$22,332	$22,319
Penn Power	$20,427	$20,139	$21,275	$20,132
PPL	$22,209	$23,281	$23,005	$23,061
West Penn	$22,557	$21,259	$23,581	$22,814

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 3.A.19: **EDC Heating Energy Burden of CAP LIHEAP Recipients at 0-50% FPIG**

EDC Energy Burden of Heating CAP LIHEAP Recipients at 0-50% FPIG								
	Without LIHEAP Dollars Applied				With LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne	51.40	51.40	52.59	46.43	35.44	35.44	36.64	30.47
Met-Ed	10.08	24.95	21.45	21.98	4.90	20.62	16.80	17.66
PECO Electric	19.02	19.70	18.93	19.27	6.70	8.66	8.55	10.22
Penelec	10.85	25.96	22.69	23.46	3.72	17.79	15.33	16.03
Penn Power	9.81	27.79	25.49	24.24	3.10	20.12	19.21	18.79
PPL	35.55	39.66	44.07	30.54	30.27	34.55	38.41	25.72
West Penn	12.41	40.51	23.92	24.59	3.05	27.71	17.09	18.66

Appendix 3.A.20: **EDC Heating Energy Burden of CAP LIHEAP Recipients at 51-100% FPIG**

EDC Energy Burden of Heating CAP LIHEAP Recipients at 51-100% FPIG								
	Without LIHEAP Dollars Applied				With LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne	14.35	14.35	15.31	13.46	10.68	10.68	11.96	9.58
Met-Ed	6.20	13.73	12.67	12.72	3.67	11.11	10.04	10.19
PECO Electric	10.19	9.90	9.60	9.22	7.11	7.13	6.59	6.27
Penelec	6.87	17.87	13.86	13.78	3.56	14.73	10.47	10.36
Penn Power	7.79	17.62	16.79	18.48	4.88	14.76	13.85	15.16
PPL	22.37	19.56	22.36	14.04	19.61	16.94	19.28	11.42
West Penn	5.96	15.74	14.35	14.93	3.19	13.23	11.48	12.08

Appendix 3.A.21: **EDC Heating Energy Burden of CAP LIHEAP Recipients at 101-150% FPIG**

EDC Energy Burden of Heating CAP LIHEAP Recipients at 101-150% FPIG								
	Without LIHEAP Dollars Applied				With LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne	8.39	8.39	8.91	7.93	6.20	6.20	7.14	5.54
Met-Ed	4.41	9.61	7.77	8.37	3.17	8.14	6.20	6.94
PECO Electric	7.59	7.48	7.07	6.61	6.13	6.25	5.58	4.95
Penelec	4.63	12.17	10.76	10.11	3.31	10.96	9.33	8.34
Penn Power	5.20	12.12	11.31	12.45	3.91	10.85	9.88	10.71
PPL	12.05	14.27	14.15	9.00	10.35	12.63	12.25	7.37
West Penn	3.90	10.49	9.45	9.97	2.56	9.20	8.20	8.41

Appendix 3.A.22: **EDC Heating LIHEAP Recipients at 0-50% FPIG**

EDC Heating LIHEAP Recipients at 0-50% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$1,559.0	$1,559.0	$1,547.7	$1,449.4	$484.13	$484.13	$469.48	$498.30
Met-Ed	$864.24	$1,732.2	$1,563.2	$1,627.7	$444.26	$300.76	$338.39	$319.87
PECO	$958.37	$958.37	$958.37	$958.37	$620.71	$536.93	$525.46	$450.02
Penelec	$813.82	$1,850.2	$1,685.9	$1,710.3	$534.59	$582.06	$546.76	$541.93
Penn Power	$791.10	$2,038.9	$1,960.7	$2,061.6	$541.34	$562.34	$483.55	$463.76
PPL	$2,394.0	$2,674.5	$3,001.3	$2,131.2	$355.25	$344.37	$385.22	$336.15
West Penn	$722.79	$1,944.8	$1,782.5	$1,913.3	$545.16	$614.49	$508.92	$461.69

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.23: **EDC Heating LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG**

EDC Heating LIHEAP Recipients – Average Annual CAP Income at 0-50% FPIG				
	2013	2014	2015	2016
Duquesne*	$3,033	$3,033	$2,943	$3,122
Met-Ed	$8,570	$6,942	$7,289	$7,404
PECO Electric	$5,040	$4,866	$5,063	$4,973
Penelec	$7,504	$7,127	$7,429	$7,291
Penn Power	$8,061	$7,337	$7,691	$8,506
PPL	$6,735	$6,744	$6,811	$6,978
West Penn	$5,826	$4,801	$7,451	$7,781

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 3.A.24: **EDC Heating LIHEAP Recipients at 51-100% FPIG**

EDC Heating LIHEAP Recipients at 51-100% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$1,212.25	$1,212.25	$1,250.21	$1,174.29	$309.81	$309.81	$274.03	$338.61
Met-Ed	$746.07	$1,745.90	$1,585.44	$1,591.07	$304.42	$332.84	$329.84	$316.05
PECO Electric*	$1,033.90	$1,033.90	$1,033.90	$1,033.90	$312.38	$289.01	$324.00	$330.50
Penelec	$711.62	$1,919.97	$1,463.41	$1,461.04	$342.40	$337.32	$358.36	$362.91
Penn Power	$887.30	$2,091.90	$1,973.95	$2,119.39	$331.41	$339.10	$346.29	$381.23
PPL	$2,880.36	$2,574.72	$2,793.60	$1,801.20	$355.35	$344.54	$385.33	$336.22
West Penn	$729.63	$1,981.00	$1,751.70	$1,761.10	$339.48	$315.49	$350.21	$336.94

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.25: **EDC Heating LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG**

EDC Heating LIHEAP Recipients – Average Annual CAP Income at 51-100% FPIG				
	2013	2014	2015	2016
Duquesne*	$8,446	$8,446	$8,165	$8,727
Met-Ed	$12,034	$12,714	$12,509	$12,510
PECO Electric	$10,147	$10,445	$10,775	$11,214
Penelec	$10,357	$10,744	$10,557	$10,603
Penn Power	$11,388	$11,873	$11,754	$11,466
PPL	$12,878	$13,164	$12,493	$12,831
West Penn	$12,245	$12,586	$12,208	$11,793

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 3.A.26: **EDC Heating LIHEAP Recipients at 101-150% FPIG**

EDC Heating LIHEAP Recipients at 101-150% FPIG								
	Average CAP Bill				Average LIHEAP Dollars Applied			
	2013	2014	2015	2016	2013	2014	2015	2016
Duquesne**	$1,023.75	$1,023.75	$1,017.90	$1,029.60	$267.12	$267.12	$201.95	$310.25
Met-Ed	$834.21	$2,046.46	$1,712.16	$1,832.74	$235.14	$313.59	$345.70	$314.13
PECO Electric*	$1,262.80	$1,262.80	$1,262.80	$1,262.80	$242.68	$207.74	$265.21	$317.96
Penelec	$801.45	$2,094.43	$1,915.16	$1,817.62	$228.23	$208.74	$254.70	$319.04
Penn Power	$962.00	$2,330.70	$2,196.80	$2,425.28	$239.51	$244.76	$277.35	$338.82
PPL	$2,517.12	$3,003.48	$2,868.00	$1,856.40	$355.39	$344.51	$385.37	$336.13
West Penn	$791.46	$2,039.50	$1,931.00	$1,980.44	$270.89	$250.66	$255.08	$308.36

*PECO Average CAP Bill for 2012-2015 is estimated.

**Duquesne Average CAP Bill for 2012-2013 is estimated.

Appendix 3.A.27: **EDC Heating LIHEAP Recipients – Average Annual CAP Income 101-150% FPIG**

EDC Heating LIHEAP Recipients – Average Annual CAP Income 101-150% FPIG				
	2013	**2014**	**2015**	**2016**
Duquesne*	$12,209	$12,209	$11,430	$12,987
Met-Ed	$18,904	$21,292	$22,024	$21,886
PECO Electric	$16,644	$16,878	$17,862	$19,090
Penelec	$17,305	$17,210	$17,804	$17,977
Penn Power	$18,500	$19,225	$19,429	$19,477
PPL	$20,896	$21,048	$20,263	$20,619
West Penn	$20,317	$19,440	$20,430	$19,872

*Duquesne Average CAP Income for 2012-2013 is estimated.

Appendix 4 – Pre-Program Arrearages and In-Program Arrears

Appendix 4.A: Tables 5-2 to 5-3 NGDCs – Pre-Program Arrearages (PPAs) and In-Program Arrears (IPAs)

The average dollar amount of PPA and IPA per NGDC CAP customer with a PPA or IPA balance for the period from 2012 through 2016.

Appendix 4.A.1: **Average PPAs of NGDC CAP Customers with PPA Balances**

Average PPAs of NGDC CAP Customers with PPA Balances					
	2012	**2013**	**2014**	**2015**	**2016**
Columbia	N/A	$98.82	$116.10	$129.75	$132.68
NFG	$494.67	$748.73	$482.39	$462.53	$402.23
PECO Gas	$643.44	$547.45	$558.27	$529.35	$460.25
Peoples	$739.63	$672.09	$708.84	$788.27	$790.31
Peoples EQT	$957.40	$836.29	$772.38	$720.76	$617.82
PGW	$1,311.98	$1,313.29	$1,341.56	$1,330.32	$1,259.90
UGI Gas	$442.05	$387.83	$422.16	$391.41	$341.31
UGI PNG	$510.36	$417.54	$455.35	$424.22	$382.21

Appendix 4.A.2: **Average IPAs of NGDC CAP Customer with IPAs Balances**

Average IPAs of NGDC CAP Customer with IPAs Balances					
	2012	**2013**	**2014**	**2015**	**2016**
Columbia	N/A	$36.34	$36.70	$34.52	$31.44
NFG	$135.01	$115.55	$97.84	$71.20	$64.05
PECO Gas	$735.19	$752.26	$817.09	$733.08	$695.76
Peoples	$530.05	$431.47	$489.81	$389.34	$173.39
Peoples EQT	$242.76	$223.62	$225.45	$227.99	$156.17
PGW	$258.49	$268.01	$262.17	$232.92	$209.43
UGI Gas	$144.28	$121.03	$119.53	$123.74	$103.65
UGI PNG	$162.34	$142.13	$134.91	$152.30	$124.42

Appendix 4.B: Tables 5-4 to 5-5 EDCs – PPAs and IPAs

The average dollar amounts of PPA and IPA per EDC CAP customer with a PPA or IPA balance for the period from 2012 through 2016.

Appendix 4.B.1: **Average PPAs of EDC CAP Customers with PPA Balances**

Average PPAs of EDC CAP Customers with PPA Balances (Electric Non-Heating and Electric Heating)					
	2012	**2013**	**2014**	**2015**	**2016**
Duquesne	N/A	N/A	N/A	$328.53	$416.79
Met-Ed	$533.60	$538.38	$493.74	$401.09	$350.28
PECO Electric	$531.49	$452.80	$461.66	$438.01	$379.88
Penelec	$433.54	$436.86	$389.19	$328.54	$291.44
Penn Power	$437.92	$356.14	$293.22	$237.27	$244.90
PPL	$951.95	$1,004.51	$1,033.51	$933.57	$737.80
West Penn	N/A	N/A	N/A	$1,076.08	$680.65

Appendix 4.B.2: **Average IPAs of EDC CAP Customers with IPA Balances**

Average IPAs of EDC CAP Customers with IPA Balances (Electric Non-Heating and Electric Heating)					
	2012	**2013**	**2014**	**2015**	**2016**
Duquesne	N/A	N/A	N/A	$531.96	$620.40
Met-Ed	$168.39	$124.72	$88.94	$73.82	$93.52
PECO Electric	$482.35	$489.86	$531.00	$479.45	$454.84
Penelec	$142.46	$90.49	$64.30	$58.09	$81.71
Penn Power	$113.75	$82.21	$54.77	$55.77	$87.91
PPL	$160.96	$150.77	$170.09	$162.48	$173.93
West Penn	N/A	N/A	$322.42	$325.04	$118.76

Appendix 5 – Percentage of CAP Bills Paid In-Full

Appendix 5.A: Table 6-1 Percentage of NGDC CAP Bills Paid In-Full

The percentage of NGDC CAP bills paid in full for all FPIG levels for the period from 2012 through 2016.

Appendix 5.A.1: **Percentage of NGDC CAP Bills Paid In-Full**

	Percentage of NGDC CAP Bills Paid In-Full				
	2012	**2013**	**2014**	**2015**	**2016**
Columbia	59.01%	58.10%	57.48%	59.08%	60.04%
NFG	61.65%	61.54%	60.82%	62.61%	67.31%
PECO Gas	63.19%	62.55%	59.73%	58.86%	61.52%
Peoples	71.18%	63.65%	57.83%	63.82%	64.10%
Peoples EQT	69.99%	75.53%	73.96%	72.94%	73.31%
PGW	57.52%	55.23%	57.82%	59.73%	62.08%
UGI Gas	89.94%	90.85%	93.41%	89.41%	93.82%
UGI PNG	90.78%	91.27%	93.75%	92.84%	92.93%

Appendix 5.B: Tables 6-2, 6-6 to 6-8 NGDCs Number of CAP Bills Paid

The total number of NGDC CAP bills issued and paid in full by FPIG level for the period from 2012 through 2016.

Appendix 5.B.1: **NGDC CAP Bills Issued and Paid In-Full**

2012	NGDC CAP Bills Issued and Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG
Columbia			
Bills Issued	56,406	115,349	73,202
Bills Paid in Full	29,692	69,567	45,296
NFG*			
Bills Issued	N/A	N/A	138,215
Bills Paid in Full	N/A	N/A	85,208
PECO Gas			
Bills Issued	15,541	30,399	27,343
Bills Paid in Full	8,875	19,480	17,955
Peoples			
Bills Issued	36,560	86,858	62,487
Bills Paid in Full	17,526	63,412	51,382
Peoples EQT			
Bills Issued	49,842	89,824	19,246
Bills Paid in Full	36,558	60,750	13,916
PGW			
Bills Issued	275,373	509,535	172,026
Bills Paid in Full	165,391	293,355	91,710
UGI Gas			
Bills Issued	25,936	40,935	4,046
Bills Paid in Full	24,043	36,578	3,162
UGI PNG			
Bills Issued	12,240	33,413	4,557
Bills Paid in Full	11,157	30,699	3,727

*NFG only provided aggregate data for the 0-150% FPIG level.

Appendix 5.B.2: **NGDC CAP Bills Issued and Paid In-Full**

2013	NGDC CAP Bills Issued and Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG
Columbia			
Bills Issued	53,518	110,862	68,823
Bills Paid in Full	27,642	65,457	42,395
NFG*			
Bills Issued	N/A	N/A	123,033
Bills Paid in Full	N/A	N/A	75,715
PECO Gas			
Bills Issued	12,767	26,346	22,637
Bills Paid in Full	6,975	16,684	14,965
Peoples			
Bills Issued	42,615	94,826	65,519
Bills Paid in Full	16,544	63,133	49,503
Peoples EQT			
Bills Issued	47,433	76,015	11,547
Bills Paid in Full	36,366	56,708	8,891
PGW			
Bills Issued	257,298	481,593	150,414
Bills Paid in Full	147,522	265,712	77,920
UGI Gas			
Bills Issued	24,630	27,918	4,046
Bills Paid in Full	22,780	25,140	3,497
UGI PNG			
Bills Issued	12,971	25,385	6,374
Bills Paid in Full	11,912	23,264	5,648

*NFG only provided aggregate data for the 0-150% FPIG level.

Appendix 5.B.3: **NGDC CAP Bills Issued and Paid In-Full**

2014	NGDC CAP Bills Issued and Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG
Columbia			
Bills Issued	54,428	115,013	76,092
Bills Paid in Full	27,971	66,677	46,496
NFG*			
Bills Issued	N/A	N/A	120,792
Bills Paid in Full	N/A	N/A	73,471
PECO Gas			
Bills Issued	12,412	24,802	20,118
Bills Paid in Full	6,379	15,033	12,834
Peoples			
Bills Issued	48,937	107,919	75,416
Bills Paid in Full	16,552	65,429	52,338
Peoples EQT			
Bills Issued	52,590	88,101	16,951
Bills Paid in Full	39,866	65,102	11,625
PGW			
Bills Issued	197,379	429,460	130,952
Bills Paid in Full	117,250	248,825	72,113
UGI Gas			
Bills Issued	27,305	37,417	11,452
Bills Paid in Full	25,515	34,970	10,669
UGI PNG			
Bills Issued	16,109	31,781	13,461
Bills Paid in Full	14,986	29,904	12,628

*NFG only provided aggregate data for the 0-150% FPIG level.

Appendix 5.B.4: **NGDC CAP Bills Issued and Paid In-Full**

2015	NGDC CAP Bills Issued and Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG
Columbia			
Bills Issued	52,153	116,624	78,941
Bills Paid in Full	27,385	68,927	50,048
NFG*			
Bills Issued	N/A	N/A	118,250
Bills Paid in Full	N/A	N/A	74,035
PECO Gas			
Bills Issued	14,612	27,378	22,228
Bills Paid in Full	7,657	16,507	13,638
Peoples			
Bills Issued	51,344	111,399	79,184
Bills Paid in Full	23,135	73,640	57,627
Peoples EQT			
Bills Issued	55,568	91,192	23,218
Bills Paid in Full	36,593	69,857	17,527
PGW			
Bills Issued	202,086	407,460	113,047
Bills Paid in Full	119,192	245,869	66,509
UGI Gas			
Bills Issued	30,827	48,390	20,187
Bills Paid in Full	28,470	41,870	18,539
UGI PNG			
Bills Issued	17,932	39,051	21,731
Bills Paid in Full	16,654	36,326	20,097

*NFG only provided aggregate data for the 0-150% FPIG level.

Appendix 5.B.5: **NGDC CAP Bills Issued and Paid In-Full**

2016	NGDC CAP Bills Issued and Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG
Columbia			
Bills Issued	56,984	111,311	78,139
Bills Paid in Full	30,926	67,237	49,795
NFG*			
Bills Issued	N/A	N/A	**104,325**
Bills Paid in Full	N/A	N/A	**70,224**
PECO Gas			
Bills Issued	15,919	31,839	23,011
Bills Paid in Full	8,734	20,408	14,392
Peoples			
Bills Issued	48,534	107,200	76,958
Bills Paid in Full	20,060	71,340	57,748
Peoples EQT			
Bills Issued	45,515	80,316	33,151
Bills Paid in Full	33,303	58,918	24,323
PGW			
Bills Issued	195,629	353,907	82,091
Bills Paid in Full	115,830	225,104	51,192
UGI Gas			
Bills Issued	29,346	44,404	19,297
Bills Paid in Full	27,943	41,557	17,795
UGI PNG			
Bills Issued	18,096	35,532	18,904
Bills Paid in Full	17,261	32,990	17,156

*NFG only provided aggregate data for the 0-150% FPIG level.

Appendix 5.C: Table 6-3 EDC Percentage of CAP Bills Paid

The percentage of EDC heating and non-heating accounts CAP bills paid in full for all FPIG levels for the period from 2012 through 2016.

Appendix 5.C.1: **EDC CAP Electric Accounts – Percent of Bills Paid in-Full**

	EDC CAP Electric Heating and Non-Heating Accounts Percent of Bills Paid in-Full				
	2012	**2013**	**2014**	**2015**	**2016**
Duquesne					
Heat	82.65%	83.52%	78.65%	49.83%	44.80%
Non-Heat	79.18%	79.92%	77.00%	46.86%	39.82%
Aggregate	79.52%	80.29%	77.18%	47.20%	40.38%
Met-Ed					
Heat	51.82%	40.03%	52.96%	56.87%	59.09%
Non-Heat	49.40%	41.64%	62.35%	65.79%	69.13%
Aggregate	50.01%	41.22%	59.82%	63.32%	66.31%
PECO Electric					
Heat	63.19%	62.55%	59.73%	58.86%	62.49%
Non-Heat	60.07%	59.12%	58.42%	59.26%	62.43%
Aggregate	60.67%	59.65%	58.60%	59.20%	62.44%
Penelec					
Heat	57.54%	46.77%	60.61%	63.45%	64.55%
Non-Heat	51.74%	49.68%	67.28%	69.86%	71.54%
Aggregate	52.55%	49.24%	66.33%	68.92%	70.45%
Penn Power					
Heat	60.80%	47.27%	61.27%	63.65%	63.13%
Non-Heat	57.20%	51.14%	69.09%	68.80%	70.57%
Aggregate	57.77%	50.44%	67.82%	67.94%	69.16%
PPL					
Heat	62.71%	56.40%	56.86%	63.09%	57.91%
Non-Heat	62.71%	56.40%	56.86%	63.09%	57.91%
Aggregate	57.60%	59.62%	61.18%	64.65%	60.32%
West Penn					
Heat	N/A	N/A	44.98%	45.43%	51.04%
Non-Heat	N/A	N/A	41.97%	43.00%	55.80%
Aggregate	N/A	N/A	42.66%	43.57%	54.65%

Appendix 5.D: Tables 6-9 to 6-11 EDCs Number of CAP Bills Paid in Full

The total number of EDCs CAP bills issued and paid in full by FPIG level for the period from 2012 through 2016.

Appendix 5.D.1: CAP Electric – Bills Paid in Full

2012	CAP Heating Accounts Number of Bills Paid In-Full			CAP Non-Heating Accounts Number of Bills Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG	50% FPIG	100% FPIG	150% FPIG
Duquesne						
Bills Issued	6,291	23,117	11,834	61,402	206,767	110,544
Bills Paid in Full	4,412	19,050	10,623	42,716	164,544	92,613
Met-Ed						
Bills Issued	27,218	50,954	27,033	86,501	133,170	91,517
Bills Paid in Full	12,439	27,682	14,396	36,410	67,866	49,449
PECO Electric						
Bills Issued	60,950	119,219	107,234	294,333	581,666	349,000
Bills Paid in Full	34,808	76,395	70,414	157,739	366,853	211,315
Penelec						
Bills Issued	18,033	39,022	17,631	119,727	209,479	131,850
Bills Paid in Full	8,721	23,660	10,592	50,484	112,763	75,305
Penn Power						
Bills Issued	4,639	9,712	6,703	24,881	49,396	38,616
Bills Paid in Full	2,575	6,076	4,149	11,295	29,019	24,266
PPL						
Bills Issued	2,437	6,600	4,748	3,655	9,900	7,122
Bills Paid in Full	1,404	3,802	2,735	2,105	5,703	4,102
West Penn						
Bills Issued	N/A	N/A	N/A	N/A	N/A	N/A
Bills Paid in Full	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 5.D.2: CAP Electric – Bills Paid in Full

2013	CAP Heating Accounts Number of Bills Paid In-Full			CAP Non-Heating Accounts Number of Bills Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG	50% FPIG	100% FPIG	150% FPIG
Duquesne						
Bills Issued	6,540	24,216	12,369	61,234	199,823	113,902
Bills Paid in Full	4,518	20,321	11,181	42,525	160,740	96,384
Met-Ed						
Bills Issued	26,353	50,172	27,605	75,793	126,381	92,702
Bills Paid in Full	9,421	21,641	10,623	25,526	55,304	41,958
PECO Electric						
Bills Issued	50,070	103,323	88,775	308,649	624,959	376,571
Bills Paid in Full	27,355	65,431	58,688	162,168	385,588	226,757
Penelec						
Bills Issued	16,043	38,967	18,033	94,126	186,754	125,237
Bills Paid in Full	6,076	19,751	8,335	35,172	98,109	68,473
Penn Power						
Bills Issued	4,985	10,563	6,703	21,786	45,529	34,709
Bills Paid in Full	2,149	5,229	3,139	8,905	24,076	19,191
PPL						
Bills Issued	2,503	6,791	4,785	3,755	10,186	7,177
Bills Paid in Full	1,492	4,049	2,852	2,239	6,074	4,278
West Penn						
Bills Issued	N/A	N/A	N/A	N/A	N/A	N/A
Bills Paid in Full	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 5.D.3: CAP Electric Number of Bills Paid in Full

2014	CAP Heating Accounts Number of Bills Paid In-Full			CAP Non-Heating Accounts Number of Bills Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG	50% FPIG	100% FPIG	150% FPIG
Duquesne						
Bills Issued	6,165	24,119	12,570	62,945	183,857	107,078
Bills Paid in Full	3,874	19,028	10,804	39,954	144,047	88,491
Met-Ed						
Bills Issued	11,699	28,583	15,497	32,249	67,845	51,087
Bills Paid in Full	6,440	15,433	7,667	18,250	43,082	32,925
PECO Electric						
Bills Issued	48,676	97,267	78,899	330,499	651,536	400,191
Bills Paid in Full	25,017	58,955	50,330	171,394	397,984	238,060
Penelec						
Bills Issued	6,851	23,514	9,945	44,804	118,909	78,870
Bills Paid in Full	4,007	14,708	5,718	26,106	81,831	55,265
Penn Power						
Bills Issued	2,123	5,237	2,952	9,205	25,450	18,380
Bills Paid in Full	1,225	3,260	1,833	5,533	17,743	13,367
PPL						
Bills Issued	2,631	7,295	5,423	3,947	10,943	8,134
Bills Paid in Full	1,610	4,463	3,317	2,415	6,695	4,976
West Penn						
Bills Issued	13,943	28,265	17,207	48,491	94,702	57,558
Bills Paid in Full	6,682	12,149	7,894	19,917	40,947	23,386

Appendix 5.D.4: CAP Electric Number of Bills Paid in Full

2015	CAP Heating Accounts Number of Bills Paid In-Full			CAP Non-Heating Accounts Number of Bills Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG	50% FPIG	100% FPIG	150% FPIG
Duquesne						
Bills Issued	10,113	25,009	12,853	110,550	179,294	88,904
Bills Paid in Full	3,160	13,196	7,548	38,822	90,940	47,733
Met-Ed						
Bills Issued	10,572	26,602	15,187	26,945	62,073	47,411
Bills Paid in Full	5,915	15,563	8,298	15,980	41,622	32,159
PECO Electric						
Bills Issued	57,305	107,370	87,174	320,905	634,576	387,979
Bills Paid in Full	30,027	64,737	53,484	167,905	395,153	233,123
Penelec						
Bills Issued	6,483	22,312	9,986	39,445	109,541	75,600
Bills Paid in Full	3,820	14,708	6,080	23,327	78,188	55,390
Penn Power						
Bills Issued	1,605	5,079	2,706	7,743	22,344	16,705
Bills Paid in Full	914	3,328	1,735	4,477	15,588	12,128
PPL						
Bills Issued	2,996	8,679	6,645	4,494	13,019	9,967
Bills Paid in Full	1,938	5,612	4,294	2,907	8,418	6,442
West Penn						
Bills Issued	12,887	31,842	20,191	48,995	95,651	65,519
Bills Paid in Full	5,809	14,531	9,156	20,040	42,699	27,631

Appendix 5.D.5: CAP Electric Number of Bills Paid in Full

2016	CAP Heating Accounts Bills Issued and Paid In-Full			CAP Non-Heating Accounts Number of Bills Paid In-Full		
	50% FPIG	100% FPIG	150% FPIG	50% FPIG	100% FPIG	150% FPIG
Duquesne						
Bills Issued	10,770	27,806	15,570	121,892	201,209	104,890
Bills Paid in Full	2,897	13,006	8,355	33,948	87,547	48,924
Met-Ed						
Bills Issued	10,583	25,101	14,298	25,758	57,689	44,705
Bills Paid in Full	6,076	15,157	8,302	16,316	40,492	31,785
PECO Electric						
Bills Issued	57,230	107,807	93,388	203,232	407,344	57,230
Bills Paid in Full	32,433	69,152	59,911	112,881	266,429	32,433
Penelec						
Bills Issued	6,854	22,842	10,324	37,574	106,106	72,655
Bills Paid in Full	3,938	15,337	6,558	23,121	77,723	53,920
Penn Power						
Bills Issued	2,213	5,208	3,038	6,824	20,822	17,006
Bills Paid in Full	1,240	3,370	1,993	4,076	14,809	12,626
PPL						
Bills Issued	3,452	10,096	8,040	5,177	15,144	12,061
Bills Paid in Full	2,082	6,091	4,850	3,123	9,136	7,275
West Penn						
Bills Issued	14,251	35,047	19,872	50,472	98,383	67,337
Bills Paid in Full	6,692	18,628	9,987	24,306	57,240	39,090

Appendix 6 – CAP Default Exit and Termination Rates

Appendix 6.A: Tables 7-1 to 7-2 NGDCs Default Exit and CAP Termination Rates

The number and percentage of NGDC CAP default exits and default exit rates for the period from 2012 through 2016.

Appendix 6.A.1: **NGDC Aggregate Total CAP Default Exits 0%-150% FPIG**

NGDC Aggregate Total CAP Default Exits 0%-150% FPIG								
	Columbia	**Equitable**	**NFG**	**PECO Gas**	**Peoples**	**PGW**	**UGI Gas**	**UGI PNG**
2012	2,166	4,249	2,298	8,481	5,530	82,662	2,744	1,580
2013	2,461	3,940	2,063	11,002	2,788	94,173	782	522
2014	1,841	2,861	2,020	12,608	2,819	102,156	715	406
2015	3,638	3,438	1,922	13,422	4,067	9,975	1,712	1,153
2016	3,565	4,322	935	11,997	3,573	10,027	974	622

Appendix 6.A.2: **Percent of NGDC Aggregate Total CAP Default Exit Rates 0%-150% FPIG**

Percent of NGDC Aggregate Total CAP Default Exit Rates 0%-150% FPIG								
	Columbia	**Equitable**	**NFG**	**PECO Gas**	**Peoples**	**PGW**	**UGI Gas**	**UGI PNG**
2012	10.25%	32.38%	20.50%	35.56%	36.84%	102.89%	44.73%	37.49%
2013	12.43%	34.93%	20.71%	46.34%	15.34%	126.39%	16.09%	13.88%
2014	8.60%	21.46%	20.62%	51.11%	14.26%	160.68%	10.66%	7.69%
2015	16.59%	23.99%	20.07%	54.09%	19.91%	16.49%	19.69%	17.17%
2016	16.57%	31.86%	10.85%	50.17%	18.04%	19.00%	12.14%	10.17%

The number and percentage of NGDC CAP gas heating terminations and termination rates for the period from 2012 through 2016.

Appendix 6.A.3: **NGDC Aggregate Total CAP Terminations 0%-150% FPIG**

NGDC Aggregate Total CAP Terminations 0%-150% FPIG								
	Columbia	**Equitable**	**NFG**	**PECO Gas**	**Peoples**	**PGW**	**UGI Gas**	**UGI PNG**
2012	2,458	N/A	641	52	794	5,571	1,285	963
2013	2,245	N/A	408	89	1,218	4,484	782	626
2014	2,250	N/A	723	180	1,626	3,999	782	970
2015	2,486	532	549	166	1,785	2,991	1,265	1,267
2016	2,161	1,071	52	144	1,309	3,333	1,093	969

Appendix 6.A.4: **Percent of NGDC Aggregate Total CAP Termination Rates 0%-150% FPIG**

Percent of NGDC Aggregate Total CAP Termination Rates 0%-150% FPIG								
	Columbia	**Equitable**	**NFG**	**PECO Gas**	**Peoples**	**PGW**	**UGI Gas**	**UGI PNG**
2012	11.63%	N/A	5.72%	0.22%	5.29%	6.93%	20.95%	22.85%
2013	11.34%	N/A	4.10%	0.37%	6.70%	6.02%	16.09%	16.65%
2014	10.51%	N/A	7.38%	0.73%	8.23%	6.29%	11.66%	18.37%
2015	11.34%	3.71%	5.73%	0.67%	8.74%	4.94%	14.55%	18.86%
2016	10.05%	7.90%	0.60%	0.60%	6.61%	6.32%	13.62%	15.84%

Appendix 6.*B: Tables 7-3 to 7-6 EDCs Default Exit and CAP Termination Rates*

The number and percentage of EDCs CAP electric non-heating default exits and default exit rates for the period from 2012 through 2016.

Appendix 6.B.1: **EDC Non-Heating Aggregate CAP Estimated* Default Exits 0%-150% FPIG**

EDC Non-Heating Aggregate CAP Estimated* Default Exits 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	4,954	1,484	28,067	6,503	1,045	6,920	3,906
2013	3,188	12,497	42,332	16,848	3,038	5,041	10,266
2014	3,581	6,126	51,469	8,900	1,500	3,998	9,553
2015	4,198	6,148	58,302	8,562	1,151	6,447	9,537
2016	3,068	4,955	47,340	7,173	1,073	6,165	9,514

*Default Exits were split Heating/Non-Heating based on allocation of CAP Heating/Non-Heating accounts for this analysis.

Appendix 6.B.2: **Percent of EDC Non-Heating Aggregate CAP Estimated* Default Exit Rates 0%-150% FPIG**

Percent of EDC Non-Heating Aggregate CAP Estimated* Default Exit Rates 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	13.73%	5.02%	20.24%	16.69%	10.63%	20.08%	17.79%
2013	8.72%	53.66%	30.66%	54.90%	41.83%	14.32%	49.77%
2014	10.13%	35.80%	36.43%	37.97%	28.42%	10.42%	43.78%
2015	11.79%	39.32%	41.51%	39.16%	24.61%	14.08%	41.34%
2016	7.92%	33.59%	34.60%	33.69%	23.34%	11.42%	39.82%

*Default Exits were split Heating/Non-Heating based on allocation of CAP Heating/Non-Heating accounts for this analysis.

The number and percentage of EDCs CAP electric non-heating terminations and termination rates for the period from 2012 through 2016.

Appendix 6.B.3: **EDC Non-Heating Aggregate CAP Terminations 0%-150% FPIG**

EDC Non-Heating Aggregate CAP Terminations 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	5,575	N/A	16,590	N/A	N/A	970	N/A
2013	5,930	N/A	22,301	N/A	N/A	1,467	N/A
2014	4,918	991	24,948	1,082	196	1,428	1,017
2015	306	873	13,012	1,075	178	1,206	1,172
2016	59	799	9,326	918	166	1,269	1,041

Appendix 6.B.4: **Percent of EDC Non-Heating Aggregate CAP Termination Rates 0%-150% FPIG**

Percent of EDC Non-Heating Aggregate CAP Termination Rates 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	15.45%	N/A	11.96%	N/A	N/A	2.81%	N/A
2013	16.23%	N/A	16.15%	N/A	N/A	4.17%	N/A
2014	13.91%	5.79%	17.66%	4.62%	3.71%	3.72%	4.66%
2015	0.86%	5.58%	9.26%	4.92%	3.81%	2.63%	5.08%
2016	0.15%	5.42%	6.82%	4.31%	3.61%	2.35%	4.36%

The number and percentage of EDCs CAP electric heating default exits and default exit rates for the period from 2012 through 2016.

Appendix 6.B.5: **EDC Heating Aggregate CAP Estimated* Default Exits 0%-150% FPIG**

EDC Heating Aggregate CAP Estimated* Default Exits 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	540	489	3,490	1,209	831	2,092	917
2013	367	4,406	7,110	3,477	2,472	1,300	1,897
2014	434	2,253	8,505	1,722	1,268	1,183	1,554
2015	529	2,342	9,996	1,719	966	1,977	1,788
2016	387	1,887	8,938	1,593	888	1,960	2,848

*Default Exits were split Heating/Non-Heating based on allocation of CAP Heating/Non-Heating accounts for this analysis.

Appendix 6.B.6: **Percent of EDC Heating Aggregate CAP Estimated* Default Exit Rates 0%-150% FPIG**

Percent of EDC Heating Aggregate CAP Estimated* Default Exit Rates 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	1.50%	1.65%	2.52%	3.10%	8.45%	6.07%	4.17%
2013	1.00%	18.92%	5.15%	11.33%	34.04%	3.69%	9.20%
2014	1.23%	13.17%	6.02%	7.35%	24.03%	3.08%	7.12%
2015	1.49%	14.97%	7.12%	7.86%	20.64%	4.32%	7.75%
2016	1.00%	12.79%	6.53%	7.48%	19.33%	3.63%	11.92%

*Default Exits were split Heating/Non-Heating based on allocation of CAP Heating/Non-Heating accounts for this analysis.

The number and percentage of EDCs CAP electric heating terminations and termination rates for the period from 2012 through 2016

Appendix 6.B.7: **EDC Heating Aggregate CAP Terminations 0%-150% FPIG**

EDC Heating Aggregate CAP Terminations 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	494	N/A	121	N/A	N/A	790	N/A
2013	604	N/A	209	N/A	N/A	1,358	N/A
2014	488	733	423	400	86	1,683	577
2015	45	674	390	390	88	1,395	614
2016	1	636	339	353	83	1,227	590

Appendix 6.B.8: **Percent of EDC Heating Aggregate CAP Termination Rates 0%-150% FPIG**

Percent of EDC Heating Aggregate CAP Termination Rates 0%-150% FPIG							
	Duquesne	**Met-Ed**	**PECO Electric**	**Penelec**	**Penn Power**	**PPL**	**West Penn**
2012	1.37%	N/A	0.09%	N/A	N/A	2.29%	N/A
2013	1.65%	N/A	0.15%	N/A	N/A	3.86%	N/A
2014	1.38%	4.28%	0.30%	1.71%	1.63%	4.39%	2.64%
2015	0.13%	4.31%	0.28%	1.78%	1.88%	3.05%	2.66%
2016	0.00%	4.31%	0.25%	1.66%	1.81%	2.27%	2.47%

Appendix 7 – Non-CAP Residential and Confirmed Low-Income (CLI) Customer Debt

Source: All data for tables in Appendix 7 from Universal Service Programs & Collections Performance Reports 2012-2016.

Appendix 7.A: Industry Averages NGDC and EDC Non-CAP Residential and CLI Customer Debt

Appendix 7.A.1: **NGDC Non-CAP Residential and CLI Total Debt & Debt Ratios**

NGDC Non-CAP Residential and Confirmed Low-Income Total Debt & Debt Ratios								
	Residential Customers				CLI Customers			
	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
2012	$41,301,35	2.04%	$56,594,66	2.80%	$22,755,986	5.74%	$17,645,29	4.45%
2013	$44,364,73	1.91%	$65,690,14	2.83%	$19,546,385	5.00%	$20,259,97	5.18%
2014	$45,636,68	1.78%	$63,722,92	2.49%	$22,168,530	5.38%	$20,951,88	5.08%
2015	$46,348,66	2.02%	$66,600,47	2.91%	$26,817,387	6.48%	$20,349,97	4.92%
2016	$33,110,04	1.74%	$55,419,02	2.91%	$19,373,791	5.67%	$12,103,64	3.54%

Appendix 7.A.2: **EDC Non-CAP Residential and CLI Total Debt & Debt Ratios**

EDC Non-CAP Residential and Confirmed Low-Income Total Debt & Debt Ratios								
	Residential Customers				CLI Customers			
	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
2012	$87,933,654	1.50%	$121,967,5	2.08%	$49,252,71	7.13%	$60,096,962	8.70%
2013	$86,497,160	1.48%	$123,492,7	2.11%	$49,749,02	6.91%	$63,385,552	8.81%
2014	$88,622,175	1.46%	$117,253,6	1.93%	$52,146,78	6.89%	$63,456,151	8.39%
2015	$85,684,424	1.31%	$118,382,2	1.81%	$49,875,76	5.89%	$59,078,750	6.98%
2016	$88,010,703	1.33%	$128,615,1	1.95%	$44,425,96	5.19%	$53,936,970	6.30%

Appendix 7.B: Tables 8-1 and 8-3 NGDC Non-CAP Residential Customers

Appendix 7.B.1: **NGDC Non-CAP Residential Customers Debt & Debt Ratio**

	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
Columbia				
2012	$3,164,943	6.80%	$1,121,775	2.41%
2013	$5,282,905	9.46%	$628,897	1.13%
2014	$6,756,013	10.19%	$1,159,968	1.75%
2015	$7,232,765	10.92%	$1,427,095	2.15%
2016	$5,341,059	9.33%	$1,171,674	2.05%
NFG				
2012	$1,495,326	8.35%	$858,526	4.79%
2013	$1,229,077	6.33%	$915,782	4.72%
2014	$1,468,095	6.75%	$988,370	4.54%
2015	$1,496,516	8.78%	$981,719	5.76%
2016	$1,335,709	9.83%	$1,133,617	8.35%
PECO-Gas				
2012	$882,306	5.71%	$2,565,367	16.59%
2013	$1,031,022	6.03%	$2,989,994	17.48%
2014	$993,347	5.02%	$1,856,335	9.38%
2015	$919,207	5.27%	$1,686,623	9.66%
2016	$1,056,220	7.69%	$1,355,545	9.87%
Peoples				
2012	$5,175,426	7.94%	$3,358,032	5.15%
2013	$3,412,550	4.38%	$3,402,725	4.37%
2014	$3,289,065	3.84%	$2,087,002	2.44%
2015	$2,387,402	3.18%	$2,125,573	2.83%
2016	$1,181,803	1.95%	$1,036,381	1.71%
Peoples EQT				
2012	$3,046,495	9.63%	$722,376	2.28%
2013	$3,268,826	8.67%	$875,335	2.32%
2014	$3,230,526	8.58%	$858,822	2.28%
2015	$2,641,103	7.16%	$829,595	2.25%
2016	$647,581	2.18%	$1,066,339	3.59%
PGW				
2012	$6,700,882	4.15%	$4,932,157	3.05%
2013	$2,288,750	1.88%	$6,105,622	5.02%
2014	$2,410,536	2.14%	$6,835,691	6.06%
2015	$8,618,074	6.40%	$6,340,821	4.71%
2016	$7,384,073	6.01%	$2,188,203	1.78%
UGI Gas				
2012	$1,245,209	4.02%	$2,408,765	7.78%
2013	$1,684,812	5.28%	$3,133,749	9.83%
2014	$2,354,783	6.54%	$4,302,184	11.95%
2015	$1,956,803	5.65%	$4,193,699	12.10%
2016	$1,489,546	6.47%	$2,536,577	11.02%
UGI PNG				
2012	$1,045,398	3.82%	$1,678,300	6.14%
2013	$1,348,443	4.60%	$2,207,866	7.54%
2014	$1,666,165	5.14%	$2,863,510	8.83%
2015	$1,565,517	4.91%	$2,764,845	8.68%
2016	$937,800	4.55%	$1,615,307	7.83%

Appendix 7.C: Tables 8-2 and 8-4 EDCs Non-CAP Residential Customers Debt

Appendix 7.C.1: **EDC Non-CAP Residential Customers Debt & Debt Ratios**

	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
Duquesne				
2012	$7,111,396	1.48%	$3,893,461	0.81%
2013	$6,881,436	1.68%	$4,390,065	1.07%
2014	$7,413,769	1.70%	$5,256,987	1.20%
2015	$8,475,599	1.64%	$11,655,027	2.25%
2016	$12,409,870	2.34%	$11,011,293	2.07%
Met-Ed				
2012	$22,176,919	3.69%	$5,228,520	0.87%
2013	$19,375,229	3.42%	$4,365,518	0.77%
2014	$19,051,671	3.60%	$4,740,501	0.90%
2015	$16,068,324	2.77%	$5,188,397	0.89%
2016	$13,865,755	2.41%	$6,223,947	1.08%
PECO Electric				
2012	$12,422,305	0.61%	$38,874,965	1.92%
2013	$13,362,308	0.66%	$39,668,475	1.96%
2014	$11,820,927	0.57%	$29,714,134	1.43%
2015	$9,496,265	0.45%	$23,695,090	1.12%
2016	$9,907,906	0.48%	$17,552,052	0.84%
Penelec				
2012	$18,891,292	3.67%	$4,824,677	0.94%
2013	$16,991,387	3.60%	$4,024,969	0.85%
2014	$17,104,959	3.79%	$4,217,542	0.94%
2015	$15,044,320	3.00%	$4,842,244	0.97%
2016	$14,022,529	2.65%	$6,465,524	1.22%
Penn Power				
2012	$4,825,654	3.20%	$1,073,501	0.71%
2013	$4,050,249	2.90%	$964,919	0.69%
2014	$3,923,847	2.86%	$998,328	0.73%
2015	$3,846,100	2.22%	$1,355,800	0.78%
2016	$4,403,138	2.39%	$1,779,980	0.97%
PPL				
2012	$18,143,704	1.14%	$61,844,995	3.90%
2013	$17,617,784	1.01%	$65,872,581	3.77%
2014	$19,161,432	0.99%	$68,105,839	3.53%
2015	$22,412,561	1.11%	$66,174,920	3.26%
2016	$22,619,415	1.11%	$78,760,112	3.86%
West Penn				
2012	$4,362,384	0.84%	$6,227,461	1.20%
2013	$8,218,767	1.65%	$4,206,199	0.84%
2014	$10,145,570	1.95%	$4,220,365	0.81%
2015	$10,341,255	1.69%	$5,470,722	0.89%
2016	$10,782,090	1.63%	$6,822,278	1.03%

Appendix 7.D: Tables 8-5 and 8-7 NGDC CLI Customers Debt

Appendix 7.D.1: **NGDC Confirmed Low-Income Customers Debt & Debt Ratios**

	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
Columbia				
2012	$3,164,943	6.80%	$1,121,775	2.41%
2013	$5,282,905	9.46%	$628,897	1.13%
2014	$6,756,013	10.19%	$1,159,968	1.75%
2015	$7,232,765	10.92%	$1,427,095	2.15%
2016	$5,341,059	9.33%	$1,171,674	2.05%
NFG				
2012	$1,495,326	8.35%	$858,526	4.79%
2013	$1,229,077	6.33%	$915,782	4.72%
2014	$1,468,095	6.75%	$988,370	4.54%
2015	$1,496,516	8.78%	$981,719	5.76%
2016	$1,335,709	9.83%	$1,133,617	8.35%
PECO Gas				
2012	$882,306	5.71%	$2,565,367	16.59%
2013	$1,031,022	6.03%	$2,989,994	17.48%
2014	$993,347	5.02%	$1,856,335	9.38%
2015	$919,207	5.27%	$1,686,623	9.66%
2016	$1,056,220	7.69%	$1,355,545	9.87%
Peoples				
2012	$5,175,426	7.94%	$3,358,032	5.15%
2013	$3,412,550	4.38%	$3,402,725	4.37%
2014	$3,289,065	3.84%	$2,087,002	2.44%
2015	$2,387,402	3.18%	$2,125,573	2.83%
2016	$1,181,803	1.95%	$1,036,381	1.71%
Peoples EQT				
2012	$3,046,495	9.63%	$722,376	2.28%
2013	$3,268,826	8.67%	$875,335	2.32%
2014	$3,230,526	8.58%	$858,822	2.28%
2015	$2,641,103	7.16%	$829,595	2.25%
2016	$647,581	2.18%	$1,066,339	3.59%
PGW				
2012	$6,700,882	4.15%	$4,932,157	3.05%
2013	$2,288,750	1.88%	$6,105,622	5.02%
2014	$2,410,536	2.14%	$6,835,691	6.06%
2015	$8,618,074	6.40%	$6,340,821	4.71%
2016	$7,384,073	6.01%	$2,188,203	1.78%
UGI Gas				
2012	$1,245,209	4.02%	$2,408,765	7.78%
2013	$1,684,812	5.28%	$3,133,749	9.83%
2014	$2,354,783	6.54%	$4,302,184	11.95%
2015	$1,956,803	5.65%	$4,193,699	12.10%
2016	$1,489,546	6.47%	$2,536,577	11.02%
UGI PNG				
2012	$1,045,398	3.82%	$1,678,300	6.14%
2013	$1,348,443	4.60%	$2,207,866	7.54%
2014	$1,666,165	5.14%	$2,863,510	8.83%
2015	$1,565,517	4.91%	$2,764,845	8.68%
2016	$937,800	4.55%	$1,615,307	7.83%

Appendix 7.E: Tables 8-6 and 8-8 EDCs CLI Customers Debt

Appendix 7.E.1: **EDC Confirmed Low-Income Customers Debt & Debt Ratios**

	Dollars in Debt on Agreement	Debt Ratio on Agreement	Dollars in Debt Not on Agreement	Debt Ratio Not on Agreement
Duquesne				
2012	$1,763,408	2.81%	$3,818,908	6.10%
2013	$1,831,381	2.99%	$3,971,232	6.48%
2014	$2,204,174	4.20%	$4,565,510	8.70%
2015	$1,061,156	2.11%	$2,499,669	4.96%
2016	$780,301	1.38%	$2,612,553	4.63%
Met-Ed				
2012	$13,573,213	15.27%	$1,672,475	1.88%
2013	$12,491,100	14.81%	$1,432,428	1.70%
2014	$12,364,042	15.46%	$1,894,114	2.37%
2015	$10,947,284	11.31%	$2,122,143	2.19%
2016	$9,434,155	10.26%	$2,844,351	3.09%
PECO Electric				
2012	$2,233,654	1.98%	$7,131,993	6.33%
2013	$2,926,340	2.54%	$8,961,442	7.79%
2014	$2,904,709	2.49%	$5,675,610	4.87%
2015	$2,789,568	2.33%	$4,674,494	3.91%
2016	$2,874,058	2.59%	$3,355,357	3.02%
Penelec				
2012	$12,630,650	12.83%	$1,886,507	1.92%
2013	$11,990,862	13.42%	$1,630,552	1.82%
2014	$12,162,602	14.22%	$1,946,277	2.28%
2015	$11,050,780	10.24%	$2,236,890	2.07%
2016	$10,200,122	9.28%	$3,362,454	3.06%
Penn Power				
2012	$3,173,251	13.32%	$365,630	1.53%
2013	$2,837,341	13.26%	$350,002	1.64%
2014	$2,790,788	13.66%	$417,487	2.04%
2015	$2,725,270	10.07%	$562,532	2.08%
2016	$3,000,987	10.83%	$833,929	3.01%
PPL				
2012	$13,150,465	5.19%	$42,798,103	16.88%
2013	$12,622,149	4.25%	$45,838,694	15.43%
2014	$13,692,419	3.95%	$47,729,889	13.75%
2015	$15,116,573	4.15%	$45,269,005	12.44%
2016	$11,882,724	3.18%	$38,238,163	10.23%
West Penn				
2012	$2,728,070	5.42%	$2,423,346	4.81%
2013	$5,049,855	9.90%	$1,201,202	2.35%
2014	$6,028,055	11.01%	$1,227,264	2.24%
2015	$6,185,136	7.65%	$1,714,017	2.12%
2016	$6,253,617	7.31%	$2,690,163	3.15%

Appendix 8 – State Survey Responses

Staff received eight responses to the survey. None of the responders provided data for every question.[98] These summaries have been supplemented by limited staff research.

Question 1: Excluding LIHEAP, what utility and/or energy assistance programs does your state offer to low-income customers?

Colorado:

Energy Outreach Colorado
- Low-income assistance
- Program specifically targeted to low-income customers for each utility
- Paid by rate charged to each residential non-participant monthly bill

Michigan:

Michigan Energy Assistance Program
- Implemented by utilities
- Funded by state's Low-Income Energy Assistance Fund
- Utilities can opt in or out on an annual basis

Indiana:

A state-funded energy assistance program which provides benefits to homeowners only.[99]

District of Columbia:

Residential Aid Discount Program
- Offered by Pepco for electric customers. This program offers a credit that covers full customer charges for energy distribution and exemption for several surcharges. The combined discount equals about 30% of the typical bill for eligible customers.

Residential Essential Service Program (RES)
- Offered for gas customers of Washington Gas. The program offers a discount to eligible Pepco residential customers in D.C. The discount is a percentage reduction in the distribution portion of the customer's bill

[98] The actual survey questions and responses have been summarized in this Appendix.
[99] Staff notes that additional information about Indiana's program is available at: https://www.in.gov/ihcda/2329.htm.

for the winter months, November through April, resulting in approximately 25% reduction in charges. RES also provides for an automatic short-term increase in this reduction if gas prices increase above a specific historical average.

Ohio:

PIPP Plus

- Customers are eligible if their household income is at or below 150% of the FPIG level. (Ohio LIHEAP income eligibility guidelines are set at or below 175% of the FPIG level.)

Winter Reconnect Orders

- Issued annually by the Public Utility Commission of Ohio, allowing customers who are disconnected or being threatened with disconnection to pay a maximum of $175 to maintain or restore their utility service once per winter heating season.

The electric and gas companies offer their own specific programs to assist eligible customers with paying their utility bills.

Question 2: Does your state have a definition for an "affordable" energy burden?

No respondents reported a definition for an affordable energy burden.

Question 3: Please provide an explanation of how your state calculates a household's energy burden (i.e., statewide; includes housing expenses) and if there is a difference based on fuel type (i.e., electric or gas; heating/non-heating account).

Colorado:

Eligible participants are limited to those with a household income at or below 186% of the current federal poverty level, or, if the utility applies Low-Income Energy Assistance Program (LEAP) benefits to offset the costs of the unaffordable portion of the participating customer's utility bill, the percent of the current federal poverty level set by the Colorado Department of Human Services, Division of Low-Income Energy Assistance for eligibility in the LEAP program.

Participant payments for natural gas bills rendered to participants shall not exceed an "affordable PIPP." For accounts for which natural gas is the primary heating

fuel, participant payments shall be no lower than 2% and not greater than 3% of the participant's household income.

Participant payments for electric bills rendered to participants shall not exceed an "affordable PIPP." The percentage of a participant's household income for which the participant is responsible shall be determined as follows:

A. For electric accounts for which electricity is the primary heating fuel, participant payments shall be no lower than 3% and not greater than 6% of the participant's household income; and

B. For electric accounts for which electricity is not the primary heating fuel, participant payments shall be no lower than 2% and not greater than 3% of the participant's household income.

Colorado does not perform any calculations. Each utility is required to calculate the total bill and the "affordable" portion of the average bill for each eligible participant. There is a small difference in the calculation for gas versus gas/electric.

Indiana:

Indiana does not calculate energy burden except for its Performance Measure Reporting. This is simply the total cost of energy compared to income.

Ohio:

Ohio does not calculate a household's energy burden. Electric and natural gas customers who qualify pay $10 or 6% of their gross monthly household income, whichever is greater, to the utility each month. If the utility provides both gas and electric services or if the customer has an all-electric home, the payment is $10 or 10% of the gross monthly income, whichever is greater. (*See* https://www.puco.ohio.gov/be-informed/consumer-topics/energy-assistance-programs-help-with-paying-your-utility-bills/) The eligibility threshold for LIHEAP is 60% of the State Median Income which is roughly 175% of the FPIG.

Question 4: Do you establish a target energy burden level for your utility and/or energy assistance programs?

Colorado and New Hampshire establish target energy burdens.
Colorado includes LIHEAP payments in the calculation for target energy burden levels.

Question5: Does your state use the same target energy burden for all programs, or are there different levels for each program or fuel type?

New Hampshire:

New Hampshire does not use energy burden as described above. The discount levels are set to bring the amount that the average participating customer pays between 4% and 5% of the average income for that discount tier. There are five discount tiers with discounts ranging from 8% to 76%.

Colorado:

In Colorado, a participant's minimum payment for an electric heating account shall be no more than $20 per month, and the minimum payment for a non-heating electric account shall be no more than $10 per month. For gas heating customers, with a household income of zero dollars, a utility may establish a minimum monthly payment amount of $10 per month or less.

Question 6: Does your state provide a CAP program? If yes, please describe program.

South Dakota does not offer CAPs.

New Hampshire

New Hampshire has CAPs but provided no additional information. Staff notes that additional information may be found at: https://www.puc.nh.gov/consumer/electricassistanceprogram.htm

District of Columbia:

For electric, D.C. has the Residential Aid Discount (RAD) Program offered by Pepco. The credit covers the following charges: the full customer charge and energy charge for distribution and exemption from the following surcharges: the RAD Surcharge, the Sustainable Energy Trust Fund, and the Energy Assistance Trust Fund. Credits for these charges are individually listed on the customer's bills as "Residential Aid Credit (RAC) – Distribution" and "RAC Surcharges." Customers will receive the RAC whether or not they have a retail supplier. The full RAC is equal to approximately 30% of a typical RAD customer's bill. In addition, the D.C. Commission is working with stakeholders to develop an arrearage management plan.

For gas, D.C. has the Residential Essential Service (RES) offered by Washington Gas. The program offers eligible Pepco D.C. residential customers a discount on the distribution portion of the customer's bill from November through April. The discount is achieved through a percentage reduction of the distribution portion of a customer's bill, resulting in an approximately 25% reduction in the total bill. The RES additionally provides for an automatic short-term increase in the reduction to the distribution portion of the bill when purchased gas prices rise above a specified historic percentage. RES customer bills also indicate the costs of surcharges that RES customers are exempt from paying, specifically: RES surcharge; Sustainable Energy Trust Fund surcharge, and Energy Assistance Trust Fund surcharge. Customers can enroll in the RES program year-round; the enrollment year begins on October 1.

Ohio:

Ohio provided detailed information on three variations of its PIPP programs.

PIPP Plus is an extended payment arrangement that requires regulated gas and electric companies to accept payments based on a percentage of the household income for those customers who are at or below 150% of FPIG. The PIPP Plus payment amount is based on the household's countable income received during the previous 30 days. If a gas customer qualifies for PIPP Plus, he or she would pay 6% of the household's current gross monthly income to the gas company or a minimum of $10, whichever is greater, year-round. If electricity is not the primary heat source, a customer pays 6% of the household's current gross monthly income or a minimum of $10, whichever is greater, year-round. The customer of an all-electric household pays 10% of the household's monthly income or a minimum of $10, whichever is greater, year-round.

Graduate PIPP Plus allows customers who are no longer eligible to participate in PIPP Plus as a result of an increase in the household income or a change in the household size to continue to receive a reduction in their outstanding arrearages in return for making timely payments. Graduate PIPP Plus customers receive arrearage reduction for on-time and in-full payments. Customer will earn 1/12th credit on arrearages. Graduate PIPP Plus customer bills will be adjusted for the difference between the required installment payment and the current month's utility charges.

Post PIPP Plus is a 12-month payment plan for former PIPP Plus or former Graduate PIPP Plus customers who are no longer customers of the utility but still have an arrearage. Post PIPP Plus is only available in the 12 months immediately after a PIPP Plus account is closed. The customer enters into a

payment plan to pay at least 1/60th of the final account arrears for 12 months. For each payment made, the utility will credit 1/12th of the customer's arrears. *See* https://development.ohio.gov/is/is_PIPP_plus_review.htm

Colorado:

Debt forgiveness is included in Colorado's authorized low-income assistance program.

Utility A: Customers must pay down the PPA to $300 before being allowed to enroll in the program and receive 1/24th PPA forgiveness per month over 24 months.

Utility B: PPAs of $500 or less are "retired" over 12 months; larger PPAs are retired over 24 months. This utility also offers a one-time forgiveness of up to $200.

Other utilities offer credit designed to reduce PPAs to zero over 12 months.

Regarding rate assistance, one utility offers a fixed monthly credit to customers who are LIHEAP recipients with income below 150% of the FPIG level and who agree to participate in a weatherization program and enroll in a budget billing plan.

Some utilities offer percentage of income plans for customers who receive LIHEAP and have incomes at or below 150% of the FPIG level, based on a utility formula.

For another utility, households at or below 100% of the FPIG level can receive a 25% discount based on their prior 12 months of usage, while customers between 100 and 150% of the FPIG level receive a 20% discount.

A gas utility offers customers who are LIHEAP recipients with household income at or below 125% of the FPIG level a tiered-maximum payment option:

- 2% of income if household income is at or below 75% of the FPIG level
- 2.5% of income if income is between 76 and 125% of the FPIG level
- 3% of income for households with incomes between 126 and 185% of the FPIG level

Question 7: If the state has a CAP program, what are the eligibility requirements?

New Hampshire:

For New Hampshire's Energy Assistance Program (EAP), the eligibility level is at or below 200% of the FPIG. For the gas discount program, it is categorical eligibility, with participation in one of 13 programs qualifying a customer.

District of Columbia:

Household Size	FY 2018 Maximum Annual Income
1	$30,142
2	$39,416
3	$48,691
4	$57,965
5	$67,239
6	$76,514
7	$78,253
8	$79,992

Ohio:

PIPP Plus eligibility - The customer must be at or below 150% of the FPIG and have an active account with a regulated utility.

Graduate PIPP Plus eligibility - The customer may elect to enroll on graduate PIPP Plus, or the customer must be income-ineligible for PIPP Plus. The customer must be current with all PIPP Plus payments.

Post PIPP eligibility - Plus-PIPP Plus or Graduate PIPP customers who contact the utility to close their account for the following reason(s):

a. Moving beyond the utility companies service territory.
b. Transferring to a residence where utility service is not in the former PIPP Plus or Graduate PIPP Plus customer's name.
c. Moving to a master-metered residence.

Question 8: How is your CAP program funded (i.e., through LIHEAP, residential rates, commercial rates, industrial rates, etc.)?

New Hampshire:

The EAP is funded through a per kWh system benefits charge on all electric bills, both residential and commercial. The gas low-income program is funded through a component of the local distribution adjustment clause (LDAC) assessed to all customer classes.

Ohio:

PIPP Plus is funded through all ratepayers based on kWh or Mcf.

Question 9: What is the total CAP program cost for your state for 2012-2016?

New Hampshire:

Year	CAP Cost
2012	$16,227,754 (10/1/2012 through 9/30/2013)
2013	$16,213,338 (10/1/2013 through 9/30/2014)
2014	$16,351,717 (10/1/2014 through 9/30/2015)
2015	$16,057,192 (10/1/2015 through 9/30/2016)
2016	$15,797,509 (10/1/2016 through 9/30/2017)

Question 10: If funded through residential rates, for each of the past five years (2012-2016), what is the average spending/cost per residential customer in your state to support the CAP program?

New Hampshire:

Year	**CAP Cost per Residential Customer**
2012	0.0015 mills per kWh
2013	0.0015 mills per kWh
2014	0.0015 mills per kWh
2015	0.0015 mills per kWh
2016	0.0015 mills per kWh

Question 11: How do you define collections expenses for utility companies?

Colorado:

> Administrative costs are considered part of the cost included in the low-income program.

New Hampshire:

> Collection expenses are reviewed during rate cases, not as part of assistance programs or energy efficiency programs.

Ohio:

> Collection expenses are defined as the cost labor, materials, and expenses incurred in work on collections as recorded in the Federal Energy Regulatory Commission (FERC) 903 account during a rate case. Collection expenses may also include uncollectible expenses.

Question 12: Questions about utility collections expenses:

Colorado, New Hampshire, and Ohio track utility collections expenses. Only Colorado includes CAP expenses in their utility collections expenses.

None of these states reported seeing a corresponding reduction in utility collections expenses for increased enrollment of low-income customers in their CAP programs.

Only Colorado reported having different collections procedures for CAP, non-CAP low-income, and non-low-income residential customers. For low-income customers, expenses are included in the low-income program while all other collection expenses are included in base rates.

None of the responding states reported observing better payment patterns for low-income customers who are in CAP compared to low-income customers not in CAP.

Question 13: On the average over each of the past five years (2012-2016), what percent of monthly payments for CAP customers are paid in full?

Ohio

Percent of Monthly CAP Bills Paid in Full		
Year	**Electric**	**Gas**
2012	52%	50%
2013	52%	51%
2014	53%	53%
2015	55%	59%
2016	55%	59%

Question 14: For each of the past five years (2012-2016), what were the service termination rates?

Ohio:

Ohio CAP Termination Rates			
Year	**CAP Customers**	**CLI Customers**	**Non-CAP Residential**
2012	11%	**No Response**	3%
2013	17%	**No Response**	6%
2014	9%	**No Response**	5%
2015	3%	**No Response**	3%
2016	11%	**No Response**	5%

Appendix 9 –CAP Costs and Forecasts

Appendix 9.A: Table 10-3 NGDC Residential Customers and Average CAP Enrollment Used to Calculate NGDC Non-CAP Residential Customers

Appendix 9.A.1: **NGDC Residential Customers**

NGDC Residential Customers						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Columbia	382,677	384,213	386,150	387,782	390,394	393,410
NFG	198,663	198,763	198,681	199,061	197,992	196,950
PECO Gas	454,583	456,331	461,173	465,404	470,133	480,586
Peoples	329,809	330,123	330,459	331,587	331,814	333,761
Peoples EQT	241,778	242,632	243,610	245,930	243,371	247,930
PGW	479,889	468,943	469,283	470,788	473,019	474,960
UGI Gas	317,170	324,576	331,583	338,929	345,693	352,720
UGI PNG	147,046	149,097	150,495	151,648	152,761	154,319

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.A.2: **NGDC Annual Average CAP Enrollment**

NGDC Average CAP Enrollment						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Columbia	21,137	19,803	21,418	21,925	21,509	22,921
NFG	11,208	9,961	9,797	9,577	8,615	8,014
PECO Gas	23,847	23,744	24,667	24,813	23,915	21,898
Peoples	15,009	18,170	19,762	20,432	19,807	18,194
Peoples EQT	13,122	11,280	13,334	14,333	13,564	13,009
PGW	80,343	74,507	63,578	60,507	52,767	48,471
UGI Gas	6,135	4,859	6,709	8,693	8,026	8,326
UGI PNG	4,214	3,760	5,279	6,717	6,116	5,666

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.B: Table 10-1 NGDCs CAP Total Costs with 5-Year Forecasting

Appendix 9.B.1: **NGDC Actual Total Gross CAP Costs**

Actual Total Gross CAP Costs						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Columbia	$8,167,972	$13,272,158	$18,237,407	$18,204,869	$13,544,667	$19,668,704
NFG	$1,958,376	$1,838,472	$1,934,109	$1,489,477	$1,169,595	$1,199,650
PECO Gas	$4,555,567	$5,219,029	$5,294,959	$4,905,156	$2,857,660	$2,357,836
Peoples	$6,022,673	$8,227,588	$11,270,401	$12,607,004	$6,606,963	$8,102,420
Peoples EQT	$6,055,041	$7,090,722	$9,988,104	$8,614,710	$3,826,459	$5,328,722
PGW	$73,059,396	$77,281,237	$71,187,450	$56,502,542	$47,310,248	$49,005,928
UGI Gas	$2,662,779	$3,176,112	$2,482,458	$4,145,889	$2,470,474	$3,187,005
UGI PNG	$2,782,805	$2,852,339	$2,299,074	$3,747,453	$2,137,095	$2,088,411
Industry Average	**$13,158,076.13**	**$14,869,707.13**	**$15,336,745.25**	**$13,777,137.50**	**$9,990,395.13**	**$11,367,334,50**

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.B.2: **NGDC Forecast Total Gross CAP Costs***

Forecast Total Gross CAP Costs				
	2018	**2019**	**2020**	**2021**
Columbia	$13,650,000	*$22,718,175*	*$22,718,175*	*$22,718,175*
NFG	$2,323,457	$2,434,767	$2,535,559	*$3,011,408*
PECO Gas	*$3,154,191*	*$2,435,981*	*$2,439,918*	*$2,564,742*
Peoples	$5,897,531	*$7,064,231*	*$7,065,818*	*$7,067,452*
Peoples EQT	$3,907,618	*$4,531,268*	*$4,532,356*	*$4,533,476*
PGW	$56,071,383	$58,428,965	$59,694,816	$63,614,524
UGI Gas	*$3,970,000*	*$4,135,000*	*$4,341,750*	$4,735,391
UGI PNG	*$3,025,000*	*$3,235,000*	*$3,396,750*	$3,863,164
Industry Average	**$11,367,334,50**	**$13,122,923.43**	**$13,340,642.77**	**$14,013,541.41**

*Italicized numbers reflect projected CAP costs from USECPs that the Commission has not yet approved.

Appendix 9.C: Table 10-4 EDC Residential Customers and Average CAP Enrollment Used to Calculate EDC Non-CAP Residential Customers

Appendix 9.C.1: **EDC Residential Customers**

EDC Residential Customers						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Duquesne	525,683	526,817	527,390	525,714	526,283	532,204
Met-Ed	487,312	488,375	490,059	492,501	495,698	499,192
PECO Electric	1,418,715	1,421,426	1,430,397	1,440,188	1,450,942	1,463,266
Penelec	505,013	504,543	503,596	502,415	501,820	501,533
Penn Power	140,666	141,147	141,745	142,591	143,536	144,286
PPL	1,215,950	1,218,734	1,221,960	1,226,583	1,231,155	1,223,076
West Penn	618,033	619,531	621,020	622,404	623,830	624,914

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.C.2: **EDC Annual Average CAP Enrollment**

EDC Average CAP Enrollment						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Duquesne	36,085	36,544	35,352	35,602	38,719	37,596
Met-Ed	29,574	23,290	17,111	15,639	14,750	14,875
PECO Electric	138,691	138,086	141,297	140,469	136,841	126,401
Penelec	38,962	30,687	23,440	21,865	21,291	21,154
Penn Power	9,830	7,262	5,277	4,678	4,596	4,667
PPL	34,462	35,197	38,373	45,801	53,970	52,726
West Penn	21,965	20,627	21,820	23,071	23,892	25,568

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.D: Table 10-2 EDCs CAP Total Costs with 5-Year Forecasting

Appendix 9.D.1: **EDC Actual Total Gross CAP Costs**

Actual Total Gross CAP Costs						
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Duquesne	$16,680,684	$16,549,705	$15,888,626	$18,984,666	$21,244,454	$23,083,236
Met-Ed	$28,356,979	$22,984,906	$17,525,198	$15,113,962	$14,313,820	$14,758,527
PECO Electric	$94,760,602	$91,508,724	$94,812,522	$96,675,303	$92,369,577	$70,653,278
Penelec	$30,152,302	$25,303,288	$20,236,493	$18,127,221	$18,254,884	$18,852,006
Penn Power	$8,861,651	$6,116,965	$4,287,789	$3,970,526	$4,275,287	$4,435,519
PPL	$49,106,215	$55,223,019	$72,016,857	$83,614,471	$86,446,411	$80,923,575
West Penn	$8,495,135	$10,768,235	$13,385,035	$16,540,073	$24,609,316	$27,280,111
Industry Average	**$33,773,366.86**	**$32,636,406.00**	**$34,021,788.57**	**$36,146,603.14**	**$37,359,107.00**	**$34,283,750.29**

Source: Universal Service Programs & Collections Performance Reports 2012-2017.

Appendix 9.D.2: **EDC Forecast Total Gross CAP Costs***

Forecast Total Gross CAP Costs				
	2018	**2019**	**2020**	**2021**
Duquesne	$26,652,524	$27,434,572	$29,970,350	$32,256,531
Met-Ed	$16,652,500	*$17,818,900*	*$17,791,600*	*$17,791,600*
PECO Electric	$94,802,060	$73,215,616	$73,333,937	$77,085,620
Penelec	$22,202,500	*$23,556,250*	*$23,874,650*	*$24,228,000*
Penn Power	$5,068,000	*$5,681,250*	*$5,773,800*	*$5,879,000*
PPL	$118,000,000	$129,000,000	$156,407,274	$181,479,403
West Penn	$31,855,500	*$38,511,900*	*$38,916,350*	*$39,465,800*
Industry Average	**$45,033,297.67**	**$45,031,212.51**	**$49,438,280.07**	**$54,026,564.90**

*Italicized numbers reflect projected CAP costs from USECPs that the Commission has not yet approved.

Appendix 9.E: Table 10-5 NGDC Annual CAP Costs per Non-CAP Residential Customer 2012-2016 and 5-Year Forecasting if CAP Enrollment Adjustments Ranged between a Decrease of 10% and an Increase of 10%

Appendix 9.E.1: **Actual Data and Forecasts – Columbia**

	Actual Data						**Forecasts**			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$22.59	$36.42	$50.00	$49.76	$36.72	$53.09	$36.66	$60.74	$60.47	$60.21
-10%	$20.33	$32.78	$45.00	$44.78	$33.05	$47.78	$32.99	$54.67	$54.42	$54.19
-5%	$21.46	$34.60	$47.50	$47.27	$34.88	$50.43	$34.83	$57.70	$57.45	$57.20
-1%	$22.37	$36.06	$49.50	$49.26	$36.35	$52.56	$36.29	$60.13	$59.87	$59.61
No Change										
1%	$22.82	$36.79	$50.50	$50.26	$37.09	$53.62	$37.03	$61.35	$61.07	$60.81
5%	$23.72	$38.24	$52.50	$52.25	$38.55	$55.74	$38.49	$63.78	$63.49	$63.22
10%	$24.85	$40.06	$55.00	$54.74	$40.39	$58.40	$40.33	$66.81	$66.52	$66.23

Appendix 9.E.2: **Actual Data and Forecasts – NFG**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$10.45	$9.74	$10.24	$7.86	$6.18	$6.35	$12.29	$12.86	$13.38	$15.88
-10%	$9.40	$8.76	$9.22	$7.07	$5.56	$5.71	$11.06	$11.57	$12.04	$14.29
-5%	$9.92	$9.25	$9.73	$7.47	$5.87	$6.03	$11.68	$12.22	$12.71	$15.09
-1%	$10.34	$9.64	$10.14	$7.78	$6.11	$6.29	$12.17	$12.73	$13.25	$15.72
No Change										
1%	$10.55	$9.83	$10.34	$7.94	$6.24	$6.41	$12.41	$12.99	$13.51	$16.04
5%	$10.97	$10.22	$10.75	$8.25	$6.48	$6.67	$12.90	$13.50	$14.05	$16.67
10%	$11.49	$10.71	$11.26	$8.65	$6.79	$6.98	$13.52	$14.15	$14.72	$17.47

Appendix 9.E.3: **Actual Data and Forecasts – PECO Gas**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$10.58	$12.06	$12.13	$11.13	$6.40	$5.14	$6.72	$5.06	$4.94	$5.07
-10%	$9.52	$10.86	$10.92	$10.02	$5.76	$4.63	$6.05	$4.55	$4.45	$4.56
-5%	$10.05	$11.46	$11.52	$10.58	$6.08	$4.88	$6.38	$4.81	$4.69	$4.82
-1%	$10.47	$11.94	$12.01	$11.02	$6.34	$5.09	$6.65	$5.01	$4.89	$5.02
No Change										
1%	$10.68	$12.19	$12.25	$11.24	$6.47	$5.19	$6.79	$5.11	$4.99	$5.12
5%	$11.11	$12.67	$12.74	$11.69	$6.72	$5.40	$7.06	$5.31	$5.19	$5.32
10%	$11.63	$13.27	$13.34	$12.25	$7.04	$5.65	$7.39	$5.57	$5.43	$5.58

Appendix 9.E.4: **Actual Data and Forecasts – Peoples**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$19.13	$26.37	$36.27	$40.52	$21.18	$25.68	$18.69	$22.36	$22.34	$22.32
-10%	$17.22	$23.74	$32.65	$36.47	$19.06	$23.11	$16.82	$20.12	$20.11	$20.09
-5%	$18.18	$25.06	$34.46	$38.49	$20.12	$24.39	$17.76	$21.24	$21.22	$21.20
-1%	$18.94	$26.11	$35.91	$40.11	$20.96	$25.42	$18.50	$22.14	$22.12	$22.10
No Change										
1%	$19.32	$26.64	$36.64	$40.92	$21.39	$25.93	$18.88	$22.58	$22.56	$22.54
5%	$20.09	$27.69	$38.09	$42.54	$22.23	$26.96	$19.62	$23.48	$23.46	$23.44
10%	$21.04	$29.01	$39.90	$44.57	$23.29	$28.24	$20.56	$24.60	$24.57	$24.55

Appendix 9.E.5: **Actual Data and Forecasts – Peoples EQT**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$26.48	$30.65	$43.37	$37.20	$16.65	$22.68	$16.77	$19.27	$19.31	$19.14
-10%	$23.83	$23.74	$32.65	$36.47	$19.06	$23.11	$16.82	$20.12	$20.11	$20.09
-5%	$25.16	$25.06	$34.46	$38.49	$20.12	$24.39	$17.76	$21.24	$21.22	$21.20
-1%	$26.22	$26.11	$35.91	$40.11	$20.96	$25.42	$18.50	$22.14	$22.12	$22.10
No Change										
1%	$26.75	$26.64	$36.64	$40.92	$21.39	$25.93	$18.88	$22.58	$22.56	$22.54
5%	$27.81	$27.69	$38.09	$42.54	$22.23	$26.96	$19.62	$23.48	$23.46	$23.44
10%	$29.13	$33.71	$47.71	$40.92	$18.32	$24.95	$18.45	$21.20	$21.24	$21.05

Appendix 9.E.6: **Actual Data and Forecasts – PGW**[100]

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$137.14	$144.99	$130.90	$101.63	$79.03	$81.12	$90.06	$92.93	$92.93	$86.51
-10%	$123.43	$130.49	$117.81	$91.47	$71.13	$73.01	$81.05	$83.64	$83.64	$77.86
-5%	$130.28	$137.74	$124.36	$96.55	$75.08	$77.06	$85.56	$88.28	$88.28	$82.18
-1%	$135.77	$143.54	$129.59	$100.61	$78.24	$80.31	$89.16	$92.00	$92.00	$85.64
No Change										
1%	$138.51	$146.44	$132.21	$102.65	$79.82	$81.93	$90.96	$93.86	$93.86	$87.38
5%	$144.00	$152.24	$137.45	$106.71	$82.98	$85.18	$94.56	$97.58	$97.58	$90.84
10%	$150.85	$159.49	$143.99	$111.79	$86.93	$89.23	$99.07	$102.22	$102.22	$95.16

Appendix 9.E.7: **Actual Data and Forecasts – UGI Gas**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$8.56	$9.93	$7.64	$12.55	$7.32	$9.25	$11.32	$11.58	$11.94	$12.79
-10%	$7.70	$8.94	$6.88	$11.30	$6.58	$8.33	$10.19	$10.42	$10.75	$11.51
-5%	$8.13	$9.44	$7.26	$11.93	$6.95	$8.79	$10.75	$11.00	$11.34	$12.15
-1%	$8.48	$9.83	$7.56	$12.43	$7.24	$9.16	$11.21	$11.46	$11.82	$12.66
No Change										
1%	$8.65	$10.03	$7.72	$12.68	$7.39	$9.35	$11.43	$11.70	$10.75	$11.51
5%	$8.99	$10.43	$8.02	$13.18	$7.68	$9.72	$11.89	$12.16	$11.34	$12.15
10%	$9.42	$10.93	$8.41	$13.81	$8.05	$10.18	$12.45	$12.74	$11.82	$12.66

[100] Forecasts for PGW are based on 70% residential allocation of CAP costs.

Appendix 9.E.8: **Actual Data and Forecasts – UGI PNG**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$19.48	$19.63	$15.83	$25.86	$14.57	$14.05	$20.34	$21.63	$22.57	$25.52
-10%	$17.53	$17.66	$14.25	$23.27	$13.12	$12.64	$18.31	$19.47	$20.31	$22.97
-5%	$18.51	$18.64	$15.04	$24.56	$13.84	$13.35	$19.32	$20.55	$21.44	$24.24
-1%	$19.29	$19.43	$15.67	$25.60	$14.43	$13.91	$20.14	$21.41	$22.34	$25.26
No Change										
1%	$19.68	$19.82	$15.99	$26.12	$14.72	$14.19	$20.54	$21.85	$22.80	$25.78
5%	$20.46	$20.61	$16.62	$27.15	$15.30	$14.75	$21.36	$22.71	$23.70	$26.80
10%	$21.43	$21.59	$17.42	$28.44	$16.03	$15.45	$22.37	$23.79	$24.83	$28.07

Appendix 9.F: Table 10-6 EDC Annual CAP Costs per Non-CAP Residential Customer 2012-2016, With CAP Enrollment Adjustments and 5-Year Forecasting

Appendix 9.F.1: **Actual Data and Forecasts – Duquesne**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$34.07	$33.76	$32.29	$38.74	$43.57	$46.67	$54.13	$55.67	$60.76	$65.34
-10%	$30.66	$30.38	$29.06	$34.86	$39.22	$42.00	$48.72	$50.10	$54.68	$58.81
-5%	$32.37	$32.07	$30.68	$36.80	$41.39	$44.34	$51.42	$52.89	$57.72	$62.07
-1%	$33.73	$33.42	$31.97	$38.35	$43.14	$46.20	$53.59	$55.11	$60.15	$64.69
No Change										
1%	$34.41	$34.09	$32.61	$39.12	$44.01	$47.14	$54.67	$56.23	$61.37	$65.99
5%	$35.77	$35.44	$33.91	$40.67	$45.75	$49.00	$56.84	$58.45	$63.80	$68.61
10%	$37.48	$37.13	$35.52	$42.61	$47.93	$51.34	$59.54	$61.24	$66.84	$71.87

Appendix 9.F.2: **Actual Data and Forecasts – Met-Ed**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$61.95	$49.42	$37.06	$31.69	$29.76	$30.47	$34.03	$36.04	$35.62	$35.26
-10%	$55.76	$44.48	$33.35	$28.53	$26.79	$27.43	$30.63	$32.44	$32.06	$31.73
-5%	$58.85	$46.95	$35.20	$30.11	$28.27	$28.95	$32.33	$34.24	$33.84	$33.50
-1%	$61.33	$48.93	$36.68	$31.38	$29.46	$30.17	$33.69	$35.68	$35.26	$34.91
No Change										
1%	$62.57	$49.92	$37.43	$32.01	$30.06	$30.78	$34.37	$36.40	$35.98	$35.61
5%	$65.05	$51.89	$38.91	$33.28	$31.25	$32.00	$35.73	$37.84	$37.40	$37.02
10%	$68.15	$54.36	$40.76	$34.86	$32.74	$33.52	$37.43	$39.64	$39.18	$38.79

Appendix 9.F.3: **Actual Data and Forecasts – PECO Electric**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$74.03	$71.31	$73.55	$74.38	$70.29	$52.85	$69.92	$53.42	$52.96	$55.12
-10%	$66.63	$64.17	$66.19	$66.94	$63.26	$47.56	$62.93	$48.08	$47.66	$49.61
-5%	$70.33	$67.74	$69.87	$70.66	$66.78	$50.21	$66.42	$50.75	$50.31	$52.36
-1%	$73.29	$70.59	$72.81	$73.64	$69.59	$52.32	$69.22	$52.89	$52.43	$54.57
No Change										
1%	$74.77	$72.02	$74.28	$75.13	$70.99	$53.38	$70.62	$53.95	$53.49	$55.67
5%	$77.73	$74.87	$77.23	$78.10	$73.81	$55.49	$73.42	$56.09	$55.61	$57.88
10%	$81.43	$78.44	$80.90	$81.82	$77.32	$58.13	$76.91	$58.76	$58.26	$60.63

Appendix 9.F.4: **Actual Data and Forecasts – Penelec**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$64.70	$53.40	$42.15	$37.72	$37.99	$39.24	$46.04	$48.62	$49.05	$49.55
-10%	$58.23	$48.06	$37.93	$33.95	$34.19	$35.32	$41.44	$43.76	$44.15	$44.60
-5%	$61.46	$50.73	$40.04	$35.84	$36.09	$37.28	$43.74	$46.19	$46.60	$47.07
-1%	$64.05	$52.86	$41.72	$37.34	$37.61	$38.85	$45.58	$48.13	$48.56	$49.05
No Change										
1%	$65.34	$53.93	$42.57	$38.10	$38.37	$39.64	$46.50	$49.11	$49.54	$50.05
5%	$67.93	$56.07	$44.25	$39.61	$39.89	$41.21	$48.34	$51.05	$51.50	$52.03
10%	$71.17	$58.74	$46.36	$41.49	$41.79	$43.17	$50.64	$53.48	$53.96	$54.51

Appendix 9.F.5: **Actual Data and Forecasts – Penn Power**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$67.73	$45.69	$31.42	$28.79	$30.77	$31.77	$35.88	$39.76	$39.96	$40.23
-10%	$60.96	$41.12	$28.28	$25.91	$27.69	$28.59	$32.29	$35.78	$35.96	$36.21
-5%	$64.34	$43.40	$29.85	$27.35	$29.23	$30.18	$34.09	$37.77	$37.96	$38.22
-1%	$67.05	$45.23	$31.11	$28.50	$30.46	$31.45	$35.52	$39.36	$39.56	$39.83
No Change										
1%	$68.41	$46.15	$31.73	$29.08	$31.08	$35.88	$39.76	$39.96	$40.23	$35.88
5%	$71.12	$47.97	$32.99	$30.23	$32.31	$32.29	$35.78	$35.96	$36.21	$32.29
10%	$74.50	$50.26	$34.56	$31.67	$33.85	$34.09	$37.77	$37.96	$38.22	$34.09

Appendix 9.F.6: **Actual Data and Forecasts – PPL**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$41.56	$46.66	$60.85	$70.81	$73.43	$69.14	$100.41	$109.99	$133.63	$155.37
-10%	$37.41	$41.99	$54.76	$63.73	$66.09	$62.23	$90.37	$98.99	$120.27	$139.83
-5%	$39.48	$44.33	$57.80	$67.27	$69.76	$65.69	$95.39	$104.49	$126.95	$147.60
-1%	$41.15	$46.19	$60.24	$70.10	$72.70	$68.45	$99.41	$108.89	$132.29	$153.82
No Change										
1%	$41.98	$47.13	$61.45	$71.52	$74.17	$69.84	$101.41	$111.09	$134.97	$156.92
5%	$43.64	$48.99	$63.89	$74.35	$77.11	$72.60	$105.43	$115.49	$140.31	$163.14
10%	$45.72	$51.33	$66.93	$77.89	$80.78	$76.06	$110.45	$120.99	$146.99	$170.91

Appendix 9.F.7: **Actual Data and Forecasts – West Penn**

	Actual Data						Forecasts			
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Avg Annual CAP Cost per Non-CAP Residential Customer	$14.25	$17.98	$22.34	$27.60	$41.02	$45.52	$53.10	$64.15	$64.78	$65.65
-10%	$12.83	$16.18	$20.10	$24.84	$36.92	$40.96	$47.79	$57.74	$58.30	$59.09
-5%	$13.54	$17.08	$21.22	$26.22	$38.97	$43.24	$50.45	$60.94	$61.54	$62.37
-1%	$14.11	$17.80	$22.11	$27.32	$40.61	$45.06	$52.57	$63.51	$64.13	$64.99
No Change										
1%	$14.39	$18.16	$22.56	$27.87	$41.43	$45.97	$53.63	$64.79	$65.43	$66.31
5%	$14.96	$18.88	$23.46	$28.98	$43.07	$47.79	$55.76	$67.36	$68.02	$68.93
10%	$15.68	$19.78	$24.57	$30.36	$45.12	$50.07	$58.41	$70.57	$71.26	$72.22

Appendix 9.G: Table 10-7 NGDCs Industry Cost per Non-CAP Residential Customer 5-Year Forecasting with Cost Adjustments 2017-2021

Appendix 9.G.1: **NGDC Industry Forecasts: Costs per Non-CAP Residential Customer with Cost Adjustments**

NGDC Industry Forecasts per Non-CAP Residential Customer with CAP Enrollment Adjustments					
Year	**2017***	**2018**	**2019**	**2020**	**2021**
-10%	$24.79	$24.16	$28.07	$28.52	$28.19
-5%	$26.17	$25.50	$29.63	$29.80	$29.76
-1%	$27.27	$26.58	$30.88	$31.05	$31.01
1%	$27.82	$27.11	$31.50	$31.51	$31.46
5%	$28.92	$28.19	$32.75	$32.78	$32.73
10%	$29.89	$29.27	$33.88	$33.92	$33.85

*2017 actual data from USR

Appendix 9.H: Table 10-8 EDCs Industry Cost per Non-CAP Residential Customer 5-Year Forecasting with Cost Adjustments 2017-2021

Appendix 9.H.1: **EDC Industry Forecasts: Costs per Non-CAP Residential Customer with Cost Adjustments**

EDC Industry Forecasts per Non-CAP Residential Customer with CAP Enrollment Adjustment					
Year	**2017***	**2018**	**2019**	**2020**	**2021**
-10%	$40.59	$50.59	$52.44	$56.15	$59.98
-5%	$42.84	$53.40	$55.32	$59.27	$63.31
-1%	$44.64	$55.65	$57.65	$61.77	$65.98
1%	$45.55	$56.78	$58.82	$63.02	$67.31
5%	$47.35	$59.03	$61.15	$65.51	$69.98
10%	$49.60	$61.84	$64.06	$68.63	$73.31

*2017 actual data from USR

Appendix 9.I: Table 10-10 NGDC CAP Heating Model – Additional Discount Needed for 6% NGDC Energy Burden

The example of a 10% energy burden applicable to all heat sources and FPIG levels would equate to a 6% energy burden for NGDC gas heating and 4% for EDC electric non-heating.

Appendix 9.I.1: **NGDC Model for 6% Energy Burden – Components**

NGDC Model for 6% Energy Burden						
Gas Heating	**Average CAP Bill Change Needed**			**Average CAP Gas Heat**		
	Accounts Billed 2012-2016			**Accounts Billed 2012-2016**		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Columbia	-$250.47	$0.00	$0.00	4,558	9,485	6,253
PECO Gas	-$799.54	-$620.26	-$557.40	1,187	2,346	1,922
Peoples	-$127.08	-$116.75	$0.00	3,799	8,470	5,992
Peoples EQT	-$154.12	-$221.60	-$194.74	4,182	7,090	1,738
PGW	-$56.98	-$330.82	-$696.37	18,795	36,365	10,808
UGI Gas	-$215.49	-$142.69	-$159.33	2,300	3,317	983
UGI PNG	-$264.12	-$209.47	-$176.26	1,289	2,752	1,083

Note: NFG not included in Model because data were not available at specific FPIG levels.

Appendix 9.I.2: **NGDC Model for 6% Energy Burden – Costs**

NGDC Model for 6% Energy Burden					
	AVG Cost to Reach 6% EB			**Incremental Cost to Change CAP Customers Currently Over 6% with Gas Heating, down to a targeted 6% Energy Burden**	
FPIG Level	**50%**	**100%**	**150%**	**Company**	**Amount**
Columbia	-$1,141,671	$0	$0	**Columbia**	-$1,141,671
PECO Gas	-$949,472	-$1,455,171	-$1,071,488	**PECO Gas**	-$3,476,132
Peoples	-$482,898	-$988,893	$0	**Peoples**	-$1,471,791
Peoples EQT	-$644,602	-$1,571,350	-$338,627	**EQT**	-$2,554,578
PGW	-$1,070,907	-$12,030,427	-$7,526,891	**PGW**	-$20,628,225
UGI Gas	-$495,780	-$473,414	-$156,751	**UGI Gas**	-$1,125,945
UGI PNG	-$340,481	-$576,603	-$191,032	**UGI PNG**	-$1,108,115
				NGDC TOTAL	**-$31,506,457**

Note: NFG not included in Model because data were not available at specific FPIG levels.

Appendix 9.J: Table 10-11 EDC CAP Electric Heating Model – Additional Discount Needed for 10% Energy Burden

Appendix 9.J.1*:* **EDC Model for 10% Energy Burden – Components**

EDC Model for 10% Energy Burden						
Electric Heating	Avg CAP Bill Change Needed			AVG CAP Electric Heat		
	Accounts Billed 2012-2016			Accounts Billed 2012-2016		
FPIG Level	50%	100%	150%	50%	100%	150%
Duquesne	-$765.72	-$151.78	$0.00	664	2,071	1,086
Met-Ed	-$65.30	$0.00	$0.00	1,440	3,023	1,660
PECO Electric	-$591.82	-$339.58	-$89.68	4,570	8,916	7,591
Penelec	-$160.46	$0.00	$0.00	904	2,444	1,098
Penn Power	-$668.18	-$29.38	$0.00	259	596	368
PPL	-$296.38	$0.00	$0.00	3,141	9,000	6,557
West Penn	-$562.48	-$27.18	$0.00	1,097	2,220	1,306

Appendix 9.J.2: **EDC Model for 10% Energy Burden – Costs**

EDC Model for 10% Energy Burden					
	AVG Cost to Reach 10% EB			Incremental Cost to Change CAP Customers Currently Over 10% with Electric Heating, down to a targeted 10% Energy Burden	
FPIG Level	50%	100%	150%	Company	Amount
Duquesne	-$508,936	-$314,354	$0	Duquesne	-$823,290
Met-Ed	-$94,059	$0	$0	Met-Ed	-$94,059
PECO Electric	-$2,704,923	-$3,027,842	-$680,776	PECO Electric	-$6,413,541
Penelec	-$145,120	$0	$0	Penelec	-$145,120
Penn Power	-$173,337	-$17,530	$0	Penn Power	-$190,867
PPL	-$931,182	$0	$0	PPL	-$931,182
West Penn	-$617,331	-$60,351	$0	West Penn	-$677,682
				EDC TOTAL	**-$9,275,741**

Appendix 9.K: Table 10-12 EDC CAP Electric Non-Heating Model – Additional Discount Needed for 4% Energy Burden

Appendix 9.K.1: **EDC Model for 4% Energy Burden – Components**

EDC Model for 4% Energy Burden						
Electric Non-Heating	**Avg CAP Bill Change Needed**			**AVG CAP Electric Non-Heat**		
	Accounts Billed 2012-2016			**Accounts Billed 2012-2016**		
FPIG Level	**50%**	**100%**	**150%**	**50%**	**100%**	**150%**
Duquesne	-$705.14	-$404.33	-$213.85	6,967	16,182	8,755
Met-Ed	-$231.26	-$55.56	$0.00	4,120	7,452	5,457
PECO Electric	-$446.11	-$312.56	-$193.87	24,293	48,334	29,442
Penelec	-$246.94	$0.00	$0.00	5,594	12,179	8,070
Penn Power	-$461.70	-$68.76	-$51.70	1,173	2,725	2,090
PPL	-$703.36	-$414.81	-$49.54	3,804	10,710	8,133
West Penn	-$475.44	-$335.35	-$251.49	4,163	7,247	4,605

Appendix 9.K.2: **EDC Model for 4% Energy Burden – Costs**

EDC Model for 4% Energy Burden					
	AVG Cost to Reach 4% EB			**Incremental Cost to Change CAP Customers Currently Over 4% with Electric Non-Heating, down to a targeted 4% Energy Burden**	
FPIG Level	**50%**	**100%**	**150%**	**Company**	**Amount**
Duquesne	-$4,912,741	-$6,543,038	-$1,872,303	**Duquesne**	-$13,328,083
Met-Ed	-$952,977	-$414,068	$0	**Met-Ed**	-$1,367,045
PECO Electric	-$10,837,681	-$15,107,489	-$5,708,105	**PECO Electric**	-$31,653,275
Penelec	-$1,381,508	$0	$0	**Penelec**	-$1,381,508
Penn Power	-$542,033	-$187,418	-$108,075	**Penn Power**	-$837,526
PPL	-$2,676,214	-$4,442,829	-$402,887	**PPL**	-$7,521,930
West Penn	-$1,979,613	-$2,430,374	-$1,158,215	**West Penn**	-$5,568,203
				EDC TOTAL	**-$61,657,570**

Appendix 9.L: Table 1-2 NGDC and EDC Energy Usage/Demand Forecasts

Appendix 9.L.1: **Residential Natural Gas Usage Forecasts**

	Retail Residential Gas Usage (Firm Sales) Forecast in Mmcf						2016-2021
Utility:	**2016***	**2017***	***2018***	***2019***	***2020***	***2021***	**Percent Change**
Columbia	24,389	24,984	*23,520*	*23,617*	*23,737*	*23,891*	-2.1%
NFG	15,556	15,602	*17,425*	*17,529*	*17,652*	*17,671*	13.6%
Peoples	40,745	40,873	*41,781*	*41,885*	*41,011*	*41,061*	0.8%
EQT	(Combined with Peoples)						
PGW	30,604	32,668	*35,189*	*35,131*	*35,382*	*35,595*	16.3%
UGI Gas	20,096	20,609	*22,551*	*23,174*	*23,815*	*24,461*	21.7%
UGI PNG	15,160	14,880	*16,844*	*17,003*	*17,138*	*17,319*	14.2%
PECO Gas	35,159	37,918	*41,662*	*41,886*	*42,265*	*42,637*	21.3%

Source: 2018 Annual Resource Planning Reports (ARPR)
*Actual Data

Appendix 9.L.2: **Residential Electric Demand Forecasts**

		Projected Residential Electric Demand in GWh						2016-2021
Utility:		**2016***	**2017***	***2018***	***2019***	***2020***	***2021***	**Percent Change**
Duquesne		4,197	3,876	*3,949*	*3,915*	*3,856*	*3,797*	-9.5%
Met-Ed		5,528	5,351	*5,347*	*5,265*	*5,201*	*5,166*	-6.6%
Penelec		4,328	4,153	*4,238*	*4,157*	*4,090*	*4,056*	-6.3%
Penn Power		1,686	1,591	*1,640*	*1,617*	*1,604*	*1,595*	-5.4%
PECO		13,664	13,024	*13,266*	*13,240*	*13,182*	*13,104*	-4.1%
PPL		13,810	13,650	*13,588*	*13,499*	*13,448*	*13,253*	-4.0%
West Penn		7,186	6,817	*6,931*	*6,906*	*6,819*	*6,756*	-6.0%

Source: 2018 Electric Power Outlook for Pennsylvania -
http://www.puc.pa.gov/General/publications_reports/pdf/EPO_2018.pdf
*Actual Data

Appendix 9.L.3: **Residential National Energy Prices: U.S. EIA**

U.S. Energy Information Administration Historic and Forecast Prices											
Residential	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	***2019***	***2020***	***2021***	**Percent Change**
Units: 2017 $/MMBtu	**Historic**							***Forecast***			**2017-2021**
Energy Prices: Natural Gas	10.60	10.01	10.73	10.25	9.93	10.77	10.39	*10.79*	*11.06*	*11.17*	**3.7%**
Energy Prices: Electricity	35.35	35.64	37.08	37.60	37.46	37.12	37.08	*38.07*	*39.18*	*39.42*	**6.2%**

Appendix 9.M: ***Variance between USECP CAP Cost Projections and Actual CAP Costs***

Appendix 9.M.1: **Variance between USECP CAP Cost Projections and Actual CAP Costs – Energy Industry 2015-2017 (EDC + NGDC)**

	2015	2016	2017	Total	Overall % Spend
CAP Costs from USECPs	$362,091,155	$351,521,805	$367,747,093	$1,081,360,053	
Actual USR CAP Costs	$348,439,656	$327,338,456	$325,596,206	$1,001,374,318	92.6%