Public Service Company of Colorado's (PSCo) Pilot Energy Assistance Program (PEAP) and Electric Assistance Program (EAP)

2011 Final Evaluation Report

Colorado PUC E-Filings System

Prepared For:

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The analysis and conclusions presented in this Final Evaluation are exclusively the responsibility of the author and do not necessarily represent the opinions and conclusions of Public Service Company of Colorado or of Xcel Energy Company.

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Executive Summary

In 2009, Public Service Company of Colorado (PSCo) began offering low-income customers its Pilot Energy Assistance Program (PEAP).[1] The PEAP delivered benefits on natural gas bills through two primary mechanisms.

- Some customers took service through a percentage of income "fixed credit" program. Through this program, Public Service calculated the bill credit necessary to reduce the customer's projected annual natural gas bill to no more than three percent (3%) of income. In addition to the fixed credit, program participants received bill credits designed to reduce the repayment of pre-existing arrears to an affordable level.

- In the alternative, customers took service through a "tiered rate discount" program. These tiered discounts ranged from 15% of a customer's bill at standard residential rates to 25% of a customer's bill. The tiered discount was available for customers whose bills as a percentage of income were less than the 3% percentage of income without the discount.

One purpose of the PEAP was to determine the extent to which, if at all, a targeted percentage of income program and the less-targeted tiered discount program delivered equivalent benefits and achieved equivalent outcomes.

[1] Docket No. 085-546G (December 2008).

This Final Evaluation is based on data for the 24 months ending September 30, 2011. The Final Evaluation considers and compares the groups of customers for the 24-month study period. Four basic study groups were used in the analysis:

- Group 1: those customers who were combination gas/electric PSCo customers who participated in PEAP for between 21 and 24 months of the 24-month study period;[2]

- Group 2: those customers who were combination gas/electric PSCo customers who participated in PEAP for between one (1) and six (6) months of the 24-month study period;

- Group 3: those customers who were recipients of low-income federal energy assistance (called LEAP in Colorado) (but who had not participated in PEAP at any time); and

- Group 4: those customers who were general residential customers (which might include LEAP participants, but would not include any customer that had participated in PEAP at any time).

At times, the residential and LEAP comparison groups will be further disaggregated by the amount of arrears that existed in Month 1 of the study period. Other disaggregation may from time-to-time be presented and will be specifically noted when they are discussed.

This Final Evaluation is presented in four parts. After a brief introduction, Part 1 explains the operation of the PEAP and examines selected attributes of program participants. Part 2 examines the outcomes of the program from the perspective of the customer. Part 3 examines the outcomes of the program from the perspective of the company. The final Part of the Evaluation summarizes findings and makes recommendations as appropriate.

Attributes of PEAP Participants

A substantial majority of customers participated in *both* the gas *and* electric affordability programs of Public Service. Even through the electric and gas programs were independent of each other, combination customers who participate in the gas program are most likely to participate in the electric program also. Nearly two-thirds of gas program participants (65%) also participated in the electric program.

Low-income gas customers tend to be reasonably divided between the percentage of income Fixed Credit program component and the bill discount program component. More than half (55%) of all PEAP participants took service under the Fixed Credit program component, while 45% took service under the discount. Low-income electric service was substantively different. More than 8-of-10 customers (82%) participated in the electric Fixed Credit program component, rather than the Discount program.

[2] Throughout this report, unless specifically noted otherwise, references to "combination" customers, or a "combination G/E" customer, are intended to refer to customers taking combination gas and electric service from Public Service.

Very few PEAP participants lived in homes that had been weatherized. These unweatherized homes include an overwhelming majority of high use participants. Of the 666 Fixed Credit participants with usage more than 150% of the average, 629 had not been weatherized. Of the 194 Tiered Rate Discount participants with usage greater than 150% of the average, 183 had not been weatherized. A similar pattern exists for participants with bills greater than 130% of the average.

The PEAP participation population tended to have somewhat higher natural gas consumption than both the residential population in general and the federal energy assistance population. Gas-only PEAP participants had a higher gas usage than did the gas-only LEAP participant or the gas-only residential customer. Each type of combination (electric/gas) PEAP participant (PEAP/EAP, PEAP/no-EAP) also evidenced higher consumption than did either the LEAP population or general residential population.

In contrast, with a few exceptions, the low-income consumption tends to be lower than the general residential consumption. In particular, the consumption of the high-arrears non-participant low-income population of gas-only customers tends to be lower than the high-arrears residential population as a whole. The usage of the low-income combination customers at all arrearage levels is lower than the usage of the residential customers at all arrearage levels.

While the *incidence* of pre-existing arrears was noticeably higher for Fixed Credit customers than for Tiered Rate Discount customers, the *level* of pre-existing arrears was not. Across all ranges of pre-existing arrears, the average arrears for Tiered Rate Discount customers was roughly equal to the average arrears for Fixed Credit customers. Customers who take a combination gas and electric service bring a higher level of pre-existing arrears into the program.

The benefits of the PSCo PEAP initiative flow not simply from the amount of the discount provided, but also from the levelized budget billing under which bills for current usage are presented to program participants. The levelized budget billing makes a considerable difference in the reduction in monthly volatility in bills. The "flatness" in the variation in month-to-month bills for all months from months 1 through 24 becomes evident as the length of PEAP participation increases. For PEAP participants in the program for only one to six months, the volatility in monthly bills is quite high. For customers in PEAP for 21 to 24 months, the volatility in monthly bills is quite low. The same impact can be seen for both the all-PEAP population and the PEAP population taking combination gas/electric service.

Customer Perspective: PEAP Payment Characteristics

Providing rate affordability assistance to low-income utility customers in Colorado should provide low-income customers with the capacity to sustain bill payment. "Sustaining bill payment" (referred to in this evaluation as "payment compliance" involves the following payment attributes with respect to bills for current usage:

- Complete bill payment;

- Prompt bill payment;
- Regular bill payment; and
- Unsolicited bill payment.

In sum, one objective of the Company's PEAP and EAP programs is to improve customer management of their own bills as bills become more affordable. Rather than having partial, late or periodic payments, or payments that are made only in response to Company collection activity, the objective is for low-income customers to address their bills for current usage in a complete, regular, timely and unsolicited fashion on a monthly basis.

This Final Evaluation found that due to improved payment compliance, the PEAP program generated a revenue neutrality when PEAP participants were compared to other low-income customers, but not when compared to the residential population as a whole. PEAP generates a sufficiently substantial improvement in payment coverage ratios relative to the low-income (LEAP) population to more than offset the discount provided.

To the extent that the low-income customers have a prior history of non-payment, the revenue neutrality will be somewhat (but not substantially) greater. However, because the payment coverage ratios of the residential population as a whole are higher with which to begin, the revenue that is being "lost" to nonpayment in the absence of the discount is smaller, and the increase in payment coverage ratios is insufficiently large to offset the effects of the discount.

PEAP participant payments did not demonstrate significant seasonal variability. In both Years 1 and 2 of the study period, PEAP participant payments remained reasonably constant during the cold weather and non-cold weather months. Payments declined somewhat in Year 2 of the study period, reflecting a corresponding decline in the underlying bills. However, in neither year did overall payments show an abrupt seasonal decline.

PEAP appears to have generated a positive impact on PEAP participant bill payment coverage ratios. Continuing participation in the Company's PEAP appears to help low-income customers increase their customer payment coverage ratio. The population of PEAP participants with the lowest customer payment coverage ratio is the population with least number of months of PEAP participation. Low-income customers who had participated in PEAP for more than 12 months had customer payment coverage ratios of roughly 80%.

Overall, PEAP appears to help low-income customers improve their payment coverage ratio. Combination gas/electric customers who participate in both EAP and PEAP demonstrate a distinctly improved cumulative customer payment coverage ratio than do either LEAP recipients or residential customers generally.

PEAP was successful in maintaining the number of accounts in arrears to the same levels as those which were experienced in the residential and federal energy assistance populations overall. Differences began to appear in the winter heating season of the first year of the study

period. At that time, the number of energy assistance (LEAP) accounts with $0 in arrears began to decrease, while the number of PEAP accounts instead continued to reflect the payment patterns of residential customers as a whole. During the warm weather months of the first year of the study period, the improvement of PEAP payment patterns relative to LEAP increased further.

Overall, long-term PEAP participants had significantly improved payment patterns as measured by the incidence of arrears. A higher proportion of customers had arrears in six or fewer months. A lower proportion of PEAP customers had arrears in both 13 to 18 months and in 19 to 23 months than for either LEAP or the residential population generally.

PEAP appears to reduce both the rate and intensity of the use of notices of disconnection for nonpayment (DNP notice) as a collection activity. Customers who participated in PEAP for between 21 and 24 months in the study period received one-third the number of DNP notices as did short-term PEAP participants. While the difference was narrower between long-term PEAP participants and both LEAP recipients and residential customers having $0 in Month 1 arrears, there still existed a significant drop in the number of DNP notices per account compared to LEAP and to the general residential population.

The same observations cannot be made about the actual disconnection of service for nonpayment (DNP). While there appears to be a lower overall incidence of DNPs within the PEAP population, the intensity of the use of DNPs does not demonstrate the same reduction per each account having experienced a disconnection for nonpayment.

Utility Perspective: Collection Effectiveness and Productivity

Improvements in the productivity of collection activities can occur in either of two ways:

- The need for collection interventions can be reduced thus allowing an increased payment per each collection intervention performed; in the first instance, improvement can be seen even if total dollars collected remains the same (but the interventions needed to generate those dollars decreases); or

- The customer response to the collection activity can improve thus allowing an increased payment per each collection intervention performed. In this second instance, improvement can be seen if the total number of collections activities remains the same but the dollars generated by those activities increase.

In essence, this evaluation process considers the effectiveness and efficiency of collection activities from two different but related perspectives. On the one hand, it examines how much revenue is generated by each collection intervention. On the other hand, it examines how many collection activities are associated with the generation of the revenue.

The collection activities that Public Service directs toward non-PEAP participants are not as efficient at generating payments as those collection activities directed toward PEAP participants.

The Company needs to engage in from three to five times more collection activities (in this case, issuing notices of disconnection for nonpayment) for each 1,000 customer payments it receives.

The disparity in performance between PEAP participants and non-participants is even more evident when the long-term PEAP population is compared to low-income customers who received LEAP benefits, but never participated in PEAP. Low-income customers who receive only LEAP received, on a cumulative basis over the 24-month study period, more DNP notices per 1,000 customer payments than did PEAP participants. Moreover, while the rate at which DNP notices are issued per 1,000 customer payments received is seen to be increasing for each population, the rate of increase for the PEAP population is slower than for the LEAP recipients.

In the converse analysis, which considers the percentage of accounts receiving DNP notices that have a customer payment coverage ratio of *more* than 1.0 in the ensuing four months, a higher number is "more effective" while a lower number is "less effective." While PEAP participation does not eliminate the seasonal variation in this level of payment success after a DNP notice, the proportion of PEAP participants making customer payments of more than 1.0 is consistently higher than the proportion of either short-term PEAP participants, LEAP recipients or residential customers generally. The residential population as a whole out-performs the low-income LEAP recipient population, but does not achieve the same level of multi-month payment success after receipt of a DNP notice as does the PEAP population.

While the level of performance regarding arrears is much closer, the PEAP participant population outperforms both the LEAP and the residential population. A lower proportion of PEAP customers had an arrearage that was higher in the fourth month after receiving a DNP notice than in the month having received a DNP notice. When viewed on a monthly basis, there is a noticeable seasonal variation in this metric. Consistent with the prior data, we find that PEAP participants have both a lower proportion of accounts with higher arrearages and a higher proportion of accounts with lower arrearages.

Recommendations

The Final Evaluation offers a series of recommendations for Public Service to pursue to improve its delivery of low-income energy assistance. The recommendations, while flowing from and supported by the data and analysis presented through this Final Evaluation, represent the conclusions and recommendations of the author. They may or may not be endorsed by the Company. Recommendation #1 is based simply on the observation that the PEAP/EAP initiative appears to effectively, and cost-effectively, accomplish the objectives articulated for the program at its inception. It should be continued beyond its "pilot" stage as a permanent fixture of the Company's low-income rate and customer service offerings. .

Recommendation #2 through Recommendation #6 are designed to improve the efficient design of the Company's low-income program. It is acknowledged, however, that implementation of these recommendations are not exclusively within the province of the Company.

Recommendation #2, for example, involving an automatic enrollment process for LEAP recipients, would require future conversations between the state LEAP office and the Company. Recommendation #5, involving inter-utility sharing of information to facilitate the enrollment of low-income customers using electricity for other than primary heating would require future conversations between PSCo and those utilities with whom PSCo "shares" its service territory.

Recommendation #7 through Recommendation #11 are designed to improve the efficient operation of the Company's low-income programs. They address a variety of issues ranging from the accurate determination of discount levels (Recommendation #8) to both medium-term (Recommendation #7) and long-term (Recommendation #9) cost-control mechanisms.

Finally, Recommendation #12 seeks to take the learning arising from the PEAP/EAP pilots with respect to the positive impacts of levelizing bills (and payments) through equal monthly budget billing and extending that learning beyond the confines of the specific study populations of PEAP/EAP. While Recommendation #12 exceeds the scope of the specific "low-income" population treated through PEAP and EAP, and recommends a service offering that may or may not be a part of any proposed permanent low-income plan to be filed with the Commission in the Spring of 2012, it identifies important lessons regarding the positive effects of budget billing and recommends that Company (and other stakeholders) begin a conversation that would appear to deliver positive benefits to participants and non-participants in the same fashion as PEAP/EAP has delivered positive benefits.

Given this introduction, the Recommendations flowing from the data and analysis presented in the narrative above include the following:

1. The Pilot Energy Assistance Program (PEAP) and Electric Assistance Program (EAP) offered by Public Service Company of Colorado (PSCO) were found above to be cost-effective mechanisms for delivering rate affordability assistance to low-income customers. These programs were found not only to be revenue-neutral from the perspective of the Company, but were also found to increase the productivity, efficiency and effectiveness of existing collection mechanisms. Accordingly **Recommendation #1** is for Public Service to continue the PEAP/EAP as a permanent feature of its rate and customer service offerings to low-income customers.

2. Consistent with this primary recommendation, PSCO should work with the Colorado LEAP office to devise a mechanism for the automatic enrollment of LEAP recipients in PEAP/EAP. Participation in the PEAP/EAP appears clearly to improve the payment patterns of low-income customers. An enrollment process, however, that requires the utility to solicit participation and that, correspondingly, requires a customer to take some affirmative action-step to enroll, creates a barrier to enrollment that redounds to the detriment of both the customer and the Company. **Recommendation #2** is for the state

LEAP office and Public Service to enter into a conversation to develop and implement a process through which an application for LEAP assistance would be deemed an application for PEAP/EAP participation (and that, consistent with the observation in Appendix 2 that PEAP/EAP is in effect a form of ratepayer-funded "supplement" to the federal LEAP benefits, the LEAP application would constitute or contain a consent to share the information necessary for customers to access those ratepayer-provided benefits without further administrative action on the customer's part).

3. In addition to working with the state LEAP office, the Public Service should work with other state agencies to assess the feasibility of an automatic enrollment process for non-LEAP customers. The data clearly indicates that in the absence of PEAP/EAP participation, LEAP recipients have consistently poorer payment performance than does the residential customer base as a whole. No reason exists to believe that a low-income customer receiving federal energy assistance has a poorer payment performance than a low-income customer not receiving federal energy assistance. As a result, it is likely that the cost-effectiveness and revenue neutrality found for LEAP participants would extend to other low-income non-LEAP recipients. Given that the sharing of information between government agencies and public utilities has been approved as a "routine use" under federal privacy law,[3] when such sharing facilitates enrollment in public assistance programs, the commencement of such a conversation to implement such an exchange with Public Service is merited.[4] **Recommendation #3** is for Public Service to pursue an agreement under which an application for non-LEAP public assistance (e.g., SNAP/Food Stamps, SSI WIC, Medicaid) would be deemed an application for PEAP/EAP (and a consent to share necessary information solely for the purposes of allowing such enrollment).

4. While it was generally the case that customers enrolling in PEAP also enrolled in EAP, that dual enrollment was not universally the case. As the data discussion above notes, it is not possible to determine whether a combination gas/electric customer who participates in the natural gas program (PEAP) without also participating in the electric program (EAP) involves a customer taking electric service from a vendor other than PSCO or whether that customer has simply failed to enroll in both available programs. **Recommendation #4** is for PSCO to ensure that enrollment of a combination gas and

[3] See e.g., 70 *Federal Register* 10456, 10460 (March 3, 2005).
[4] The electronic exchange of data with a public utility has long been approved by the federal government. In a 1994 letter to the Public Utility Law Program (PULP) of New York, for example, the Social Security Administration (U.S. Department of Health and Human Services) (SSA) stated "we are authorizing approval for a confidential, computerized data exchange of SSI recipient data between the New York State Department of Social Services and New York Telephone (NYNEX), a regulated public utility. This exchange of information which you described is considered "routine use" under the Privacy Act regulations."

electric customer in either the gas or electric affordability program will be deemed to be an enrollment in both programs.

5. The door through which low-income customers enter the PEAP/EAP programs involves an application for federal energy assistance (LEAP) benefits. As a result, while customers who are combination gas/electric customers taking both services from the Company, or who are customers using electricity as their primary heating source, tend to enroll in the PEAP/EAP initiatives when those initiatives affect the customer's primary heating fuel, or in the combined PEAP/EAP initiatives when a combination customer. In contrast, EAP (in particular) tends *not* to reach electric-only customers when the customer has a non-electric primary heating fuel supplied by a vendor other than PSCO. This failure to reach non-heating electric-only service occurs notwithstanding the fact that the data supports the conclusion that electric non-heating bills appear to represent a greater threat to affordability than do natural gas heating bills. **Recommendation #5** is for PSCo to establish an inter-utility information sharing mechanism through which PSCO may share the fact of PEAP participation with the electric vendor(s) serving the geographic area in which the PEAP participant resides exclusively for the purpose of enrolling that customer in the corresponding electric-only affordability program. Moreover, **Recommendation #6** is for Public Service to convene a work group of interested stakeholders to determine an appropriate procedure for identifying and enrolling customers purchasing primary heating fuel from a non-regulated energy vendor in the PSCO electric affordability program.

6. One of the primary attributes of PEAP/EAP participants who enroll in the Fixed Credit rather than the Tiered Rate Discount program component is a consistently higher annual (and thus average monthly) bill. Under the Fixed Credit program, where the credit provided by the Company is "fixed" (and not the customer payment), the impact of bill volatility (either due to changes in consumption or due to changes in prices) lies with the customer. If the bill increases, the customer pays the difference. If the bill decreases, the customer pockets the reduction. In contrast, under the discount program, where the discount is fixed (and not the monthly credit), the impact of bill volatility is shared between the customer and the Company in proportion to the extent of the discount. The Company appears to do an adequate job of estimating Year 1 energy bills when customers enroll in the PEAP/EAP (although it appears to be more difficult to accurately estimate natural gas bills). **Recommendation #7** is to convert the Tiered Rate Discount program into a fixed credit program along with the percentage-of-income based Fixed Credit program component. Under this approach, a customer would not be offered a 15% discount, but rather would be offered a monthly fixed credit equal to a 15% discount if the customer incurs a bill at the level of the estimated bill.

7. While the Company appears to accurately estimate annual home energy bills for low-income customers who enroll in PEAP/EAP (although it appears to be more difficult to estimate natural gas bills than to estimate electric bills), as the period of participation extends beyond Year 1, the bill estimates become less and less accurate. Moreover, to the extent that a customer with higher consumption (and thus a customer with higher Fixed Credits or Tiered Discount amounts) is weatherized using utility or government funds, the benefits of the reduced consumption redound exclusively to the benefit of the customer. While a customer should bear the risk of higher bills in the short-term, and pocket the benefit of reduced bills in the short-term, the program should neither pay affordability amounts (whether discounts or fixed credits) at a higher-than-needed or lower-than-needed rate over the long-term. **Recommendation #8** is to re-estimate the participant natural gas/electric bills on an annual basis to re-determine both the Fixed Credit amount and/or the Tiered Rate Discount amount.

8. Participation in the Fixed Credit program component appears to be largely driven by the size of the low-income customer's annual bill. Not only are average bills for Fixed Credit participants somewhat higher than the average bills of Tiered Rate Discount participants, but also the incidence of Fixed Credit participants in the groups of customers with bills higher than designated ranges (130% of average; 150% of average) is higher as well. High bills for Fixed Credit program participants in particular are costly to the program, as the bills above the designated affordable percentage of income are paid (albeit through a fixed credit) on a dollar-for-dollar basis (rather than as a percentage discount). Despite these higher bills, and the structure of the affordability rate component, an overwhelming majority of high-use customers have received no weatherization services. On a long-term basis, weatherizing homes of participants with fixed credits that are high-cost (due to high use) should present a substantial opportunity for program cost reduction. **Recommendation #9** is for the Company to create a close tie-in between the provision of high-cost fixed credits to high use customers and available weatherization programs.

9. Participation in both the PEAP and EAP initiatives appears to increase the productivity, efficiency and effectiveness of company collection activities directed toward program participants. Not only are fewer collection activities directed toward program participants, but fewer collection activities are directed toward program participants on a per-unit of bills basis (e.g., per-1,000 bills per-$1,000 of billed revenue). Despite this increase in the productivity, efficiency and effectiveness of company collection activities, and despite the fact that program participants out-perform their low-income LEAP counterparts on important bill-sustainability metrics, a substantial proportion of PEAP/EAP program participants fail to make consistently full and timely payments on a monthly basis. The PEAP/EAP programs are designed to provide bill credits as the Company's contribution toward helping bills be "affordable" (and thus subject to

sustainable bill payment). In the event that payments are *not* made, however, PEAP/EAP participants should be subject to the same collection activities and same collection opportunities (e.g., deferred payment arrangements) as customers that do not participate in the program(s) are. **Recommendation #10** is for the Company to review its collection activities to ensure that, for purposes of collection, PEAP/EAP participants are subject to the same collection activities and collection opportunities as residential customers not participating in PEAP/EAP are.

10. This Final Evaluation represents a comprehensive evaluation of the success (or lack thereof) of the Public Service PEAP/EAP initiatives in achieving the program objectives articulated for PEAP/EAP before the programs ever began. Despite its comprehensive nature, the PEAP/EAP initiative will continue to evolve and will generate different impacts responsive to different social and economic conditions existent in different years. One attribute of good program planning involves an on-going evaluation of the activities, outputs and outcomes of the PEAP/EAP initiatives. Nonetheless, a program can be "over-evaluated," with the expenses of evaluation outweighing the benefits of added learning generated by the evaluation. **Recommendation #11** is for the PEAP/EAP initiatives to be subjected to a periodic evaluation by an independent third-party on a six-year cycle with the results of that evaluation provided to the Company, the Commission, and other interested stakeholders.

11. A substantial population of low-income customers receives gas and/or electric bills that fall below an affordable percentage of income without assistance (as indicated by the customer's participation in the Tiered Rate Discount rather than the Fixed Credit program component). While the data supports the observation that Tiered Rate Discount participants tend to have substantively lower home energy bills, given the distribution of both gas and combination gas/electric bills, it is reasonable to expect that as household income increases, it is increasingly likely that a "low-income" customer receives a bill that does not reach the designated percentage-of-income based threshold of "unaffordability." Despite the receipt of bills that are at or below this percentage-of-income based affordability level, the Company's PEAP initiative appears to offer substantive advantages in levelizing bill payments over the course of the year. Moreover, when monthly payments are compared to monthly bills, it further appears that levelizing bills has the effect of levelizing bill payments as well. **Recommendation #12** is for the Company to provide financial incentives, in an amount determined to be effective and reasonable, for customers with income above the eligibility level for PEAP/EAP but below a level considered to be adequate for a household to make consistently full and timely payments, to incentivize such customers to enter into levelized budget billing (known on the PSCO system as Equal Payment Plans, EPPs).

Introduction

This final program evaluation is charged with assessing whether the Public Service Company of Colorado's (PSCo) Pilot Energy Assistance Program (PEAP) generates the outcomes that it was designed to achieve. From an evaluation perspective, it is possible to measure three identified program components:

- Did the program *do* what it said it would do (activity measures)?
- Did the program *produce* what it said it would produce (output measures)?
- Did the program *yield* what it said it would yield (outcome measures)?

The purpose of this Final Evaluation is two-fold:

- First, the discussion below will report data on the activities of the Public Service Pilot Energy Assistance Program (PEAP). These activities include information on factors such as the enrollment of program participants; the distribution of benefits; the calculation of energy bills; the distribution of program participants by program component; and the like.
- Second, the discussion below will report data on program outcomes. These outcomes will focus on factors such as customer payments and the collection activities involved with generating those payments.

The information is based on data provided by Public Service for the 24-month period October 2009 through September 2011. Ultimately, the program evaluation is charged with assessing whether the PEAP generates the outcomes that it was designed to achieve. In turn, the outcomes

of the program are assessed from two perspectives. On the one hand, there are outcomes from the perspective of the customer (e.g., payment outcomes). On the other hand, there are outcomes from the perspective of the Company (e.g., collection effectiveness and efficiency). Both perspectives will be specifically addressed below.

In light of this introduction, this document is presented in the following parts:

- Part 1 examines the underlying attributes of the PEAP population;
- Part 2 examines the payment characteristics of the various PEAP populations; and
- Part 3 examines the effectiveness and productivity of Public Service collection efforts within the various PEAP populations.

The final section articulates findings and recommendations based on the data and analysis presented in the first three sections.

The PEAP Implementation Plan

The PEAP Implementation Plan presented to the CPUC in the winter of 2009 presented two sections that are relevant to the program evaluation. First, the Implementation Plan identified the "program objectives" for PEAP. Second, the Implementation Plan identified a mechanism through which the operation of the program would be assessed after-the-fact to determine the extent to which, if at all, those objectives have been achieved.

Any evaluation of the extent to which, if at all, a utility rate affordability program accomplishes its program objectives can only be measured through an analysis of program outcomes. While output measures and activity measures may be relevant to a discussion of how well a program operates, neither of those measurements contributes to a determination of whether the program's objectives are being met. Accordingly, the discussion below identifies the program objectives and discusses outcome measurements to determine whether those objectives are being achieved. The program objectives represent the *raison d'ētre* for the Company's low-income interventions.

The discussion below identifies the objectives of the PEAP.[5] After each objective, there is presented a discussion of the program "outcomes." "Outcomes" measure what a program *accomplishes*.

Objective #1: The PEAP should improve utility operations to the benefit of all customers.
Providing rate affordability assistance to low-income utility customers in Colorado should seek to improve utility operations to the benefit of all customers, including non-participating customers.[6] While this objective is a primary objective of the PEAP, it is not the exclusive, and perhaps not the primary, objective. Other objectives might predominate in importance even if they "cost" Public Service money.

[5] The objectives were first set forth in the Program Implementation Plan, filed by Public Service with the Colorado Public Utilities Commission (CPUC) in February 2009. (hereafter PEAP Implementation Plan). The PEAP Implementation Plan set forth program objectives before the first customer was enrolled in the Program.
[6] PEAP Implementation Plan, at 4 – 5.

The following two specific outcomes will be measured in assessing this program objective:

- **Revenue Neutrality:** The revenue neutrality of a low-income program examines the extent to which, if at all, a low-income rate affordability program generates the same dollars of revenues to the utility as would have been generated without the offer of discounted rates or bills. "Revenue neutrality" distinguishes between billed revenue and collected revenue. Revenue neutrality is based on the observation that it is better to collect 90% of a $70 bill ($63 revenue) than it is to collect 60% of a $90 bill ($54 revenue). Revenue neutrality occurs when a low-income program increases collected revenue sufficiently to offset any reduction in billing attributable to the program's bill discount.

- **Cost-Efficiency Relative to Alternatives:** The cost efficiency of a low-income program, relative to alternatives, measures whether the low-income rate affordability program generates at least the same level of revenue to the Company in a less-costly way than currently available alternatives might generate the same revenue. Cost-efficiency considers the revenue potentially generated by an increase in collection activities not involving discounted bills. Using the effectiveness of those collection activities in generating revenue, along with the costs of those collection activities, the analysis then assesses the extent to which available collection alternatives could have produced the same level of revenue as that generated by the rate affordability program and, if so, at what cost. Finally, a comparison of the cost of the low-income affordability program to the cost of an equivalent increase in collection activities is considered.

Objective #2: The PEAP should provide low-income customers with the capacity to sustain complete bill payment. Providing rate affordability assistance to low-income utility customers in Colorado should provide low-income customers with the capacity to sustain bill payment.[7] "Sustaining bill payment" involves the following payment attributes with respect to bills for current usage:

- **Complete Bill Payment:** The most common indicator of whether complete payment has been received from a utility customer involves measuring both the incidence and depth of arrears. The *incidence* of arrears considers the proportion of the total population in arrears. The *depth* of arrears considers the size of arrears at any given point in time. A bill coverage ratio (the proportion of current bills paid) should also be used (on a monthly, seasonal and annual basis) to consider complete bill payment over a period of time.

- **Prompt Bill Payment:** Prompt bill payment considers the timeliness of bill payment, not merely whether a customer pays his or her utility bill in full. If a utility renders a bill for $100, that company wants a customer to pay the bill by the due date as well as paying the bill in full. Bill promptness is primarily measured through the use of a "weighted arrears" statistic called "bills behind."

[7] PEAP Implementation Plan, at 5 – 7.

- **Regular Bill Payment:** The regularity of bill payment measures the extent to which customers make at least *some* bill payment each month. A customer may maintain a relatively low level of arrears by paying multiple months of bills on an infrequent basis. An examination of January arrears, for example, does not distinguish between the customer that has made his or her last twelve monthly payments on time and in full, the customer that has made $0 in payments during August through October (perhaps waiting for a Low Income Home Energy Assistance Program ("LIHEAP") benefit to pay those arrears), and the customer who makes three payments over the year, the sum of which payments equals the total annual bill. The *regularity* of bill payment measures the extent to which some payment is made in response to each bill rendered.

- **Unsolicited Bill Payment:** The extent to which bill payments are "solicited" considers the extent to which, if at all, a company is required to engage in collection activities to generate a bill payment. An *unsolicited bill payment* involves a payment that is made in response to a bill without any need for company collection contact with the customer. Measuring collection activities considers both the number and the intensity of collection activities. A more intense collection activity involves a more direct company-to-customer contact than does a less intense activity. Issuing a posted disconnect notice involves a more intense activity than issuing a computer generated "reminder" notice. The disconnection of service involves a more intense collection activity than does a call center contact.

In sum, the second objective of the Company's PEAP is to improve customer management of their own bills as bills become more affordable. Rather than having partial, late or periodic payments, or payments that are made only in response to Company collection activity, the objective is for low-income customers to address their bills for current usage in a complete, regular, timely and unsolicited fashion on a monthly basis.

Objective #3: The PEAP should help minimize the extent of home energy insecurity as measured by the Home Energy Insecurity Scale. The final objective of a low-income rate affordability program is to minimize the extent of home energy insecurity.[8] Administrators of low-income energy assistance programs have long struggled to develop a mechanism to capture the many facets of home energy unaffordability.

- Some efforts have focused on lowering home energy burdens. A household's "energy burden" is the household bill divided by the household's gross income. This process, however, does not capture the circumstances of a household for whom the receipt of energy assistance might result in an *increase* in the home energy burden (e.g., because he or she is no longer required to cut off all rooms of the home but one).

- Some efforts have focused on the nonpayment of home energy bills (as well as the disconnection of service and other collection-related problems). This process,

[8] PEAP Implementation Plan, at 7 – 8.

however, does not capture the circumstances of a customer that pays his or her bill, but reduces spending on household necessities for food or medicine in order to do so.

- Some efforts have focused on reductions in energy consumption. This process, however, does not capture the circumstances of a household whose energy unaffordability problems result from very low incomes (even though usage may be very low as well).

Home energy security is measured through application of the Home Energy Insecurity Scale. Developed for the federal LIHEAP office, the Home Energy Insecurity Scale allows the program manager to capture all aspects of low-income energy affordability. Through application of the Scale, customers are categorized into one of five levels of the scale: thriving, capable, stable, vulnerable, in-crisis. An improvement in home energy security is evidenced not merely by where a customer falls on the scale, but by the change in status as represented by a move "up" the scale (e.g., from vulnerable to stable, from in-crisis to vulnerable).[9]

The Final Evaluation

This Final Evaluation involves extensive data analysis of both a "participant" and a "non-participant" population. The objective of this Evaluation is to assess the extent to which, if at all, the PEAP program succeeded in achieving the program objectives articulated in the "Implementation Plan" filed with the Colorado utility commission at the inception of the program. The discussion below presents a description of the research population, the data collected, and the research questions that were used to guide the data analysis.

The Research Populations

The Final Evaluation of the PEAP initiative is based on data from three separate populations;

Study Group: Population 1 involves PEAP participants. In turn, the PEAP population was sub-divided into populations defined by the fuel(s) purchased from PSCo (gas, electric, combination), the corresponding participation in EAP (the electric equivalent of PEAP), and the number of PEAP participation months. The final "participant" populations separately studied thus include those set forth in Table 1.

Table 1. Populations Studied from Amongst PEAP Participants

Population Description	Population Count
Combination Gas/Electric: No EAP: 1 – 6 months PEAP participation	153
Combination Gas/Electric: No EAP: 21 – 24 months PEAP participation	601
Combination Gas/Electric: With EAP: 1 – 6 months PEAP participation	524
Combination Gas/Electric: With EAP: 21 – 24 months PEAP participation	3,356

[9] Due to the decision to decrease the affordability target from 5% to 3% during the operation of the program, and the subsequent addition of the Electric Assistance Program (EAP) to the gas PEAP, the Home Energy Insecurity Scale survey was not performed.

The complete disaggregation of the total participant population between three sets of demarcation is set forth in Appendix 1 (page 1). Each of the populations will be considered an independent population throughout this report unless expressly noted otherwise.

Control Group 1: The Control Group 1 consists of non-PEAP participants who have received assistance through the federal Low-Income Home Energy Assistance Program (LIHEAP, which is known as LEAP in Colorado).[10] In turn, this Control Group 1 was divided by the fuel(s) purchased from Public Service and by the level of arrears in "Month 1" (October 2009). In addition, customers on a levelized budget billing plan (or Equal Payment Plan, EPP) were segregated out (but were of insufficient number to include in any analysis). The two overall populations that were retained for the analysis included gas-only customers (not EPP) and combination (i.e., gas and electric not EPP). The study groups from the Energy Assistance (LEAP) population are those set forth in Table 2.

Table 2. Populations Studied from Energy Assistance Recipients Not PEAP Participants

Population Description	Population Count
Combination gas/electric (no EPP) (Total)	3,070
Combination: Month 1 arrears =<$0	1,405
Combination: Month 1 arrears > $0 =< $250	1,016
Combination: Month 1 arrears > $250	649

The complete disaggregation of the Control Group 1 population is set forth in Appendix 1 (page 2).

Control Group 2: The Control Group 2 consists of non-PEAP customers randomly selected from the residential customer population. Control Group 2 is *not* "non-LEAP" customers, but rather is a selection of residential customers irrespective of whether or not the customer received LEAP. As a result, Control Group 2 has both LEAP and non-LEAP recipients within it.

As with Control Group 1, this population was subdivided by the fuel(s) purchased from Public Service and by the level of arrear sin Month 1 (i.e., October 2009). For the same reasons as with Control Group 1, Equal Payment Plan (EPP) customers were segregated out but not included in any analysis. As a result, the final study groups for Control Group 2 are those set forth in Table 3. The complete disaggregation of the Control Group 2 population is set forth in Appendix 1 (page 3).

[10] One cannot say that the LEAP population is the "low-income" population. For purposes of this analysis, the LEAP participation population is used as a surrogate for "low-income" households in general, despite the shortcomings in that use.

Table 3. Populations Studied from Residential Population as a Whole, Not PEAP Participants	
Population Description	Population Count
Combination gas/electric (no EPP) (Total)	2,492
Combination: Month 1 arrears =<$0	1,111
Combination: Month 1 arrears > $0 =< $250	876
Combination: Month 1 arrears > $250	505

From these populations, this Final Evaluation is based primarily on data for the 24 months ending September 2011. The Final Evaluation considers and compares the groups of customers for this 24-month study period. Four basic study groups were used in the analysis presented below:

- Group 1:those customers who were combination gas/electric customers who participated in PEAP for between 21 and 24 months of the 24-month study period;
- Group 2: those customers who were combination gas/electric customers who participated in PEAP for between one (1) and six (6) months of the 24-month study period;
- Group 3: those customers who were recipients of low-income federal energy assistance (called LEAP in Colorado) (but who had not participated in PEAP at any time); and
- Group 4: those customers who were general residential customers (which might include LEAP participants, but would not include any customer that had participated in PEAP at any time).

At times, the residential and LEAP comparison groups will be further disaggregated by the amount of arrears that existed in Month 1 of the study period. Other comparisons may from time-to-time be presented and will be specifically noted when they are discussed.

In sum, to fully understand the analysis that follows below, it would be easiest to conceptualize the Final Evaluation as comparing the following populations:

- Representing the "participation" population are customers who participated in both the gas and electric programs (PEAP and EAP);
- Representing the non-participation population are customers receiving federal energy assistance (but participating in neither discount program), along with PEAP participants who participated in the program for six or fewer months; and
- Representing the general residential population are customers irrespective of whether they received federal energy assistance, but who did not at any time participate in PEAP.

While some additional detail may occasionally be provided (e.g., by length of program participation for the participant group; by level of Month 1 arrears for the comparison groups), this added detail merely adds granularity to the analysis. It does not change the fundamental nature of the underlying populations.

Data Collection

Data for this Final Evaluation was provided for three distinct populations:

- A study group, consisting of customers who participated in PEAP for one or more months in the study period;

- A low-income comparison group, consisting of customers who received LEAP benefits[11] in the 2010 and/or 2011 program year,[12] but who had not participated in PEAP in any month; and

- A residential comparison group, consisting of residential customers irrespective of whether they received LEAP, but who had not participated in PEAP in any given month.[13]

For each population, monthly information was provided for the 24 months ending September 2011. Information was provided on:

- Monthly consumption;
- Monthly bills for current usage;
- Monthly asked-to-pay amounts;[14]
- Payments dates and dollar amounts, including both customer payments and agency payments;
- Monthly collection activities, including the disconnection of service for nonpayment (DNP) and notices of the potential disconnection of service for nonpayment;
- Whether the customer, in each given month, was participating on a payment plan, including both levelized budget billing and deferred payment arrangements for arrears.

Data from each of the population groups was adjusted based on certain factors that made the data unusable. Customers for whom billing and usage data was reported for more than one premise were excluded from the analysis. Customers for whom billing, usage and payment data was reported for more than one month in a single study month were excluded from the analysis. Records for which one or more months had more than 56 days of billing data were eliminated, as were records that were "missing" one or more months of data.

[11] LEAP is the Colorado acronym for the federal energy assistance program, the Low-Income Home Energy Assistance Program (LIHEAP), 42 U.S.C., Sections 8621, et seq. (2011).
[12] A LEAP program year runs from November through the subsequent October.
[13] A customer in the residential control group could be a LEAP recipient, but could not be in both the LEAP control group and in the residential control group.
[14] Asked-to-pay amounts may differ from bills for current usage in situations such as if the customer was participating in equal monthly budget billing; if the customer had unpaid bills from a prior month that are subject to payment (e.g., not on a payment plan); and the like.

The final population counts, by sub-division of each population, are presented in Appendix 1 (page 1: Study Group; page 2: LEAP comparison group; page 3: residential comparison group). The data provided for each population will become operationally evident throughout this Final Evaluation.

The Research Questions

Based on the data collection explained above, the following research questions will be presented for analysis:

- Program effectiveness
- Program cost-neutrality
- Program cost-effectiveness/cost-efficiency

In sum, the data analysis presented in this Evaluation is directed toward assessing the extent to which, if at all, the Public Service PEAP initiative meets the objectives articulated in the Program Implementation Plan. In addition to presenting basic descriptive information about PEAP activities (e.g., number of customers served), this Final Evaluation will consider each of the program objectives using the data elements identified in the narrative above. The discussion below is intended to provide insights into the effectiveness of PEAP in achieving the articulated objectives; into the revenue neutrality of the PEAP; and into the cost-effectiveness and/or cost-efficiency of the PEAP.

Structure of the Final Evaluation

Given this introduction, the remainder of the Final Evaluation is presented in three parts:

- Part 1 explains the operation of the PEAP and examines selected attributes of program participants.
- Part 2 examines the outcomes of the program from the perspective of the customer.
- Part 3 examines the outcomes of the program from the perspective of the company.

A final section will present basic findings and make recommendations as appropriate.

Part 1: Attributes of PEAP Program Participants

The Pilot Energy Assistance Program (PEAP) of Public Service delivered benefits through two primary mechanisms.

- On the one hand, the PEAP delivered benefits through a percentage of income "Fixed Credit" program. Through this program component, natural gas bills were set equal to an affordable percentage of income. The program began by defining "affordable" as a home energy burden equal to 5% of income. A mid-course modification was made to lower that affordable percentage to 3% of income.

- On the other hand, PEAP customers whose home energy burdens were already at or below the affordable level were offered a Tiered Rate Discount. Depending on the ratio of household income to Poverty Level, tiered discount levels were set at 15%, 20% or 25% of the bill at standard residential rates.[15]

PEAP Participation: The Differing Program Components.

The Pilot Energy Assistance Program (PEAP) has several components to it. On the one hand, PEAP is the low-income affordability program for PSCo's natural gas customers. On the other hand, Public Service also operates its corresponding Electric Assistance Program (EAP). Even though Public Service is a combination gas and electric utility, its gas and electric service territories are not identical. Moreover, participation in one of the low-income programs does not ensure participation in both. Accordingly, a low-income customer could participate in the gas-

[15] The EAP subsequently provided corresponding electric benefits.

only PEAP, in the electric-only EAP, or in both the gas and electric programs.[16] In addition, within either the PEAP (gas) or EAP (electric) programs, customers have the option of participating in the percentage-of-income-based Fixed Credit program component or in the Tiered Rate Discount program component.

Of the 10,966 customers for whom records were provided,[17] the vast majority of customers showed participation in ***both*** the gas ***and*** electric programs. Program participation is set forth in Table 4 below.

Table 4. PEAP Participation by Program Component and EAP Program Component Participation

		EAP Program Component			
		Fixed Credit	Discount	No-EAP	Total
PEAP Program Component	Fixed Credit	3,357	261	1,905	5,523
	Discount	2,093	901	1,602	4,596
	No PEAP	670	177	---	847
	Total	6,120	1,339	3,507	---

Far more low-income customers participated in PEAP without also participating in the corresponding electric program than participated in EAP without also participating in PEAP.

- Of the 10,119 PEAP participants, 3,507 (35%) did not also participate in the corresponding electric program.[18]

- Of the 7,459 EAP participants, 847 (11%) did not also participate in the corresponding gas program.[19]

The broader observations from this data provide important insights into the structure and operation of the PSCo low-income program(s):

[16] In reviewing the "PEAP with EAP" population, it is important to remember that the EAP program did not begin until May 2010. Accordingly, throughout this report, even the "PEAP with EAP" population refers to a group of customers whose enrollment in EAP began in May 2010 of the study period at the earliest. The study period runs from October 2009 to September 2011.
[17] 103 records did not identify the program in which the customer was enrolled and were thus excluded from the data upon which this analysis is based.
[18] This does not mean that all of these customers took non-discounted electric service. PEAP customers may not be Public Service electric customers.
[19] This does not mean that all of these customers took non-discounted gas service. EAP customers may not be Public Service natural gas customers.

- Even though the electric and gas programs were independent of each other, combination customers who participate in the gas program are most likely to participate in the electric program also. Nearly two-thirds of gas program participants (65%) also participated in the electric program.

- The primary entry point for the low-income program appears to be a household's primary heating fuel. Few electric program participants did not also participate in the corresponding gas program. Of the electric-only participants, it is not possible to distinguish between those with all-electric homes (i.e., no gas heating), those using a non-PSCo heating fuel (e.g., natural gas provided by a gas company other than PSCO, bulk fuels such as propane or fuel oil), or those simply not choosing to participate in the low-income gas program.

Requiring participation in the federal low-income energy assistance program (LEAP) as a prerequisite for participation in the PEAP[20] likely explains the lack of electric-only participants. Low-income customers taking Public Service electric service, but using heating fuels provided by a vendor other than Public Service, would not enter EAP through the LEAP process.

In addition to the electric/gas program components, both the electric and gas low-income programs are offered in two independent program components. If the gas and/or electric burden of a customer exceeds an affordable percentage of income, the customer participates in the "fixed credit" program component. If the customer is low-income, but nonetheless has a bill less than the affordable percentage of income burden, the customer is placed on the Tiered Rate Discount. Discounts range from 15% to 25% depending on income.

Low-income gas customers tend to be reasonably divided between the percentage of income Fixed Credit program component and the Tiered Rate Discount program component. Of all categories PEAP participants (10,119), 55% took service under the Fixed Credit program component, while 45% took service under the Tiered Rate Discount. A slightly higher proportion of customers on the gas Fixed Credit program were also on the electric Fixed Credit program (62%). A virtually identical proportion of customers on the gas-only program took service under the Fixed Credit program component (54%).

Low-income electric service was substantively different. Far more low-income customers on the EAP qualified to take Fixed Credit service rather than the Tiered Rate Discount. More than 8-of-10 customers (82%) participated in the electric Fixed Credit program component, rather than the Tiered Rate Discount program. Irrespective of their gas program component participation, the electric participation tended toward the Fixed Credit component (93% with gas Fixed Credit also had electric Fixed Credit; 70% of gas Discount had electric Fixed Credit; 79% with no gas program participation at all had electric Fixed Credit).

[20] Requiring LEAP participation as a prerequisite to PEAP participation raises the issue of the extent to which the posting federal LEAP assistance complies with the federal LIHEAP Information Memorandum 2010-13 (July 2013). This issue is briefly discussed in Appendix 2.

Of the gas program participants taking service under the Tiered Rate Discount rather than the Fixed Credit program, the overwhelming majority qualified at the lowest discount level (15%). As Table 5 shows, 71% received the 15% discount; 20% received the 20% discount; and 9% received the 25% discount. This result does not reflect the distribution of income. Rather, it simply reflects the fact that as incomes increase, the likelihood increases that the gas bill will already be less than the designated affordable percentage of income. Households at the lower income levels that would qualify for the higher discounts are more apt to be receiving service under the Fixed Credit program component rather than the Tiered Rate Discount program component.[21]

Table 5. Tiered Rate Discount Participation by Discount Percent

	Gas PEAP Discount Participants				Electric EAP Discount Participants			
	15%	20%	25%	Total	15%	20%	25%	Total
Number	3,273	930	393	4,596	937	326	74	1,337
Percent	71%	20%	9%	100%	70%	24%	6%	100%

Similar results are evident in the electric Discount program. Of the 1,337 electric Discount participants with data,[22] 70% fell into the lowest discount range; 24% fell into the middle range; and six percent (6%) fell into the higher discount range.

Length of Participation and Program Exit Dates

Information on when low-income customers both enter and exit the PEAP program does not reveal a consistent pattern of factors that might influence program participation and non-participation. While it appears that combination gas/electric customers who participate in both the PEAP and EAP tend to more consistently stay in the program for an extended period of time, factors such as beginning arrearage levels and expected non-discounted bill levels do ***not*** appear to have an impact. Program entry dates, the length of program participation, and program exits are discussed immediately below.

Program Entry Date

All types of PEAP participants enrolled in the PEAP program relatively early in the 24-month study period. As Figure 1 indicates, whether gas-only or combination gas and electric customers, the majority of PEAP participants enrolled in the program in the first six months:

- 80% of gas-only PEAP participants enrolled in the program within the first six months of the 24-month study period;

[21] The results also show the fallacy of increasing participation by increasing income eligibility. As income increases, fewer customers would receive benefits under a percentage of income program.
[22] Six (6) were uncategorized.

- 75% of combination gas/electric PEAP participants (with EAP) enrolled within the first six months of the study period;[23]

- 80% of combination gas/electric PEAP participants (without EAP) enrolled within the first six months of the study period.

By definition, the customers who participated for all or nearly all of the 24-month study period had enrolled within the first few months of the study period. More than half (55%) of the long-term PEAP participants (21-24 months) had enrolled in the first month of the study period, while nearly 8-of-10 (78%) had enrolled within the first two months. In contrast, the short-term PEAP participants (1 – 6 months) enrolled toward the end of the study period (rather than enrolling early and dropping out). Nearly 80% of these short-term PEAP participants enrolled in the last six months of the study period. Only 13% had enrolled in the first three months (but did not participate for the full study period).

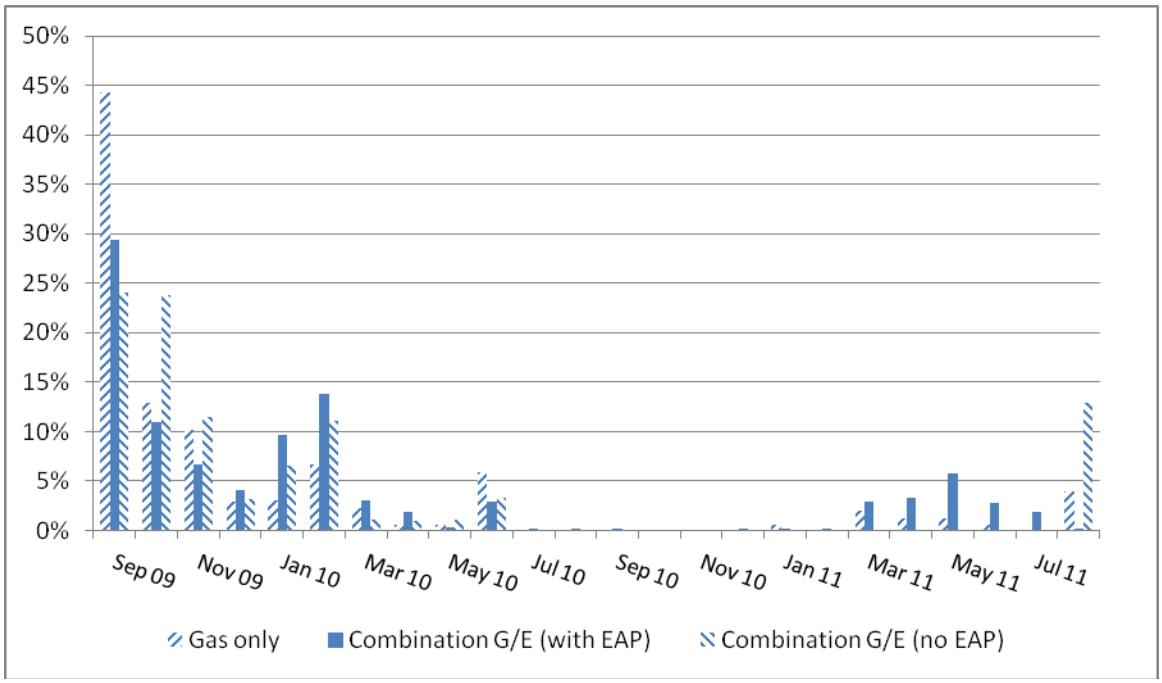

Figure 1. Percentage PEAP Participants by Date of Program Entry and Fuel Type.

Length of PEAP Participation

Public Service provided data on nearly 9,000 PEAP participants. Nearly three-quarters of those participants were combination gas and electric Public Service customers, 80% of whom participated in both PEAP and EAP. Of the 9,000 participants, roughly 90% participated for one

[23] The enrollment dates refer to PEAP enrollment dates. The EAP program did not begin until May 2010. Accordingly, throughout this report, even the "PEAP with EAP" population refers to a group of customers whose enrollment in EAP began in May 2010 of the study period at the earliest. The study period runs from October 2009 to September 2011.

or more months of the 24-month study period.[24] Nearly 60% of the PEAP participants participated for nearly the entire study period (21-24 months), while an additional 20% participated for more than half of the study period. Customers who take different fuels (or fuel combinations) from PSCo exhibited different participation characteristics. The data is set forth in Table 6.

- Combination gas/electric PEAP participants who did not also participate in EAP were under-represented in the long-term participation and over-represented in the group of 0-month participants.

- Combination gas/electric PEAP participants who also participated in EAP were under-represented in the 0-month participation, but otherwise reasonably reflected the split between participation groups.

- A nearly identical proportion of gas-only (86%) and combination gas/electric (PEAP & EAP) (87%) PEAP participants were longer-term participants, with virtually the same proportion participating in nearly the entire 24-month study period (68% gas-only; 65% combination gas/electric with PEAP and EAP).

Table 6. Length of Participation in PEAP (in Study Period) by Fuel(s) Purchased from Public Service

	All		Gas Only			Electric/Gas (PEAP & EAP)			Electric/Gas (PEAP/no-EAP)			Row Totals /a/
Months of Participation	No.	Col %	No.	Row %	Col %	No.	Row %	Col %	No.	Row %	Col %	
0	835	9%	68	8%	4%	52	6%	1%	245	29%	17%	44%
1-6	801	9%	84	10%	5%	524	65%	10%	153	19%	11%	95%
7-12	398	4%	88	22%	5%	105	26%	2%	156	39%	11%	88%
13 – 20	1,775	20%	294	17%	18%	1,132	64%	22%	275	15%	19%	96%
21-24	5,145	57%	1,129	22%	68%	3,356	65%	65%	601	12%	42%	99%
Column Total	8,954	100%	1,663	19%	100%	5,169	58%	100%	1,430	16%	100%	92%

NOTES:
/a/ The difference between this number and 100% is attributable to "electric-only" participants. Electric-only participants have been excluded from this analysis.

No significant differences existed in the estimated bills between long-term and short-term PEAP participants for gas-only and combination customers who did not also participate in EAP. The combination customers who did also participate in EAP, but who participated in PEAP for six (6)

[24] A customer who had an entry and exit date in the same month was deemed to have participated for "0" months, as were customers who enrolled in the last month of the study period.

or fewer months had a significantly smaller total estimated annual bill. Not surprisingly, combination customers exhibited larger estimated annual bills than did gas-only customers.

Table 7. Estimated Annual Bill at Time of PEAP Enrollment by Length of PEAP Participation

	Estimated Annual Bill		
Months of Participation	Gas-Only	Combination G/E (with EAP)	Combination G/E (no-EAP)
1-6	$635	$682	$665
7-12	$613	$1,668	$662
13 – 20	$694	$1,588	$725
21-24	$640	$1,453	$711

The similarity in estimated bills between the gas-only and combination gas/electric customers who did not also participate in EAP raises a question as to the accuracy of the categorization of these customers as "combination gas/electric" customers. It is not immediately evident why combination customers who participated in PEAP and EAP for only one (1) to six (6) months might have substantially lower estimated bills.

No evident patterns exist with respect to the level of pre-existing arrears as of the date of the enrollment in PEAP and how long a customer participated in PEAP. Customers participating in PEAP for the longer period of time (21 – 24 months in the 24-month study period) appear to have the lowest level of arrears (of customer having arrears).

Table 8. Estimated Pre-Existing Arrears (of customers having arrears) at Time of PEAP Enrollment by Length of PEAP Participation

	Estimated Annual Bill		
Months of Participation	Gas-Only	Combination G/E (with EAP)	Combination G/E (no-EAP)
1-6	$183	$1,091	$496
7-12	$84	$521	$477
13 – 20	$111	$514	$474
21-24	$40	$189	$184

It is important to remember what Table 8 does *not* report. It does not present data on arrears after the application of any type of PEAP credit. The arrears in Table 8 are those arrears that pre-exist program participation, those that are brought into the program by the PEAP applicant.

Program Exits

Public Service reports that 1,985 PEAP participants entered the program, but for one reason or another either dropped-out or were suspended from the program before the program's end-date. The vast majority of customers leaving the program exited because they moved out of the Public Service service territory (n=1,405).[25] Only 32 exited the program at their own request. Just over 100 accounts were removed from the program when the account holder died.

An evident seasonal pattern existed to PEAP participants leaving the program due to a change of service addresses. Mobility appears to occur more frequently in warm weather months. Consider that of the PEAP participants leaving the program due to a change in service addresses, 84 left in May 2010, 80 left in October 2010, and 86 in September 2011. An average of 72 persons exited PEAP each month due to address changes in July 2010 through November 2010, while an average of 51 left in December 2010 through April 2011. Similarly, an average of only36 per month left in December 2009 through April 2010 due to address changes.

The number of PEAP participants leaving PEAP at their own request was insufficiently large to form a basis for conclusions about seasonality. However, more than two-thirds of the participants leaving the program based on their own request left in the first ten months of the program. No person was removed from the program at the customer's request subsequent to November 2010.

The gas-only PEAP participants were somewhat overrepresented in the exit population as measured by their percentage of the total population (27% of exits compared to 20% in total population). The population of combination gas/electric customers who participated only in PEAP (and not also in EAP) were also over-represented (35% of exits compared to 17% of total population). Those customers who were most likely to enter the PEAP and remain in the program for the full study period were combination gas/electric customers who participated in both the PEAP and EAP programs (38% of exits compared to 63% of total participants).

Table 9. Percentage of Exit Population by Fuels Purchased from PSCo

	Percentage of Total Population Count	Percent of Exit Population
Gas-Only	20%	27%
Combination gas/electric (EAP)	63%	38%
Combination gas/electric (no-EAP)	17%	35%
Total	100%	100%

[25] Another 208 moved from a home with gas service to a home having only electric service, and were switched from PEAP to EAP. Another twelve moved from a home having only electric service to a home having combination gas/electric and were moved to the EAP and PEAP. A final seven (7) moved from a home with only electric service to a home with only gas service and were switched from EAP to PEAP.

Fixed Credit Participation: Weatherization Potential

While not explicitly a part of the rate affordability program, Public Service tracked which PEAP and EAP customers had received weatherization services prior to entering the affordability program. The discussion below considers certain billing characteristics disaggregated by whether the customer had received weatherization. Before beginning, however, it is important to note the purpose of this discussion. The intent is to gain insights into the extent to which, if at all, weatherization can be used as a cost-reducing strategy by PSCo for its low-income program. The purpose is *not* to assess the impacts of the usage reduction measures on previously weatherized homes.

To consider the cost-reducing potential of weatherization, this analysis began with all PEAP participants. It excluded customers with reported gas bills of $0. To remove outliers, the one percent (1%) of participants with the highest gas bills and the one percent (1%) with the lowest gas bills were also excluded. The remaining 10,215 participants were distributed by whether they had been previously weatherized and by whether they participated in PEAP (gas), in EAP (electric) or in both. Finally, both gas and electric bills were distributed by whether they were or were not equal to or in excess of either 130% or 150% of the population average. The results are set forth in Table 10 below.

Table 10. Weatherization by Participation in PEAP and EAP and Bills Compared to Population Average

Weatherization (yes or no)	PEAP/EAP Participation?	Total	Gas Bills >130% Average		Gas Bills > 150% of Average	
			No	Yes	No	Yes
No	YN /a/	3,447	2,850	597	3,114	333
	YY	6,377	5,343	1,034	5,893	484
	Sub-total	9,824	8,193	1,631	9,007	817
Yes	YN	136	103	33	120	16
	YY	255	199	56	223	32
	Sub-total	391	302	89	343	48
Total		10,215	8,495	1,720	9,350	865

NOTES:

/a/ YN = Yes for PEAP / No for EAP. YY = Yes for PEAP / Yes for EAP.

Table 10 demonstrates the lack of weatherization within the low-income participant population. Of the 10,215 PEAP participants, only 391 lived in homes that had been weatherized. This includes an overwhelming majority of high use participants:

- Of the 865 PEAP participants with gas usage at or above 150% of the average, 817 remain unweatherized.

- Of the 1,720 PEAP participants with gas usage at or above 130% of the average,[26] 1,631 remain unweatherized.

The potential for weatherization to reduce the cost of both PEAP and EAP is significant. Nonetheless, the potential varies based on whether a PEAP/EAP participant is enrolled in the percentage of income Fixed Credit or in the Tiered Rate Discount program component.

- If the participant is enrolled in the Fixed Credit program, after Year 1, there is a dollar-for-dollar program savings.[27] Since the amount of the fixed credit is based on what dollars are required to bring a bill down to an affordable percentage of income, if the bill is lowered by weatherization, the needed credit is lowered as well.[28]

- If the participant is enrolled in the Tiered Rate Discount program, there is a cost-savings equal to the bill reduction times the discount level. If, in other words, a participant receiving a 20% discount reduces his/her bill by $500 through weatherization, the program cost savings is $100 ($500 x 20%).

Table 11 presents the data. Of the 666 Fixed Credit participants with usage more than 150% of the average, 629 had not been weatherized. Of the 194 Tiered Rate Discount participants with usage greater than 150% of the average, 183 had not been weatherized. A similar pattern exists for participants with bills greater than 130% of the average.

Table 11. Gas PEAP Participants by Percentage of Bill to Population Average, PEAP Program Component and Weatherization Participation Status

	Fixed Credit		Discount	
	Bill > 130% Average	Bill > 150% Average	Bill > 130% Average	Bill > 150% Average
No weatherization	1,192	629	426	183
Weatherization	64	37	25	11
Sub-Total by Multiplier of Average	1,256	666	451	194
Population total	5,528		4,587	

Table 12 presents the corresponding results for the electric consumption of PEAP participants. There are far fewer EAP high-use customers enrolled as a participant in the Tiered Rate Discount

[26] The set of participants at or above 150% of the average is a sub-set of those participants at or above 130% of the average. The categories are ***not*** "130% to 150%" and "150% or more."
[27] Under this program component, the credit is "fixed" in Year 1, but would be recalculated each year based on income and expected usage for that year.
[28] In essence, part of the "fixed credit" is provided through a bill reduction arising from the usage reduction generated by weatherization, rather than as a bill credit.

program component. Nearly all are enrolled as Fixed Credit customers (meaning their bills exceed an affordable percentage of income). Nonetheless, the potential electric program cost savings from weatherization is substantial.

Table 12. PEAP Accounts by Electric Bills as Percentage of Population Average and EAP Program Component

	Fixed Credit		Discount	
	> 130% Average	> 150% Average	> 130% Average	> 150% Average
No Weatherization	1,242	776	34	15
Weatherization	56	36	1	1
Sub-total by Multiplier	1,298	812	35	16
Population Total	6,134		1,336	

Of the 1,298 EAP Fixed Credit participants with electric bills greater than 130% of the average, 1,242 had not been weatherized. Of the 812 EAP Fixed Credit participants with electric bills greater than 150% of the average, 776 had not been weatherized.

Table 13. Electric and Natural Gas Bills for Unweatherized Homes by Percentage of Population Average and EAP Program Component

	Fixed Credit		Discount	
	> 130% Average	> 150% Average	> 130% Average	> 150% Average
Gas: Not weatherized	$1,020	$1,129	$988	$1,109
Electric:: Not weatherized	$1,550	$1,718	$1,448	$1,692

The potential for cost savings arising from weatherization could be significant. Table 13 presents the average natural gas bills for unweatherized PEAP participants homes (above 130% and above 150% of the population average), along with the average electric bills for unweatherized EAP participants homes (above 130% and above 150% of the population average). Assuming weatherization can reduce bills by roughly 15% (for the sake of analysis),[29] the annual cost of the natural gas Fixed Credit could be reduced by $150 to $160 per weatherized home. The cost of the gas Tiered Rate Discount program component could be reduced by roughly $20 to $40 per year. In contrast, the cost of the electric Fixed Credit program

[29] Customer Services Information System Project, Pennsylvania State University (January 2009). *Long-Term Study of Pennsylvania's Low-Income Usage Reduction Program: Results of Analyses and Discussion*, prepared for Pennsylvania Public Utility Commission, Penn State University: State College (PA).

component could be reduced by $150 to $170 annually, with the electric Tiered Rate Discount cost reduction being correspondingly lower.[30]

Bills and Usage: PEAP Participants

This section of the Final Evaluation examines various attributes of both the bills and consumption of the PEAP participant population. With one exception, the discussion does not focus on a comparison of the PEAP participant population to the non-participant population. Rather, the discussion focuses on describing participant attributes that are important to the efficient operation of PEAP.

PEAP Participants: Estimated Annual Bills

Of the critical steps of establishing the costs of a low-income affordability program, whether it involves a percentage of income program or a rate discount program, involves estimating the expected annual bill of program participants. The analysis below examines the average gas (PEAP) and electric (EAP) bills from two perspectives. The first section assesses the level of the expected bills. The second section examines how closely the *estimated* bills reflect the actual (non-discounted) bills incurred by program participants.

At the time a customer enters the low-income affordability program, Public Service estimates a natural gas (PEAP participant) and/or electric (EAP participant) annual bill. The estimated bill is used for two separate but related purposes. First, this bill is used to determine whether the customer is placed into the percentage of income Fixed Credit program component or into the Tiered Rate Discount program component. If the customer's natural gas and/or electric burden (i.e., bill as percentage of income) is greater than the percentage of income defined to be "affordable," the customer is placed into the Fixed Credit program component. In contrast, if the customer's bill is already below the affordable burden (e.g., gas burden is 2% when the affordable PEAP percent is 3%), the customer is placed in the Tiered Rate Discount program component. The gas and electric bill calculations are performed separately, with each annual bill measured against the affordable percentage for that fuel.

The second step applies only to those customers who are placed into the percentage of income Fixed Credit program. Since a Fixed Credit customer has an estimated bill that exceeds the affordable percentage of income, PSCo must calculate an annual credit (modified to a monthly credit by dividing by 12) that is sufficient to reduce the bill to the affordable burden. If the estimated bill is $1,200, for example, and the bill at an affordable percentage of income is $720, the annual fixed credit would be $480 ($1,200 - $720 = $480). If the estimated bill is $1,600 and the bill at an affordable percentage of income is $720, an annual fixed credit would be $880 ($1,600 - $720 = $880).

[30] Remember, the Fixed Credit cost reduction would reflect the usage/bill reduction on a dollar-for-dollar basis, while the Tiered Rate Discount cost reduction would reflect the bill reduction times the percentage discount level.

Table 14. Distribution of Expected Natural Gas Bill by PEAP Program Component.

	$100 - $250	$251 - $500	$501 - $750	$751 - $1000	$1001 - $1,500	$1,501 or more	Total
Fixed Credit	0%	17%	46%	25%	10%	1%	100%
Discount	3%	34%	44%	14%	4%	1%	100%
Total	1%	25%	45%	20%	7%	1%	100%

As Table 14 shows, the bulk of non-discounted natural gas bills for PEAP customers ranged between $500 and $1,000 annually. Not surprisingly, somewhat more gas bills fell into higher ranges for Fixed Credit participants than for Tiered Rate Discount participants.[31] Of Fixed Credit PEAP participants, 36% had natural gas bills of $750 or more, compared to 19% of Tiered Rate Discount participants with bills that high. Of Tiered Rate Discount participants, 37% had bills of $250 or less, compared to 17% of Fixed Credit participants with bills that low.

Table 15. Average Expected Natural Gas Bills by PEAP and EAP Participation.

Program Component	Participation: PEAP/EAP	$100 - $250	$251 - $500	$501 - $750	$751 - $1001	$1001 - $1500	$1501 or more	Total
Fixed Credit	YY	$191	$423	$628	$850	$1,161	$1,769	$732
	YN	$188	$421	$625	$852	$1,146	$1,738	$703
Discount	YY	$203	$408	$608	$844	$1,123	$1,893	$602
	YN	$200	$396	$610	$847	$1,150	$1,925	$582
Sub-total	YY	$200	$414	$619	$848	$1,153	$1,791	$674
	YN	$198	$406	$619	$850	$1,146	$1,809	$651
Total population		$199	$408	$669	$849	$1,149	$1,802	$659

As the data in Table 15 shows, while Tiered Rate Discount participants have somewhat lower bills than Fixed Credit participants, no major differences appear between PEAP customers who also participate in EAP (YY) and those who participate in PEAP but not in EAP (YN).

The difference in expected bills between Fixed Credit and Tiered Rate Discount participants was even more pronounced for EAP participants. Table 16 shows that while 66% of Fixed Credit

[31] Since the Fixed Credit program component is limited to customers with bills greater than the designated affordable percentage of income, while the Tiered Rate Discount is limited to customers with bills less than the designated affordable percentage of income, it is to be expected that the Tiered Rate Discount bills will be somewhat lower.

customers had expected electric bills of $750 or more, only 25% of Tiered Rate Discount customers did. In contrast, while 74% of Tiered Rate Discount customers had expected electric bills of $500 or less, only 34% of Fixed Credit customers did.

Table 16. Expected Electric and Natural Gas Bills by Fixed Credit or Discount Participation

	$100 - $250	$251 - $500	$500 - $750	$750 - $1,000	$1001 - $1,500	$1,500 or more	Total
Fixed Credit	0%	11%	23%	26%	28%	12%	100%
Discount	3%	44%	27%	17%	7%	1%	100%
Total	1%	27%	23%	24%	25%	10%	100%

How Expected Bills at the Time of Enrollment Reflect Actual Bills.

One critical task involved with the enrollment of low-income customers into the PEAP and EAP programs is the calculation of an estimated annual bill for the program participant. The bill estimate determines what the customer's projected energy burden (i.e., bill as a percent of income) will be in the absence of participation in the PEAP program. Accordingly, accurately estimating what the annual bill will be is important from two different perspectives:

- On the one hand, the estimated bill counsels whether the customer should participate in the percentage of income based Fixed Credit program component or in the Tiered Rate Discount program component. Participation in the Fixed Credit program component occurs only in those instances where the estimated bill exceeds the percentage of income deemed to be affordable. If the bill is less than that affordable burden, the customer is placed into the Tiered Rate Discount program component.

- On the other hand, the estimated bill is used as an input into determining the actual level of the Fixed Credit to be provided to the customer. If the bill is over-estimated, the Fixed Credit will be higher than that needed to bring the bill down to an affordable level. If the bill is under-estimated, the Fixed Credit will be lower than that needed to bring the bill down to an affordable level.[32]

In addition to these two important tasks for which the estimated annual bill is utilized, a comparison of the estimated annual bill to the actual annual bills provides insights into the extent to which actual bills differ from the underlying estimate due to extraneous reasons unrelated to whether the estimate was under- or over-stated with which to begin. "Actual" bills can vary

[32] For example, assume that household income is $10,000 and the affordable burden is deemed to be three percent (3%). The affordable bill would thus be $300. If the estimated bill is $860, the "fixed credit" needed to make the bill affordable is $560 (or $47 a month). If, however, the actual bill is only $740, the "fixed credit" that would have been needed would have been only $440 ($37 a month), whereas if the actual bill is $980, the "fixed credit" that would have been needed would have been $680 ($57 a month).

based on a multitude of factors other than whether or not the initial estimate was "correct." Weather in the study period might differ from normal. Rates (including such variable factors as fuel clauses, purchased gas adjustment clauses, or other variable riders) might increase or decrease. For customers participating in the Fixed Credit component of PEAP, the entire risk of factors that might increase bills falls on the customer (while the entire benefit from factors that might decrease bills redounds to the benefit of the customer). For customers participating in the Tiered Rate Discount program component, the risk of an increased or decreased bill is split between the Company and the customer, in an amount reflecting the level of the discount.[33]

The discussion below compares the ***estimated*** annual bill used at the time of program enrollment to determine the appropriate program participation and Fixed Credit amount (if applicable) to actual 12-month bills for two separate 12-month periods: (1) Months 1 through 12 of the study period; and (2) Months 13 – 24 of the study period. Only accounts with bills in all 12 months for each time period considered are included in the analysis. Accounts are disaggregated by the ratio of the estimated bill to the study period bill, as well as by whether the bill represents a gas-only or a combination gas/electric account.

Table 17. Percentage of PEAP Participants by Ratio of Estimated Bill to Actual Non-Discounted Bill: Year 1 and Year 2 (by Gas or Combination Gas/Electric) (Estimated Bill in Numerator / Actual Bill in Denominator)

Fuel and Year	Ratio of Estimated Bill to Actual Bill							Totals	
	.01 – 0.80	0.81 – 0.90	0.91 – 1.0	1.01 – 1.10	1.11 – 1.20	1.21 – 2.0	>2.0	Percent	No.
Year1-Elec/Gas /a/	3%	13%	31%	27%	13%	11%	1%	100%	2,816
Year2-Elec/Gas	2%	6%	16%	28%	17%	25%	4%	100%	2,538
Year1-Gas/No-Electric /b/	43%	7%	17%	13%	6%	15%	0%	100%	1,444
Year2-Gas/No-Electric	37%	6%	10%	8%	13%	27%	1%	100%	1,304
24Month-Electric/Gas /c/	3%	13%	34%	28%	14%	9%	0%	100%	2,342
24Month-Gas/No-Electric	41%	7%	17%	14%	6%	15%	0%	100%	1,165

Notes:
/a/ "Year1" is a population for which 12 full months of data are available for Year 1 and the ratio is calculated for Year 1 actual bills to the estimated bill.
/b/ "Year 2" is a population for which 12 full months of data are available for Year 2 and the ratio is calculated for Year 2 actual bills to the estimated bill.
/c/ "24 Months" is a population for which 24 full months of data are available and the ratio is calculated for Year 1 actual bills to the estimated bill.

Public Service did a reasonably good job at estimating annual bills for PEAP and PEAP/EAP participants. As Table 17 shows, in the first year of participation, 58% of actual combination

[33] If the customer is receiving a 20% discount, and bills increase by $100, the Company is allocated $20 of that increase while the customer pays the remaining $80.

gas/electric bills fell between 90% and 110% of the billing estimates; 44% of the actual combination gas/electric bills for the second year of program participation fell between 90% and 110% of the billing estimates made when the customer entered the program.[34] Estimates for gas-only customers were not quite as accurate. In the first year of participation, 30% of actual bills fell between 90% and 110% of billing estimates, while 18% of actual bills in the second year of participation did. If expanded to a +/-20% range, the estimated accuracy was substantively higher, with 84% of the combination bills falling within a range of 80% to 120% in the first year and 43% of gas-only estimated bills falling into that range. It seems evident, whether due to the weather-sensitivity of gas bills, or the volatility in purchased gas prices, that it is more difficult to accurately estimate future annual natural gas bills than it is to estimate future combination gas/electric bills.

Two lessons appear from the data above. First, it is more difficult to accurately estimate future natural gas bills than it is to estimate combination gas/electric bills. Particular care must be taken, therefore, to ensure that fixed credits provide a reasonable opportunity for program participants to achieve their target affordable burden. Second, it is more difficult to match Year 2 bills to billing estimates made at the time a customer enters the program. Accordingly, it may be appropriate to ensure that fixed credits are based upon annual average billing estimates.

How Participant Energy Consumption Compared to Non-participant Consumption

Natural gas consumption for PEAP customers does not substantially vary based on the program component in which they participate. The data is set forth in Table 18. Looking at the consumption of customers participating in PEAP for all (or nearly all) of the 24-month study period, it is evident that in Months 1 through 12, gas consumption was virtually identical whether the customer was a gas-only customer or was a combination gas/electric customer, and whether the customer participated in both PEAP and EAP or whether the customer participated in only PEAP (but not the corresponding electric low-income program).[35] While consumption for all participant populations fell in the second year of participation –the objective of this discussion is not to determine why such a reduction occurred—the comparison in Table 18 reveals that within both years, as well as over the 24-month period as a whole, the gas usage between different types of program participants was nearly the same.

The PEAP participation population did tend to have somewhat higher natural gas consumption than both the residential population in general and the federal energy assistance population. Gas-only PEAP participants had a higher gas usage than did the gas-only LEAP participant or the gas-only residential customer. Each type of combination (electric/gas) PEAP participant (PEAP/EAP, PEAP/no-EAP) also evidenced higher consumption than did either the LEAP population or general residential population.

This finding is consistent with prior research regarding low-income "percentage of income" programs. While households seeking the benefits of a low-income affordability program tend to

[34] Ratio of greater than 1.0 (100%) indicates that the estimated bill was greater than the actual bill. If an estimated bill is $600 and the actual bill was $650, for example, the ratio would be 0.91. If the estimated bill was $800 and the actual bill was $550, the ratio would be 1.45.

[35] Remember, as noted previously, a person might participate in PEAP but not EAP either because he or she did not seek EAP participation or because they were a natural gas, but not an electric, customer of Public Service.

have somewhat higher than average consumption with which to begin,[36] they do not tend to increase their consumption as a result of their participation in the program.

Table 18. Natural Gas Usage by Program Component by PEAP Participation (and Length of PEAP Participation) and Non-Participation (therms)

Participation in PEAP 21 – 24 Months				
Population (by months of PEAP Participation)	Population Count	Use in Months 1 - 12	Use in Months 13 - 24	Use in Months 1 - 24
All PEAP	5,145	645	585	615
Gas-only PEAP	1,129	647	591	619
Combination (PEAP-EAP)	3,356	648	587	617
Combination (PEAP/no-EAP)	601	688	520	654
Non-Participant Populations				
Population (by months of PEAP Participation)	Population Count	Use in Months 1 - 12	Use in Months 13 - 24	Use in Months 1 - 24
Gas only: Low-Income: Non-PEAP	1,008	512	525	519
Gas-only: General Residential	886	573	531	552
Combination: Low-income: Non-PEAP	3,070	516	507	512
Combination: General Residential	2,492	539	489	514

Table 19, after re-stating the average natural gas consumption for PEAP customers (both gas-only and combination gas and electric), further disaggregates the natural gas consumption for non-participants by the level of their Month 1 arrears. Month 1 is the first month of the 24-month study period for which data was provided for this Final Evaluation (October 2009). Several observations stand-out:

- The data in Table 19 shows that the natural gas consumption for customers with $0 in arrears within the non-participant population was significantly lower than the natural gas consumption for non-participant customers with arrears. While gas-only LEAP recipients with $0 of arrearages had usage of 317 therms in months 1 through 12, the consumption of LEAP recipients with a positive level of arrears was two-times that amount (758 therms for LEAP recipients with $1 – 250 in arrears; 650 therms for LEAP recipients with $250+ in arrears).

[36] Intuitively, this result makes sense. Customers whose burdens as a percentage of income are lower are excluded from the calculation, thus leaving higher-burden, higher-use customers in the calculation.

- LEAP recipients with $0 in arrears had usage roughly half that of PEAP program participants across-the-board (317 therms for LEAP compared to 647, 648 and 688 therms for gas-only, combination PEAP/EAP, and combination PEAP/no-EAP respectively).

- Similarly, the gas consumption within the general residential population with no arrears (410 therms) was less than that of all PEAP participant populations (647, 648 and 688 for the respective PEAP populations). The same was not true for residential customers that had Month 1 arrears.

The patterns appearing in Months 1 through 12 held true for Months 13 – 24 as well.

On the other hand, with a few exceptions, the low-income consumption tends to be lower than the general residential consumption. In particular, the consumption of the high-arrears non-participant LEAP population of gas-only customers tends to be lower than the high-arrears residential population. The usage of the LEAP recipients as a whole (without disaggregating by arrearage levels) is lower than the usage of the residential customers at all arrearage levels.

Table 19. Participant and Non-participant Natural Gas Usage by PEAP Participation and by Non-Participant Populations (disaggregated by "Month 1" arrears)

Usage (in therms) of PEAP Participation (21 – 24 Months)				
Population (by months of PEAP Participation	Population Count	Months 1 – 12 Use	Months 13 – 24 Use	Months 1 – 24 Use
Gas-only PEAP	1,129	647	591	619
Combination (PEAP-EAP)	3,356	648	587	617
Combination (PEAP/no-EAP)	601	688	520	654

Usage (in therms) of Gas-Only Customers in Non-Participant Populations (LEAP and Residential)								
Gas-Only Customers by Month 1 Arrears	Population Count		Months 1 – 12 Use		Months 13 – 24 Use		Months 1 – 24 Use	
	LEAP	Res	LEAP	Res	LEAP	Res	LEAP	Res
Gas only: Arrears ($0)	538	478	317	410	485	502	401	456
Gas-only: Arrears (1 - $250)	375	372	758	762	595	562	675	662
Gas-Only: Arrears (> $250)	95	36	650	783	479	609	565	696

Usage (in therms) of Combination Gas/Electric Customers in Non-Participant Populations (LEAP and Residential)								
Combination Gas/Electric Customers by Month 1 Arrears	Population Count		Months 1 – 12 Use		Months 13 – 24 Use		Months 1 – 24 Use	
	LEAP	Res	LEAP	Res	LEAP	Res	LEAP	Res
Gas/Electric: Arrears ($0)	1,405	1,111	281	775	482	711	381	743
Gas/Electric: Arrears ($1 - $250)	1,016	876	672	858	504	696	588	777

Gas/Electric: Arrears (> $250)	649	505	780	952	569	880	674	916

Pre-Existing Arrearage Levels of PEAP Participants

PSCo's low-income population brought an average of nearly $350 of pre-existing arrears[37] to the low-income PEAP. The bulk of those arrears came from PEAP participants with large (e.g., greater than $1,000) pre-existing arrears. A full 60% of the pre-existing arrears were associated with PEAP accounts owing more than $1,000, with more than half of that brought by accounts owing more than $2,500.

Table 20. Pre-existing Arrears at the Time of Enrollment by Size of Arrears

Level of Pre-existing Arrears	Percentage of Accounts	Percentage of Dollars	Average Arrears
$0 or less	36%	0%	$0
> $0 - $300	39%	15%	$132
> $300 - $500	9%	10%	$388
> $500 - $1,000	8%	16%	$695
> $1,000 - $2,500	6%	28%	$1,578
> $2,500	3%	32%	$4,250
Total	100%	100%	$347

In turn, most of the accounts with very large arrears were those accounts associated with either lower incomes, or higher energy bills, such that the accounts participated in the Fixed Credit rather than the Tiered Rate Discount PEAP program component.[38] As Table 21 indicates, Fixed Credit PEAP participants were disproportionately in higher arrears. While 54% of all PEAP accounts with pre-existing arrears at the time of entering the program were Fixed Credit participants, 67% of the accounts with arrears of more than $2,500 were Fixed Credit participants; 65% of the accounts with arrears of between $1,000 and $2,500, and 62% of the accounts with pre-existing arrears of between $500 and $1,000 were Fixed Credit participants. Accounts with pre-existing arrears of less than $500 were roughly proportionate to the incidence of Fixed Credit participants in the population overall (50% – 54%).

While the incidence of pre-existing arrears was noticeably higher for Fixed Credit customers, the level of pre-existing arrears was not. Across all ranges of pre-existing arrears, the average

[37] This average is the average arrears spread over all customers, not the average spread over only the customers having arrears.

[38] Customers participated in the Tiered Rate Discount program component if their bills were at or below the percentage of income burden deemed to be "affordable" by PSCo. If the customer's energy burden was greater than that deemed to be affordable, the customer participated in the Fixed Credit program component, where their bill was limited to the affordable percentage of income.

arrears for Tiered Rate Discount customers was roughly equal to the average arrears for Fixed Credit customers. Indeed, at the highest level ($2,500 or more), the Tiered Rate Discount customers had a somewhat higher pre-existing arrears ($4,362 vs. $4,250), even though there were much fewer of them with that level of arrears.

Table 21. Contribution of Pre-Existing Arrears by Fixed Credit or Discount Participation

	Incidence of Pre-Existing Arrears						
	$0 or less	$0 - $300	$301 - $500	$501 - $1,000	$1,000 - $2,500	$2,501 or more	Total
Fixed Credit	54%	50%	53%	62%	65%	67%	54%
Discount	45%	49%	46%	37%	33%	30%	45%
Total	100%	100%	100%	100%	100%	100%	100%
	Level of Pre-Existing Arrears						
Fixed Credit	$0	$127	$391	$704	$1,590	$4,250	$391
Discount	$0	$137	$385	$678	$1,564	$4,362	$283
Total	$0	$132	$388	$695	$1,578	$4,250	$347

When one overlays whether a customer participates in the PEAP program (gas) alone, or in both the PEAP *and* EAP programs, not surprisingly the combination customers bring a higher level of pre-existing arrears into the program.[39] Table 22 shows the same pattern between Tiered Rate Discount and Fixed Credit program participants, with Fixed Credit participants exhibiting a higher incidence of arrears in the higher income ranges. Even while the average arrears of Tiered Rate Discount customers is higher than that of Fixed Credit customers in some ranges, the higher incidence of high-arrearage customers makes the total average arrears for Fixed Credit customers higher for the population as a whole.

The Table further shows, however, the extent to which the combination PEAP/EAP customers bring higher arrears into the program. At each level of pre-existing arrears (except $0), the combination PEAP/EAP program participants bring a higher level of arrears. The difference in arrears between the PEAP/EAP Discount customers and the PEAP/No-EAP Discount customers is particularly evident.

[39] This is "not surprising" since the PEAP/EAP customers would bring both natural gas and electric arrears into the program, while the PEAP/no-EAP customers would bring only natural gas arrears.

Table 22. Contribution of Pre-Existing Arrears by Participation in PEAP, EAP or Both

	Incidence of Pre-Existing Arrears						
	$0 or less	$0 - $300	$301 - $500	$501 - $1,000	$1,000 - $2,500	$2,501 or more	Total
Incidence of Pre-Existing Arrears: PEAP Participation but Not EAP Participation							
Fixed Credit	27%	16%	10%	10%	12%	21%	19%
Discount	22%	16%	11%	5%	5%	4%	16%
Incidence of Pre-Existing Arrears: Both PEAP Participation AND EAP Participation							
Fixed Credit	27%	35%	43%	52%	50%	46%	35%
Discount	24%	33%	34%	32%	28%	27%	29%
Total	99%	99%	98%	99%	96%	97%	99%
Level of Pre-Existing Arrears: PEAP Participation but NOT EAP Participation							
Fixed Credit	$0	$106	$402	$702	$1,620	$3,991	$260
Discount	$0	$122	$375	$671	$1,534	$4,367	$147
Level of Pre-Existing Arrears: Both PEAP Participation AND EAP Participation							
Fixed Credit	$0	$137	$389	$705	$1,583	$4,367	$461
Discount	$0	$144	$388	$679	$1,569	$4,462	$357

PEAP Participant Discounted and Non-Discounted Bills

The discussion below of the bills experienced by PEAP participants examines two aspects of the bills for current usage. On the one hand, the discussion will consider the bills rendered to PEAP participants before applying any of the discounts or credits. On the other hand, the discussion considers the discounted bills as they relate to the non-discounted bills. The discussion of non-discounted bills is presented first.

The Levelizing Impact of PEAP on Non-Discounted Bills of PEAP Participants.

The benefits of the PEAP initiative flow not simply from the amount of the discount provided, but also from the levelized budget billing under which bills for current usage are presented to program participants. The levelized budget billing makes a considerable difference in the reduction in monthly volatility in bills.

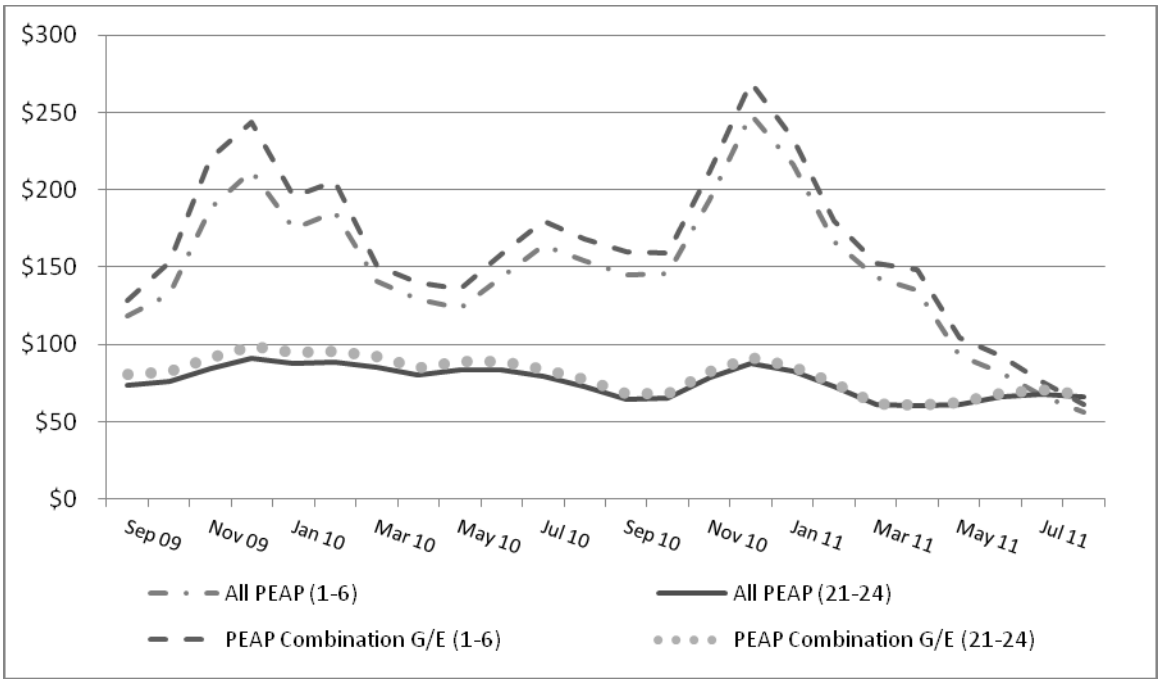

Figure 2. Monthly Bills by Length of PEAP Participation.

The levelizing impacts of budget billing are evident from a comparison of customers taking service through the PEAP initiative by the length of time those customers were in the PEAP program. Figure **2** presents the data. The "flatness" in the variation in month-to-month bills for all months from months 1 through 24 becomes evident as the length of PEAP participation increases. For PEAP participants in the program for only one to six months, the volatility in monthly bills is quite high. For customers in PEAP for 21 to 24 months, the volatility in monthly bills is quite low.

The same impact can be seen for both the all-PEAP population and the PEAP population taking combination gas/electric service. In **Figure 2**, which sets forth the comparison of combination gas/electric customers participating in the PEAP program (but not in the EAP program), the seasonal variation in bills for customers with fewer than six (6) months of PEAP participation is evident in both the warm and cold weather months. The "smoothing" effect of the budget billing requirement of PEAP is evident for those customers participating in PEAP for 21 – 24 months.

Finally, Figure 3 presents a comparison of the monthly bills for combination (gas/electric) PEAP participants (participating for 21 – 24 months) compared to combination (gas/electric) energy assistance (LEAP) recipients and residential customers. The data shows that for these populations, the combination gas/electric bills of LEAP and residential customers are virtually the same over the course of the year, with LEAP customers having a slightly lower bill. One importance of PEAP appears to lie with its requirement of levelized billing. PEAP participant bills are marked by the heavy dashed line.

The smoothing effect of the budget billing program requirement is evident for both populations. While both the LEAP and residential populations experience a substantial seasonal variation in

their monthly bills, approaching $200 a month in some months, the PEAP population does not. While both the LEAP and residential populations have a variation of nearly 2-to-1 (from roughly $100 to roughly $200) between the highest and lowest monthly bills, the PEAP population has a very slight variation between the highest and lowest monthly bills.

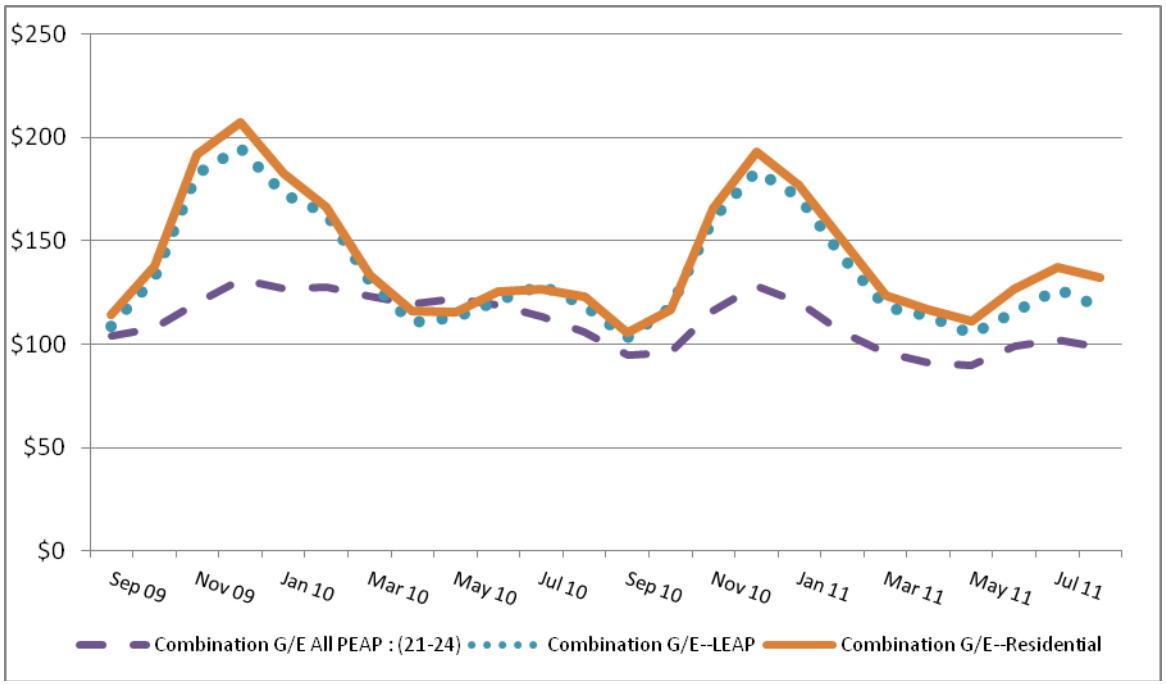

Figure 3. Monthly bills by PEAP Participation compared to LEAP and Residential.

The analysis does not change if one disaggregates the combination gas/electric PEAP customers by those who also participate in EAP and those who do not. The bill reduction impacts of the PEAP program can also be seen in a comparison of the monthly discounted PEAP combination gas/electric bills as contrasted to the monthly bills of the two comparison groups (LEAP participants; general residential). As can be seen from the data below, even the lowest monthly bills for the LEAP and residential populations are roughly equal to or higher than the highest months of discounted combination PEAP bills. The impact of the levelized budget billing requirements are again evident in the comparison of the PEAP bills to the monthly bills of the LEAP and residential populations.

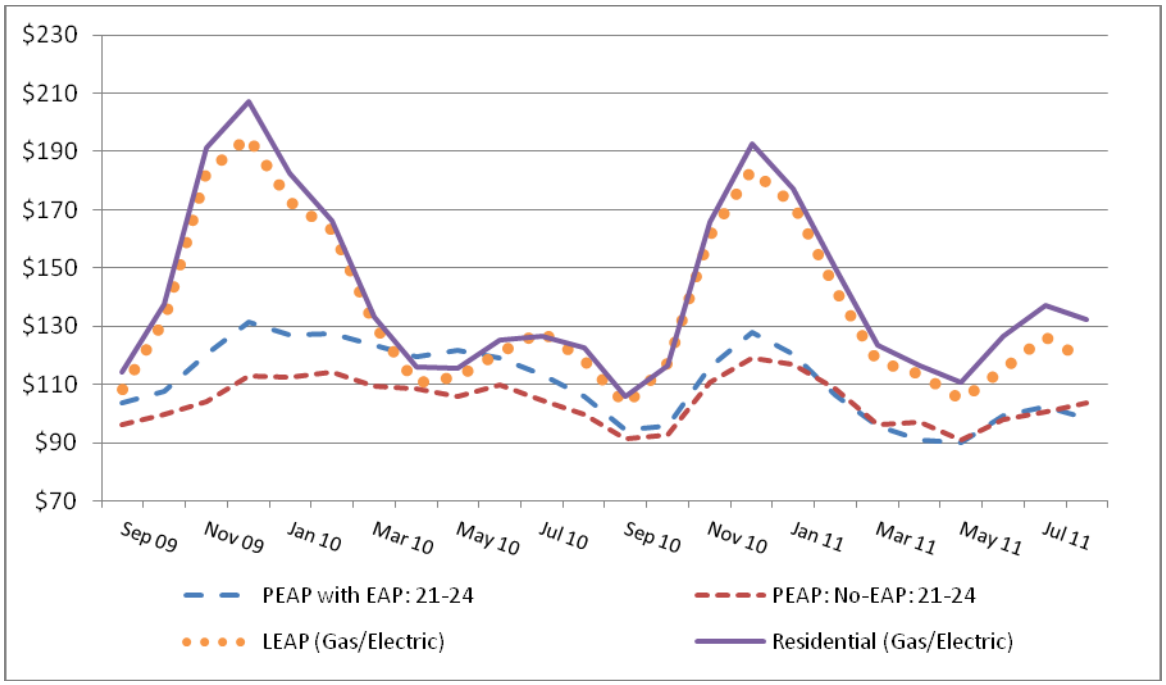

Figure 4. Gross Combination Gas/Electric Bills by Participant and Non-Participant Population.

Relationship of PEAP Discounted Bill to PEAP Non-Discounted Bill

PEAP discounts ranged between 20% and 25% for all customers who participated in PEAP for between 21 and 24 months in the study period. The Figure below shows that the discounted PEAP bill began at between 75% and 80% of the non-discounted bill and eventually leveled off at roughly 75% for all PEAP participants.

For customers who also participated in the electric discount (EAP), the discounted bill represented a somewhat lower percentage. Starting at around 75%, the discounted combination gas/electric bill for customers who participated in both PEAP and EAP leveled off at roughly 70%. (The later commencement of the EAP discount is evident in the data). While the combination discounted bill remained relatively constant for the first twelve months for PEAP customers who also participated in EAP, the decline in the discounted bill as a percentage of the non-discounted bill for these EAP participants becomes evident when the EAP program commenced. As the EAP program participation became saturated, the bills with the combined PEAP/EAP discounts became level in the same way the discounted bills did for the entire PEAP population.

The lesson to be learned from this data is that the PEAP program discount demonstrates a roughly 25 discount on a total-population basis, with a somewhat higher percentage discount for combination gas/electric customers who participate in both the gas and electric affordability programs.

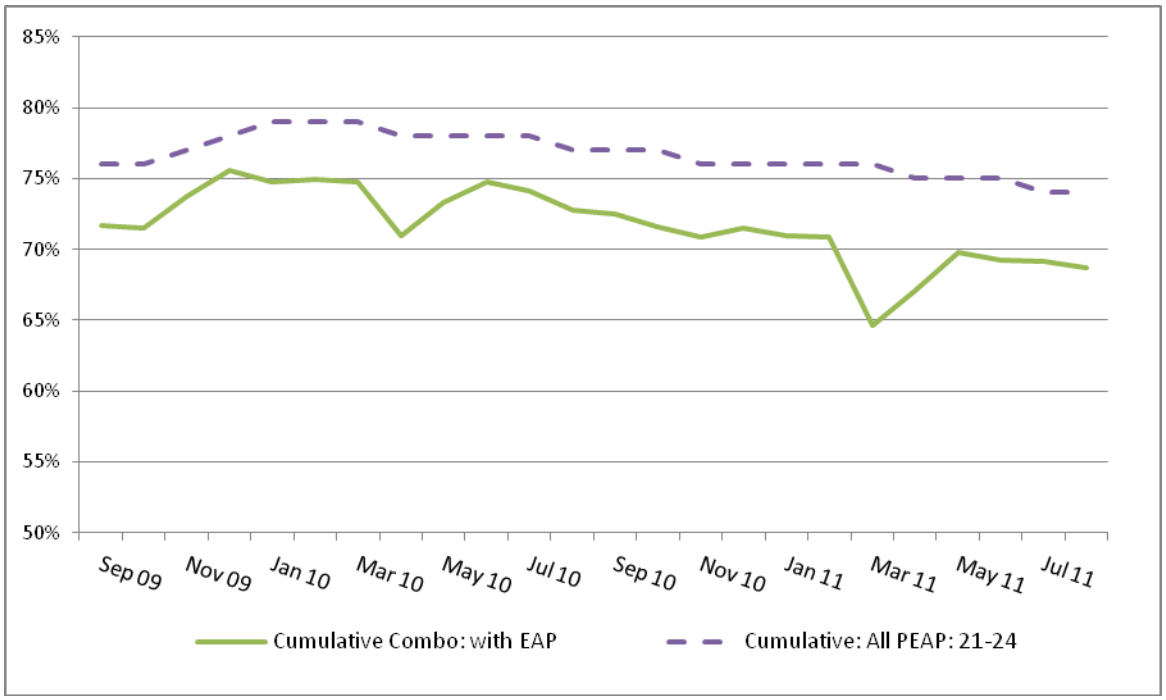

Figure 5. Discounted Bills as Percent of Non-Discounted PEAP Bills: PEAP Participation for 21 – 24 Months

Eleven Important Findings

1. A substantial majority of customers participated in *both* the gas *and* electric affordability programs of Public Service. Even through the electric and gas programs were independent of each other, combination customers who participate in the gas program are most likely to participate in the electric program also. Nearly two-thirds of gas program participants (65%) also participated in the electric program.

2. Low-income gas customers tend to be reasonably divided between the percentage of income Fixed Credit program component and the Tiered Rate Discount program component. More than half (55%) of all PEAP participants took service under the Fixed Credit program component, while 45% took service under the Tiered Rate Discount. Low-income electric service was substantively different. More than 8-of-10 customers (82%) participated in the electric Fixed Credit program component, rather than the Tiered Rate Discount program.

3. Only 391 PEAP participants lived in homes that had been weatherized. Of the 666 Fixed Credit participants with usage more than 150% of the average, 629 had not been weatherized. Of the 194 Discount participants with usage greater than 150% of the average, 183 had not been weatherized. A similar pattern exists for participants with bills greater than 130% of the average.

4. Public Service did a reasonably good job at estimating annual bills for PEAP and PEAP/EAP participants. In the first year of participation, 58% of actual combination

gas/electric bills fell between 90% and 110% of the billing estimates. Estimates for gas-only customers were not quite as accurate.

5. The PEAP participation population tended to have somewhat higher natural gas consumption than both the residential population in general and the federal energy assistance population. Gas-only PEAP participants had a higher gas usage than did the gas-only LEAP participant or the gas-only residential customer. Each type of combination (electric/gas) PEAP participant (PEAP/EAP, PEAP/no-EAP) also evidenced higher consumption than did either the LEAP population or general residential population.

6. In contrast, with a few exceptions, the low-income consumption tends to be lower than the general residential consumption. In particular, the consumption of the high-arrears non-participant low-income population of gas-only customers tends to be lower than the high-arrears residential population as a whole. The usage of the low-income combination customers at all arrearage levels is lower than the usage of the residential customers at all arrearage levels.

7. While the incidence of pre-existing arrears was noticeably higher for Fixed Credit customers, the level of pre-existing arrears was not. Across all ranges of pre-existing arrears, the average arrears for Tiered Rate Discount customers was roughly equal to the average arrears for Fixed Credit customers.

8. When one overlays whether a customer participates in the PEAP program (gas) alone, or in both the PEAP *and* EAP programs, the combination customers bring a higher level of pre-existing arrears into the program. The same pattern exists between Tiered Rate Discount and Fixed Credit program participants.

9. The benefits of the PEAP initiative flow not simply from the amount of the discount provided, but also from the levelized budget billing under which bills for current usage are presented to program participants. The levelized budget billing makes a considerable difference in the reduction in monthly volatility in bills. The “flatness” in the variation in month-to-month bills for all months from months 1 through 24 becomes evident as the length of PEAP participation increases. For PEAP participants in the program for only one to six months, the volatility in monthly bills is quite high. For customers in PEAP for 21 to 24 months, the volatility in monthly bills is quite low. The same impact can be seen for both the all-PEAP population and the PEAP population taking combination gas/electric service.

10. The seasonal variation in bills for customers with fewer than 12 months of PEAP participation is evident in both the warm and cold weather months. The “smoothing” effect of the budget billing requirement of PEAP is evident for those customers participating in PEAP for 21 – 24 months. One importance of PEAP appears to lie with its requirement of levelized billing. While both the LEAP and residential populations experience a substantial seasonal variation in their monthly bills, approaching $200 a month in some months, the PEAP population does not.

11. The PEAP program provides a roughly 25 discount on a total-population basis, with a somewhat higher percentage discount for combination gas/electric customers who participate in both the gas and electric affordability programs.

Part 2: Customer Perspective: PEAP Payment Characteristics

This examination of PEAP payment characteristics focuses on payments made by PEAP customers. Since one purpose of the program is to enable customers to make more full and consistent payments, payments that are received from non-customer sources are not included in the analysis.

Since customer payments cannot be allocated or attributed to the purpose for which they were made, payments are generally measured against the following different demarcations of a customer's "bill":

- The customer's total monthly and annual bills for current natural gas and electric usage (net of PEAP credits); and

- The customer's total asked-to-pay amount (including the natural gas and electric bills net of PEAP credits and payments toward preprogram arrears).

Both demarcations are necessary to gain a complete picture of the payments that have been made toward a customer's bill. The discussion below will refer to "payment compliance." Payment compliance relative to bills for current usage is measured using a metric referred to as the "customer payment coverage ratio." Payment compliance relative to total asked-to-pay amounts is measured using various metrics relating to "arrears." Both sets of metrics are discussed in more detail below.

PEAP Participant Payments: An Overview

The first examination of PEAP payments simply provides an overview of payments made by PEAP participants irrespective of a consideration of bills or arrears. The insights to be gained relate to how much is being paid and from which sources payments are originating.

PEAP participant payments did not demonstrate significant seasonal variability. Table 23 shows, for example, that in both Years 1 and 2 of the study period, PEAP participant payments remained reasonably constant during the cold weather and non-cold weather months. Payments declined somewhat in Year 2 of the study period, reflecting a corresponding decline in the underlying bills. However, in neither year did overall payments show an abrupt seasonal decline.[40]

The constancy of the PEAP payments reflects the levelized budget billing of the PEAP program. Given the level nature of the underlying bills, it would be expected that, to the extent that bills are being paid (a question that will be addressed in more detail below), those payments will reflect the budget billing amount rather than the underlying charges for current usage.

Table 23. Average PEAP Customer Payments (PEAP Participation 21 – 24 Months)

	Year 1											
	Sept 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10
PEAP: With EAP	$106	$103	$104	$110	$123	$129	$134	$133	$116	$124	$121	$118
PEAP: No EAP	$91	$91	$92	$96	$99	$106	$117	$114	$104	$114	$107	$110
	Year 2											
	Sept 10	Oct 10	Nov 10	Dec 10	Jan 11	Feb 11	Mar 11	Apr 11	May 11	Jun 11	Jul 11	Aug 11
PEAP: With EAP	$113	$100	$95	$110	$118	$114	$110	$104	$94	$94	$95	$104
PEAP: No EAP	$105	$97	$100	$101	$121	$119	$114	$118	$110	$100	$114	$115

Despite the lack of seasonal variation in the *customer* payments, there is a distinct seasonal variation in the extent to which those customer payments represent the total payment made toward customer bills. Table 24 presents the ratio of *customer* payments to *total* payments for PEAP customers who participated in the program for 21 – 24 months of the study period. The PEAP population is sub-divided into customers who take only natural gas service, combination gas/electric customers who participate in both PEAP and EAP, and combination gas/electric customers who participate in PEAP (but not also EAP). Given the required participation of PEAP customers in the federal energy assistance (LEAP) program, it would be expected that the proportion of the total payment that is represented by the customer payment would decline in the

[40] As expected, PEAP customers who did not also participate in EAP showed lower payments than PEAP customers who also participated in EAP. Customers who did not also participate in EAP may well include some proportion of customers who take electric service from a company other than Public Service.

LEAP program year. Indeed, such is the case. For gas-only customers, in particular, during the months in which LEAP benefits are distributed, customer payments show a sharp decline as a percentage of the total payment. The decline in the proportion of total payments made from customer resources for the combination gas/electric customers is clearly evident during the LEAP program year, but much less sharp.

In assessing these declines in the proportion of total payments represent by the customer payments, it is important to remember the data from Table 23, however. The percentage does not decline because the level of customer payment declines. Indeed, Table 23 indicates that customer payments remain relatively constant, if not somewhat expanded, during the cold weather months. Accordingly, the proportion of total payments represented by customer payments declines because the agency (LEAP) payments represent an incremental addition to the payments being directed toward customer accounts. It seems clear from the data in Table 23 and Table 24 that agency (LEAP) payments in the PEAP program supplement, and do not supplant, customer payments made toward bills for current usage.

Table 24. Ratio Average Customer Payment to Average Total Payment (PEAP Participants for 21 -24 Months)

	Year 1											
	Sept 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10
Gas-only	92%	99%	24%	23%	34%	31%	36%	80%	59%	89%	100%	100%
PEAP (with EAP)	88%	97%	47%	50%	65%	55%	79%	101%	91%	97%	97%	98%
PEAP (no EAP)	97%	100%	64%	69%	79%	61%	88%	93%	92%	97%	100%	99%
Year 2												
Gas-only	99%	100%	30%	42%	52%	35%	53%	70%	76%	100%	100%	100%
PEAP (with EAP)	98%	100%	56%	70%	78%	56%	83%	87%	92%	95%	96%	98%
PEAP (no EAP)	96%	100%	73%	82%	89%	57%	80%	85%	97%	98%	97%	96%

PEAP customers do not make greater average monthly payments than LEAP customers, irrespective of the level of arrears (as of Month 1 of the study period) held by those LEAP recipients. PEAP customers make payments that are both lower, and more level, than their LEAP counterparts. The lower payments will result from the receipt of discounted bills. The more level payments result from the receipt of levelized monthly bills.

The PEAP customer payments stand in contrast to the LEAP recipient payments in this regard. Note, for example, that LEAP customers who had arrears of more than $250 demonstrate a distinct seasonality of payments. In both years of the study period, these high-arrears customers demonstrated a distinct drop in payments in the pre-winter and early-winter months, with spring

and summer payments then escalated (presumably to help retire those winter arrears). The transfer of payments from the cold-weather to warm-weather months for these high-arrearage customers is evident. In contrast, the seasonal variation in the lower-arrears LEAP customers is much less noticeable.[41]

The story emerging from the Figure below, however, is the dramatically different payment pattern exhibited between the LEAP recipients and PEAP participants. LEAP recipients demonstrate substantial volatility in their monthly payment patterns, while the lack of seasonal variation in PEAP payments has been previously noted.

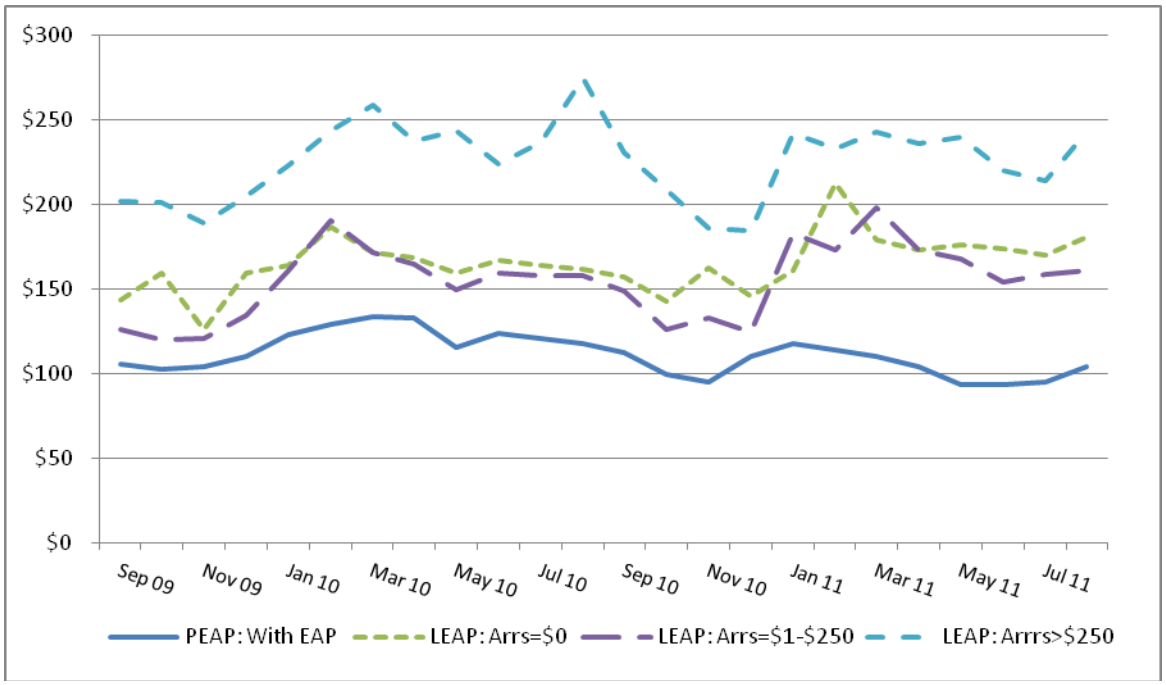

Figure 6. Monthly Payments: PEAP Particpiation (21 – 24 Months) Compared to LEAP by Level of Arrears

When the same PEAP payment patterns are compared against the residential customer base, the differences are much less evident. Even though high-arrearage residential customers exhibit some level of seasonal variation in their payment patterns, the difference is much less pronounced. In contrast, the payment patterns of residential accounts with no arrears ($0) and residential accounts with lower levels of arrears ($1 - $250) are similar enough to be virtually indistinguishable. The Figure below shows that, while the *level* of payments by PEAP participants differs from the level of payments by residential customers, the *pattern* of payments by PEAP participants much more closely resembles the payments of residential customers with low arrears than the payments of either LEAP recipients or the payments of high-arrearage residential customers.

[41] It is not clear why the average payments by LEAP recipients appear to have increased in Year 2 of the study period relative to Year 1. Bills in Year 2 declined for LEAP recipients with lower arrears, while payments increased. In contrast, payments for the high-arrears LEAP recipients appear to have declined in Year 2.

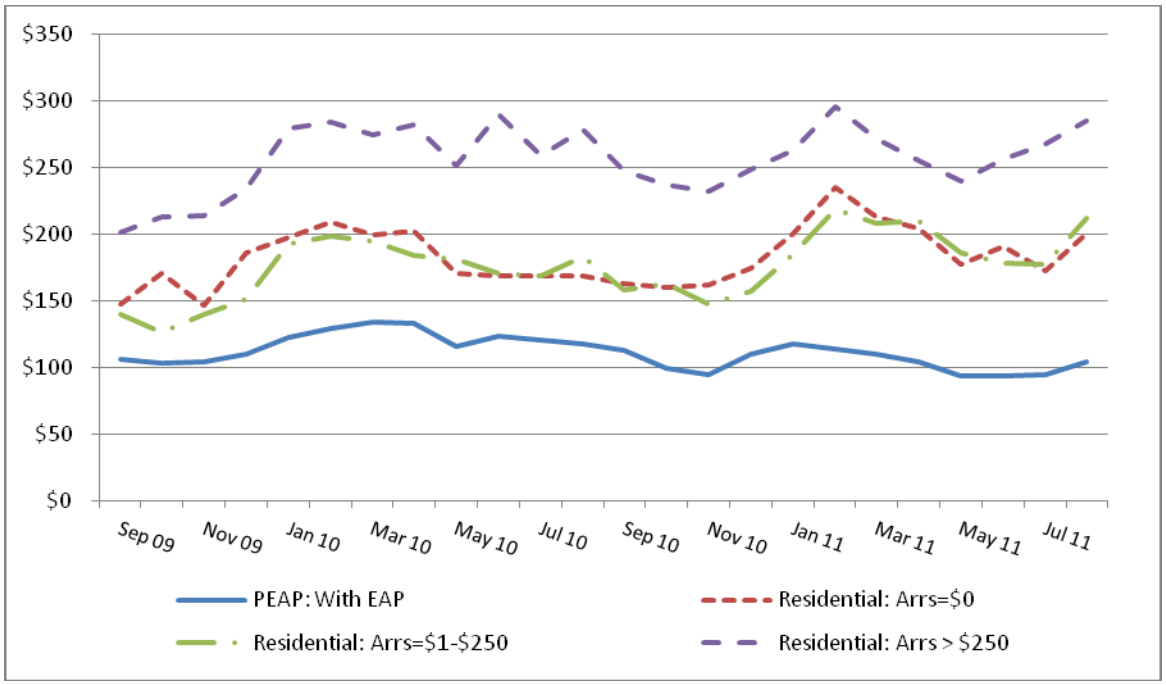

Figure 7. Monthly Payments: PEAP Participation (21 – 24 Months) Compared to Residential by Month 1 Arrearage Level

Payment Compliance by PEAP Participants

Providing rate affordability assistance to low-income utility customers in Colorado should provide low-income customers with the capacity to sustain bill payment. "Sustaining bill payment" (referred to in this evaluation as "payment compliance") involves the following payment attributes with respect to bills for current usage:

- **Complete Bill Payment:** The most common indicator of whether complete payment has been received from a utility customer involves measuring both the incidence and depth of arrears. The *incidence* of arrears considers the proportion of the total population in arrears. The *depth* of arrears considers the size of arrears at any given point in time. A bill coverage ratio (the proportion of current bills paid) should also be used (on a monthly, seasonal and annual basis) to consider complete bill payment over a period of time.

- **Prompt Bill Payment:** Prompt bill payment considers the timeliness of bill payment, not merely whether a customer pays his or her utility bill in full. If a utility renders a bill for $100, that company wants a customer to pay the bill by the due date as well as paying the bill in full. Bill promptness is primarily measured through the use of a "weighted arrears" statistic called "bills behind."

- **Regular Bill Payment:** The regularity of bill payment measures the extent to which customers make at least *some* bill payment each month. A customer may maintain a relatively low level of arrears by paying multiple months of bills on an infrequent basis. An examination of January arrears, for example, does not distinguish between the customer that has made his or her last twelve monthly payments on time and in full, the

customer that has made $0 in payments during August through October (perhaps waiting for a Low Income Home Energy Assistance Program ("LIHEAP") benefit to pay those arrears), and the customer who makes three payments over the year, the sum of which equals the total annual bill. The *regularity* of bill payment measures the extent to which some payment is made in response to each bill rendered.

- **Unsolicited Bill Payment:** The extent to which bill payments are "solicited" considers the extent to which, if at all, a company is required to engage in collection activities to generate a bill payment. An *unsolicited bill payment* involves a payment that is made in response to a bill without any need for company collection contact with the customer. Measuring collection activities considers both the number and the intensity of collection activities. A more intense collection activity involves a more direct company-to-customer contact than does a less intense activity. Issuing a posted disconnect notice involves a more intense activity than issuing a computer generated "reminder" notice. The disconnection of service involves a more intense collection activity than does a call center contact.

In sum, the second objective of the Company's PEAP is to improve customer management of their own bills as bills become more affordable. Rather than having partial, late or periodic payments, or payments that are made only in response to Company collection activity, the objective is for low-income customers to address their bills for current usage in a complete, regular, timely and unsolicited fashion on a monthly basis.

Completeness: Customer Payment Coverage Ratios

The "completeness" of bill payment by PEAP customers is measured first by considering payments from the perspective of bills for current usage. To do so, the discussion below will consider "bill payment coverage ratios." The "completeness" of payment is measured next by considering payments from the perspective of the total amount due (i.e., the total "asked-to-pay" amount). To do this, the discussion below will consider arrears (defined to be that amount by which a customer payment falls short of covering the total amount expected to be paid in a month, not simply the bill for current usage).

The PEAP program appears to have generated a positive impact on PEAP participant bill payment coverage ratios. In the discussion below, the primary focus will be placed on *customer* payment coverage ratios. The purpose of PEAP was not to influence the extent to which customers could generate additional public assistance benefits. The purpose was to influence customer payment practices. In addition, the payment coverage ratio analysis is limited to the bill for current usage. If a customer has a payment coverage ratio of more than 1.0, that means the customer is paying his/her current bill plus making some payment toward arrears.[42]

[42] For purposes here, the primary question involves the extent to which a customer is paying the bill for current usage. If the customer is making a payment sufficient to cover the entire current bill, arrearages will be decreasing. If the customer is *not* covering the entire current bill, that means that arrearages are increasing. The accounting process for posting payments is, for these purposes, not relevant. If a customer has an arrearage of $200 and a current bill of $100, if the customer makes a payment of $80, the arrearage is going to increase to $220, whether the payment is posted against the $200 arrearage or the $100 current bill first. In contrast, if the customer makes a

Continuing participation in the Company's PEAP appears to help low-income customers increase their customer payment coverage ratio. The Figure below presents the cumulative customer payment coverage ratios for the PEAP participants receiving combination gas/electric service from PSCo disaggregated by the number of months they participated in PEAP out of the 24-month study period.[43] A "combination: 1-6" customer, in other words, participated in PEAP for between one (1) and six (6) months in the 24-month study period. A "combination: 21-24" customer participated in PEAP for between 21 and 24 months in the 24-month study period.

As can be seen, the sub-population of PEAP participants with the lowest customer payment coverage ratio is the population with least number of months of PEAP participation. These customers made payments that generally "covered" between 40% and 60% of their monthly bills for current usage. In contrast, PEAP customers who had participated in PEAP for between seven (7) and twelve (12) months of the study period generated a payment coverage ratio of close to 70%. Low-income customers who had participated in PEAP for more than 12 months had customer payment coverage ratios of roughly 80%. During the last twelve months of the study period, during which both of these longer-term PEAP participants were, in fact, in the program, the customer payment coverage rates were relatively flat and virtually identical.

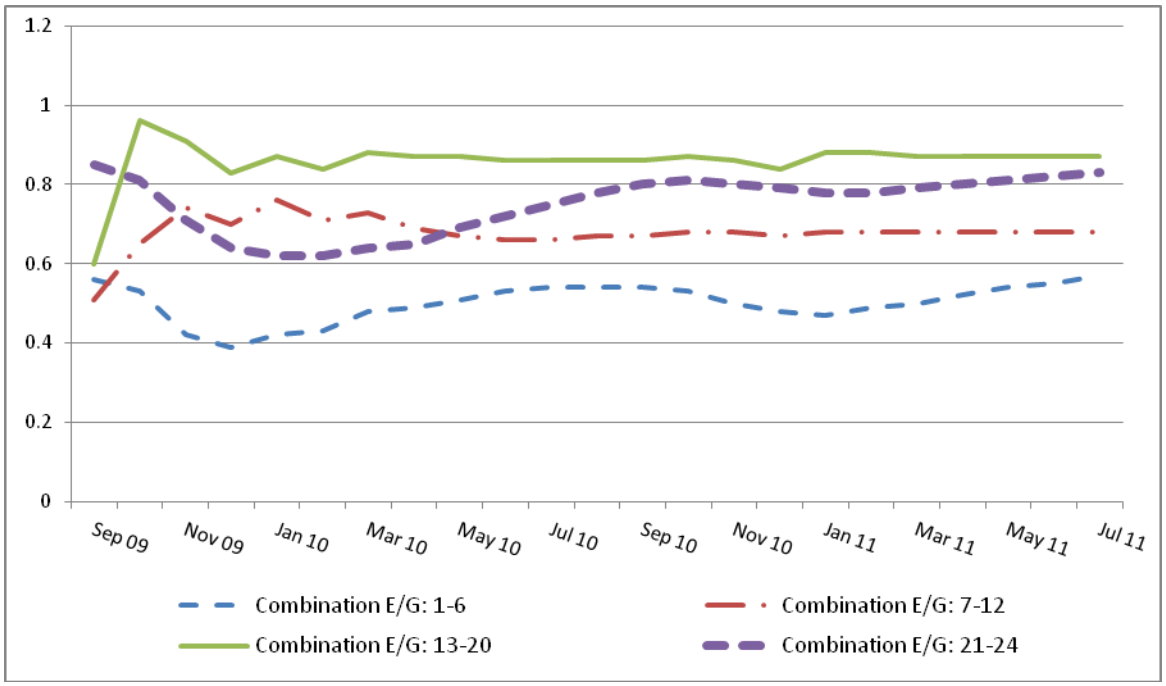

Figure 8. Cumulative Customer Payment Coverage Ratio by Months of PEAP Participation (Combination G/E)

payment of $120, that customer will have reduced his/her arrearage to $180, irrespective of whether the payment is posted against the $200 arrearage or the $100 current bill first.

[43] Reference to a "cumulative" payment coverage ratio means that each month is not examined individually. Each month of payments is added to all previous months of payments and then compared to the aggregate of bills for current usage over the same time period. In comparing "bills" and "payments," the "bills" in Month 1 are compared to the "payments" in Month 2. Accordingly, data ends in July 2011 (Month 23) rather than in August 2011 (Month 24) since there would be no Month 25 payments to compare to Month 24 bills.

The impact of the delivery of PEAP discounts on customer payment coverage ratios is also seen in a comparison of payment coverage ratios between PEAP participants with PEAP discounts in all (or nearly all) of the study months and customers who are *not* PEAP participants but who are either low-income LEAP recipients or residential customers in general. This comparison, set forth immediately below, shows that low-income customers not receiving PEAP discounts have the lowest customer payment coverage ratios of the three comparison groups (PEAP, LEAP-non-PEAP, residential). In contrast, the PEAP population and general residential population have coverage ratio patterns that are virtually indistinguishable.

It is important to remember, of course, that this Figure does *not* indicate that PEAP customers and residential customers are making the same level of payments. Rather, the Figure indicates that the PEAP participants are paying virtually the same percentage of their discounted bills as residential customers in general are paying of their non-discounted bills.[44]

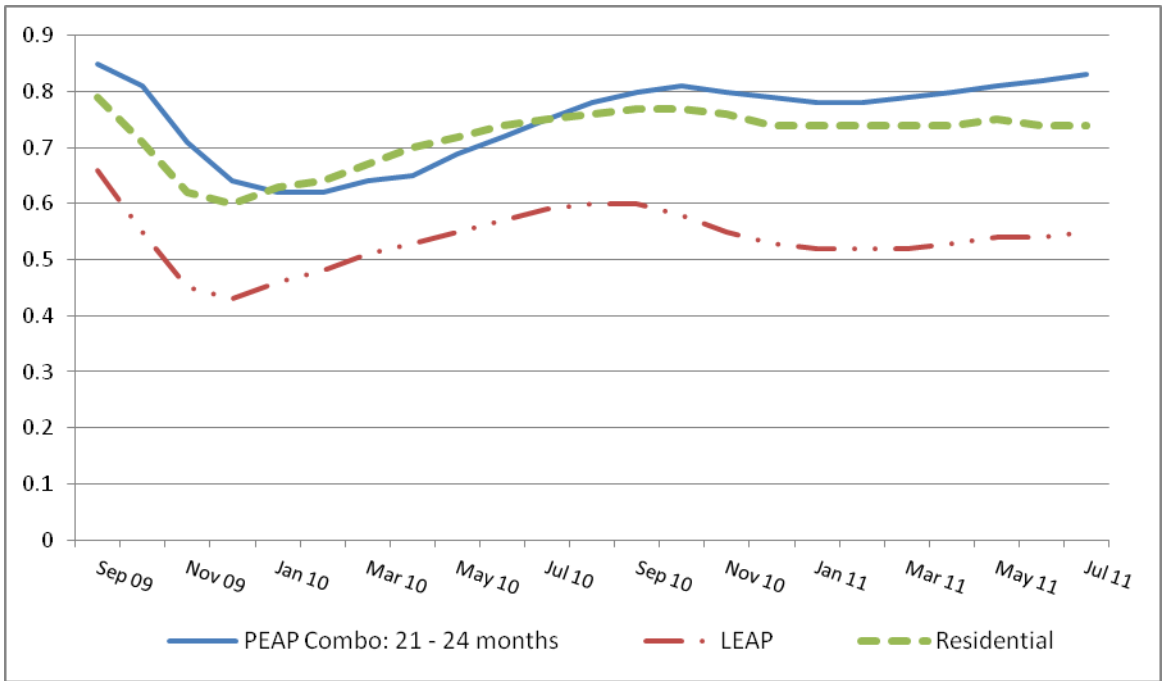

Figure 9. Cumulative Customer Payment Coverage Ratio for Combination PEAP (G/E) Participants (21 – 24 Months) compared to LEAP and Residential Accounts

Even in discussing "the" LEAP recipient population, however, it should be noted that differences exist among those recipients. The Figure below compares, solely within the LEAP population, the customer payment coverage ratios of LEAP recipients disaggregated by their level of arrears in Month 1 of the study period. While the high-arrearage LEAP recipients show a distinct seasonal variability in their customer payment coverage ratios, the customers with little or no arrears show a pattern of making a consistent proportionate payment. These payments tend not

[44] It is further important to remember that "residential customers" are *not* non-low-income customers. The residential customer base excludes PEAP participants, but then randomly selects customers irrespective of whether they received LEAP or not.

to cover their entire bills for current usage, but tend instead to cover a consistent portion of their bills for current usage. In contrast, the high-arrearage customers show, quite clearly, in other months of the 24-month study period, a proportionate dip in customer payment coverage during the cold weather months with an increase in customer payment coverage during the warm-weather months. While the warm-weather payment coverage increases, however, it is never sufficient to pay 100% of the current bills.

Remember, of course, that "customer" payments will be supplemented with public assistance payments through the federal energy assistance program. By definition, the customers in this LEAP population are customers who have applied for and received federal energy assistance benefits. Their total payment coverage ratio may be quite different from their customer payment coverage ratio. It seems evident, however, that one attribute of the lower arrearage LEAP recipients is that these customers continue to pay an ongoing proportion of their bill for current usage notwithstanding any receipt of energy assistance benefits.

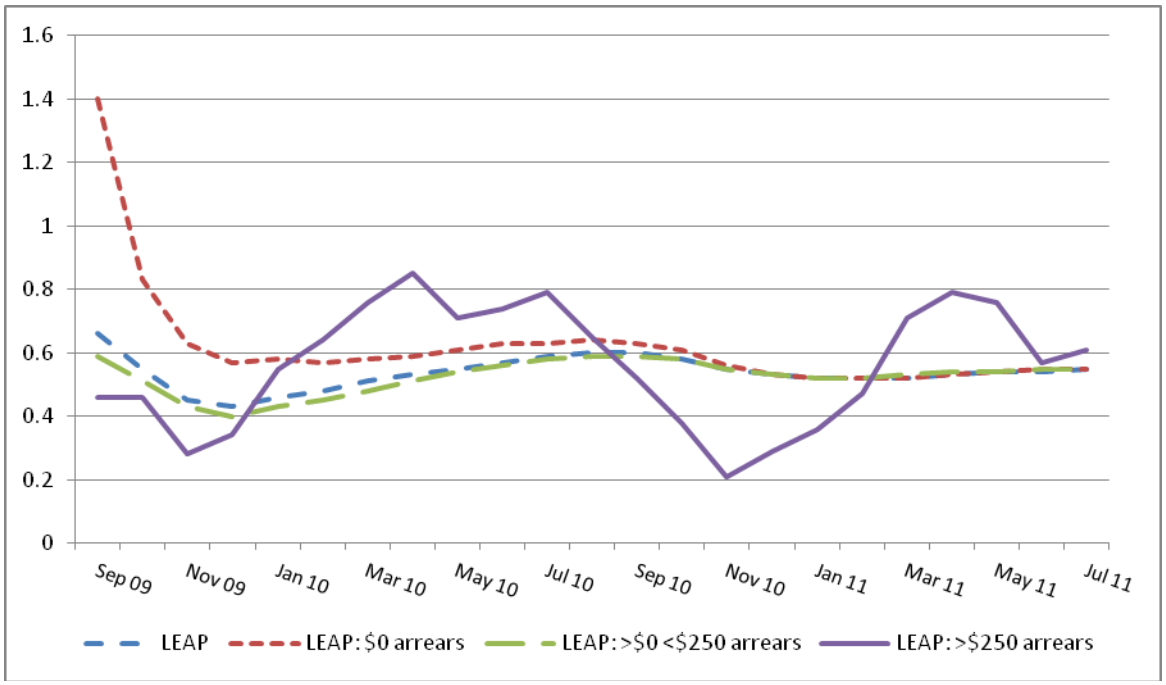

Figure 10. Cumulative Customer Payment Coverage Ratio for LEAP Recipients by Level of Month 1 Arrears.

To the extent that PEAP participation improves the customer payment coverage ratio of program participants, that improvement is not uniform throughout the PEAP population. The Figure below examines the percentage of PEAP participants by the level of their cumulative customer payment coverage ratio. As in the discussion above, the "cumulative" customer payment ratio means that each month's customer payment is added to the sum of all previous customer payments and then compared to the sum of all bills for current usage. The "cumulative" figure for Month 23 is *not* the payment coverage ratio *for* Month 23 (dividing July bills by August payments), but rather the *total* customer payments for the full study period divided by the total bills for current usage for the full study period.

With that in mind, the Figure below reveals several significant observations.

- The proportion of PEAP customers paying substantially more (e.g., payment coverage ratio of more than 1.10) or less (e.g., payment coverage ratio of less than 0.50) during the first few months of program operation leveled out to a constant payment pattern over the remaining portion of the study period. Since this sub-population of PEAP participants includes a portion who participated for fewer than 24 months, however, the performance in the time period encompassing December 2009 and later is the more robust measure of performance (by December 2009, 100% of this sub-population would have been participating in PEAP).

- The proportion of PEAP participants having a customer payment coverage ratio of between 76% and 110% each month is virtually indistinguishable. The percentage of PEAP participants paying 76% to 90% of their bills for current usage is nearly identical to the percentage of PEAP participants paying 90% to 110% (each involving 10% of the population).

- The only population for which the percentage decreased consistently over the 24-month study period was the population of PEAP participants generating a customer payment coverage ratio of less than 0.50 (i.e., paying less than half of their bill). There was a steady improvement in the customer payment coverage ratio of PEAP participants who fell into the lower payment coverage band in the early months.

- The only sub-population of PEAP participants demonstrating a noticeable seasonal variation in payment coverage ratios was that group of PEAP participants with a cumulative customer payment coverage ratio of less than 0.50. The uptick in the percentage of participants with a cumulative ratio of less than 0.5 was substantially smaller in the second cold-weather period than in the first. By the end of the study period, a smaller proportion of PEAP participants fell into the range of less than 0.50 than fell into all but the group with a customer payment coverage ratio of between 76% and 110%.

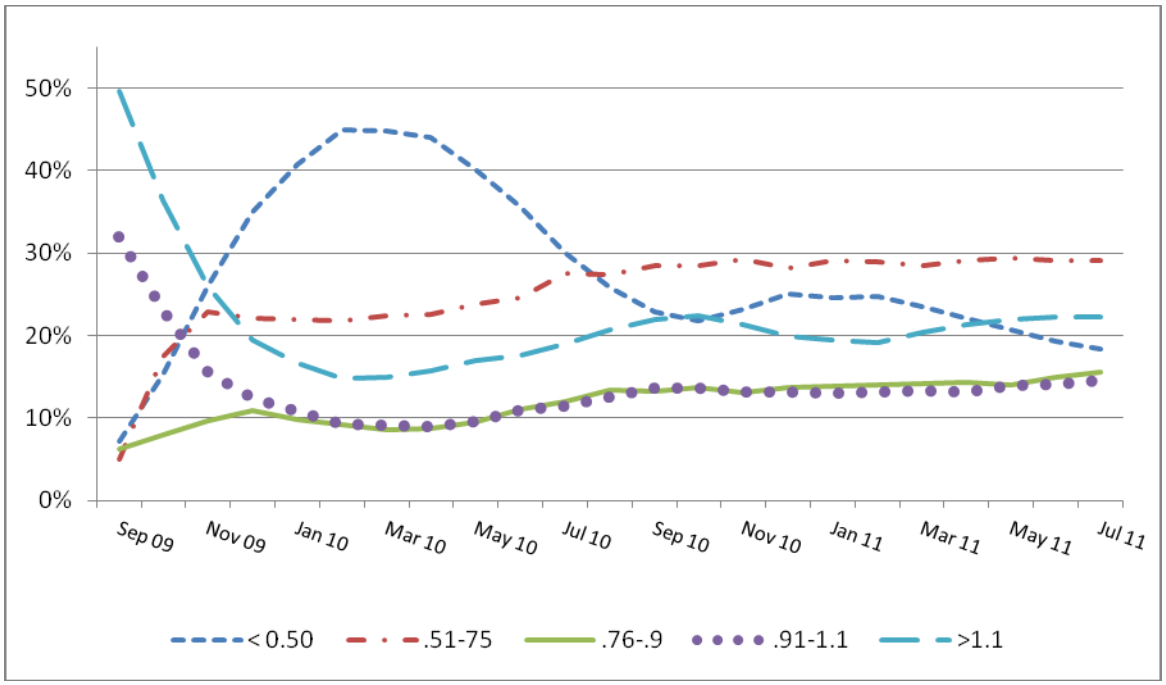

Figure 11. Percent of Combination PEAP (G/E) Participants (21 – 24 Months) by Range of Customer Payment Coverage Ratio

PEAP appears to have stabilized program participant payment patterns. Beginning in roughly July/August 2010, the proportion of customers in each band of payment coverage ratios stabilized and remained relatively constant through the remainder of the study period. The only exception was that group whose cumulative payment coverage ratio was less than 0.50, which proportion continued to fall through the remainder of the study period.

Overall, PEAP appears to help low-income customers improve their payment coverage ratio. Combination gas/electric customers who participate in both EAP and PEAP demonstrate a distinctly improved cumulative customer payment coverage ratio when compared to either LEAP recipients or to the residential customer population generally.

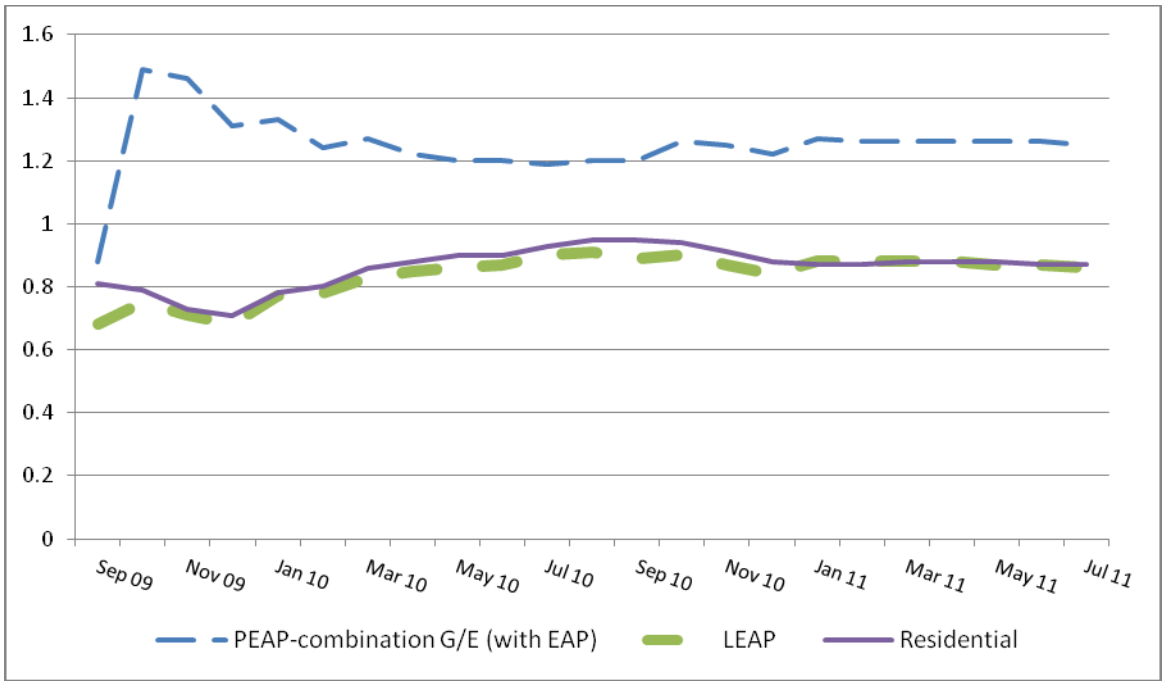

Figure 12. Cumulative Customer Payment Coverage Ratio for Combination (G/E) PEAP compared to LEAP and Residential Accounts.

One reason customer payment coverage ratios might be higher for PEAP combination customers is that these customers carry pre-existing arrears against which they must make PEAP payments. However, even if this were true, the cumulative customer payment coverage ratios indicate that PEAP combination customers are, in fact, making complete payments and retiring their pre-existing arrears. It is to this question of how PEAP affects arrears that we next turn.

Timeliness: Customer Arrearages

The impact of a program such as PEAP on the arrearages[45] of low-income customers can be measured in a number of ways. In this evaluation, the impact on arrearages is measured by both the incidence of arrears and by the depth of arrears. The "incidence" of arrears examines how many customers carry arrears. The "depth" of arrears measures how large of an arrearage a customer carries.

PEAP was successful in maintaining the number of accounts in arrears at the same levels as those levels that were experienced in the residential and federal energy assistance populations overall. Differences began to appear in the winter heating season of the first year of the study period. As the Figure 13 shows below, at that time, the number of energy assistance (LEAP)

[45] For purposes of this analysis, an "arrearage" is defined to be the balance remaining if the asked to pay amount from the prior month is not completely covered by a payment posted to the next month's bill. For example, if the asked-to-pay amount is $200 and the posted payment is $150, there is, by definition, a $50 arrears. Excluded from this definition, for example, are balances on Equal Payment Plan accounts and arrearages subject to deferred payment arrangements for which the agreed-upon monthly payment is not yet due. If, for example, an account has a $400 arrears and has agreed to retire that balance in ten installments of $40 each, and is current on all installments that have been billed to date, for purposes of this definition, the customer has no arrearage.

accounts with $0 in arrears began to decrease, while the number of PEAP accounts instead continued to reflect the payment patterns of residential customers as a whole. During the warm weather months of the first year of the study period, the improvement of PEAP payment patterns relative to LEAP increased further. After a dip in the Fall of Year 2 of the study period, the percentage of PEAP accounts with $0 in arrears substantially increased while the LEAP (and residential) percentages continued at a constant level (and lower level relative to Year 1).

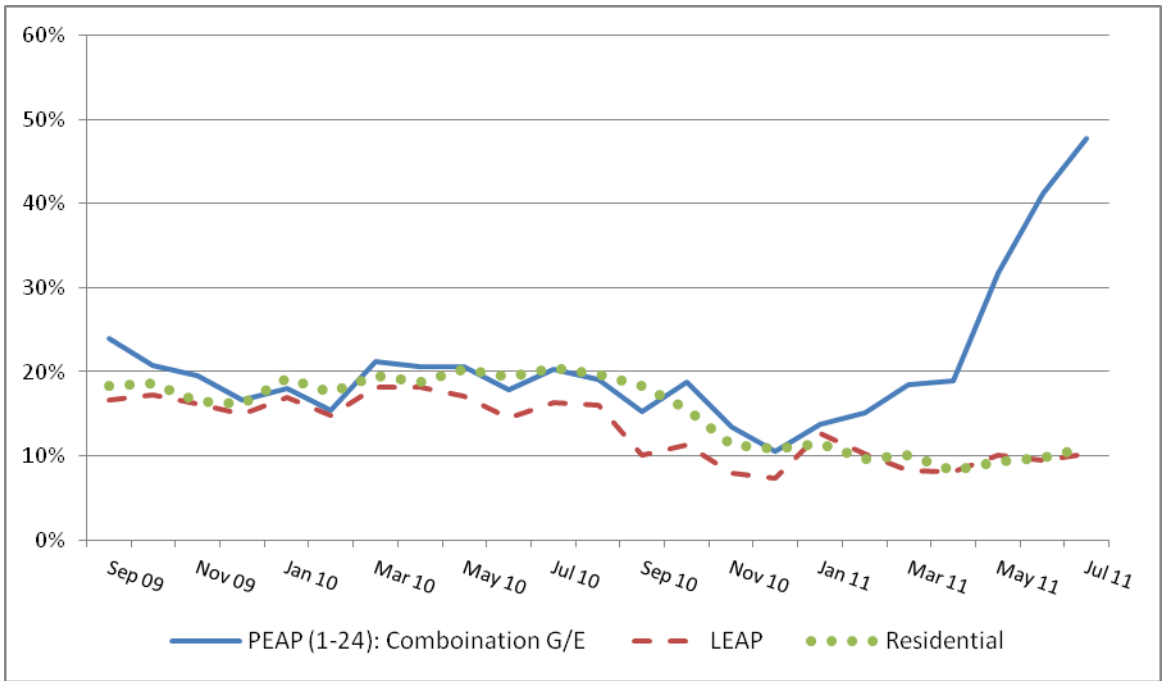

Figure 13. Percent of Accounts with $0 in Arrears by Month for Combination (G/E) PEAP (21 – 24 months) compared to LEAP and Residential Accounts

In contrast to the percentage of accounts with $0 in arrears is an examination of the percentage of accounts with more than $250 in arrears. Figure 14 shows the data. At the beginning of the study period, a greater percentage of PEAP accounts had more than $250 in arrears than did either LEAP or general residential accounts. While the LEAP accounts with high arrears roughly followed the shape of the LEAP and residential populations over time, the variation in the proportion of accounts in arrears was somewhat flatter for PEAP customers than for the two comparison group populations. Beginning in the second year of the study period, however, the performance of PEAP customers saw a substantial improvement. Starting in the Spring of 2011 and continuing for the remainder of the study period, the percentage of high arrearage accounts for the PEAP population was substantially lower than for the two comparison groups.

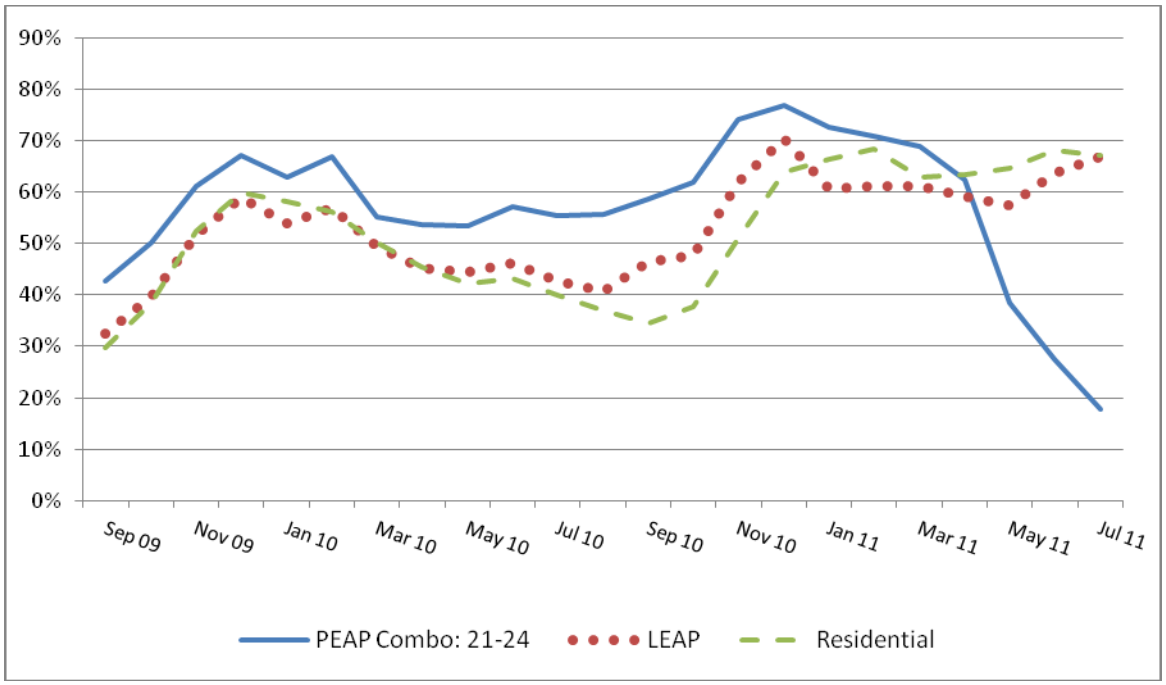

Figure 14. Percent of Combination (G/E) PEAP Accounts (21 – 24 months) with $250+ in Arrears compared to LEAP and Residential Accounts.

Table 25 presents a more comprehensive picture of the performance of the incidence of arrears in the PEAP population, as compared with the LEAP population and the general residential population. Table 25 reports the percentage of each population disaggregated by the number of months (out of the 24-month study period) in which customers in each population had some arrears. Table 25 does not distinguish between the levels of arrears. An account $10 in arrears is counted the same as an account $100 in arrears. The Table simply considers the percentage of accounts with "some" arrears. In addition to examining the performance for the two comparison groups as a whole, the Table further presents data on the performance of the sub-groups within each comparison group disaggregated by the level of Month 1 arrears.

Not surprisingly, for both the LEAP and residential populations, customers with $0 of arrears in Month 1 had a poorer performance within both the LEAP and residential populations than did customers with higher levels of Month 1 arrears. Nearly four-of-ten residential customers (38%) having a $0 Month 1 arrears were in arrears in six or fewer months over the course of the 24-month study period. Only 1-in-7 residential (14%) residential customers having an arrearage of more than $250 were in arrears for six of fewer months (with none being in arrears for zero months). In contrast nearly three-of-five customers in both the LEAP and residential populations who had Month 1 arrears of greater than $250 were in arrears for between 22 and 23 months of the study period (compared to only 1% of LEAP and residential customers who had a $0 Month 1 arrearage).

Table 25: Percent of Accounts by Number of Months in Arrears in 24 Month Study Period

	PEAP (G & E) (with EAP)		LEAP (by level of Month 1 Arrears)				Residential (by level of Month 1 Arrears)			
Months in Arrears out of 24 Month Study Period	1-6 months	21-24 months	LEAP ($0)	LEAP ($1 - $250)	LEAP (>$250)	LEAP (Total)	Res ($0)	Res ($1 - $250)	(Res (>$250)	Res (Total)
0	5%	20%	4%	1%	1%	2%	5%	0%	0%	2%
1-6	17%	33%	27%	13%	12%	20%	33%	14%	14%	23%
7-12	20%	20%	36%	9%	10%	21%	32%	12%	10%	21%
13-18	23%	15%	23%	21%	18%	21%	21%	20%	16%	20%
19-21	25%	7%	8%	27%	26%	18%	8%	22%	26%	17%
22-23	9%	4%	1%	29%	33%	17%	1%	30%	34%	18%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Count	524	3,356	1,405	1,016	649	3,070	1,111	876	505	2,492

Table 25 shows further, however, that customers participating in PEAP (combination gas/electric who also participated in EAP) out-performed the LEAP and residential populations.[46] Perhaps the two best performance comparisons are between: (1) customers who had participated in PEAP for 21-24 months of the study period and customers who had participated in PEAP for only 1 – 6 months of the study period; and (2) customers who had participated in PEAP for 21-24 months of the study period and LEAP recipients (low-income energy assistance recipients).
The short-term PEAP participants exhibited a performance that closely reflects the LEAP population. As can be seen:

- 22% of both LEAP (total) and short-term PEAP participants had arrears in six or fewer months;

- While 20% of short-term PEAP participants had arrears in seven to twelve months, 21% of LEAP customers did;

- While 23% of short-term PEAP participants had arrears in 13 to 18 months, 21% of LEAP (total) customers did;

[46] Remember, of course, that pre-existing arrearages for the PEAP population were made subject to the program's arrearage credit provisions. The PEAP arrearages would represent only unpaid bills for current usage incurred subsequent to entry in the program.

- While 34% of short-term PEAP participants had arrears in 19 to 23 months, 35% of LEAP (total) customers did.

In contrast, the long-term PEAP participants had significantly improved payment patterns as measured by the incidence of arrears. A higher proportion of customers had arrears in six or fewer months (53%). A lower proportion of customers had arrears in both 13 to 18 months (15%) and in 19 to 23 months (11%).

In contrast to Table 25, Table 26 and Table 27 below take into consideration not merely the presence of "some" arrears, but considers one aspect of the *level* of arrears as well. Both Tables allow an assessment to be made of whether the level of arrears (as opposed to the incidence of arrears) was increasing, decreasing or staying the same. Table 26 examines the level of arrears in Month 13 of the study period compared to the level of arrears in Month 1. Table 27 examines the level of arrears in Month 23 of the study period[47] compared to the level of arrears in Month 1.

The change in arrears is measured by examining the ratio of the level of arrears in the later month (either Month 13 or Month 23) to the level of arrears in Month 1. A ratio of "0" means that an account had a positive level of arrears in Month 1, but had $0 in arrears in either Month 13 or in Month 24.[48] A ratio of 1.0 means the level of arrears in Month 13 or 23 was identical to the level of arrears in Month 1 (which would happen only by coincidence, and, as is seen, rarely occurs). A ratio of less than 1.0 means that the level of arrears had deceased (so, for example, a ratio of .01 to 0.49 indicates that the level of arrears in Month 13 or Month 23 is less than half what it was in Month 1, but still greater than $0).[49]

As with the incidence of arrears, Table 26 shows that the performance of short-term PEAP participants and LEAP recipients closely mirror each other.[50] The Table shows further, however, that by the end of the first year of the study period, long-term PEAP participants out-performed both the short-term PEAP participant population and the LEAP population as a whole. Nearly four-of-ten (38%) PEAP participants had reduced their Month 1 arrears to $0 by Month 13, compared to 9% of the short-term PEAP participants and 5% of LEAP recipients. Moreover, by Month 13, nearly half (49%) of PEAP participants had reduced their arrears to less than half of their Month 1 levels, compared to 17% of short-term PEAP participants and 14% of LEAP recipients. In contrast, only 40% of PEAP participants had increased arrears in Month 13

[47] Remember, for purposes of this report, "arrears" is defined to be the unpaid amount that a customer is asked-to pay appearing on one month's bill that is not covered by the payments reflected on the next month's bill. Accordingly, the reason why only 23 months of data exist on arrears is because, while billing data is available for Month 24, no payment data is available for Month 25.

[48] The ratio of "0", in other words, does *not* include accounts with $0 in arrears in Month 1. Those accounts are separately noted. Ratios are not calculated for those accounts since it is not possible to calculate a ratio with the number "0" in the denominator.

[49] It is important to remember the limitation of this analysis. The analysis is limited to accounts having arrears in Month 1. Accounts with $0 in arrears in Month 1 are not included in the population "total" since a ratio cannot be calculated with $0 in the denominator.

[50] This result should not be surprising for any part of this analysis. PEAP participants are chosen from the LEAP population. The fact that these accounts are "short-term" PEAP participants simply indicates that they are LEAP recipients who enrolled in PEAP in a later month rather than in an earlier month.

(relative to Month 1), while 74% of short-term PEAP participants had done so and 69% of LEAP recipients had done so.

Table 26: Percent of Accounts by Ratio of Month 13 Arrears to Month 1 Arrears

	PEAP (combination G/E) by Length of PEAP participation		LEAP (by Month 1 arrears)				Residential (by Month 1 arrears)			
Ratio of Month 13 Arrears to Month 1 Arrears	1-6 months	21-24 months	$0	$1 - $250	>$250	Total	$0	$1 - $250	>$250	Total
0	9%	38%	---	7%	2%	5%	---	8%	7%	8%
.01 - .49	8%	11%	---	5%	15%	9%	---	4%	17%	8%
.50 - .99	9%	11%	---	10%	25%	16%	---	12%	27%	17%
1.0	0%	0%	---	0%	1%	0%	---	1%	0%	0%
>1.0	74%	40%	---	77%	57%	69%	---	76%	48%	66%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zero Month 1 Arrears	66	1,419	274	-	-	274	246	-	-	246
Accounts with Month 1 Arrears	220	955	0	796	503	1,299	0	679	384	1,063

By the end of the study period, the payment performance of long-term PEAP participants remained relatively constant. Four-of-ten PEAP participants had reduced their Month 1 arrears to $0, while half had reduced their arrears to either $0 or less than 50% of the Month 1 level. Roughly four-of-ten (38%) had a higher arrears in Month 23 than they had in Month 1. The PEAP performance in Month 23 was more significant because the performance of LEAP recipients had declined by Month 23 at the higher arrearage levels. For the LEAP participant as a whole, more customers had experienced an increase in arrears in Month 23 (74%) than in Month 13 (69%). As can be seen in Table 27, not only did fewer PEAP participants exhibit a higher arrears in Month 23 (relative to Month 1), but while the proportion of PEAP participants exhibiting a higher arrears declined from Month 13 to Month 23, the proportion of LEAP recipients exhibiting a higher arrears increased.

Table 27: Percent of Accounts by Ratio of Month 23 Arrears to Month 1 Arrears

	PEAP (combination G/E) (by length of PEAP participation)		LEAP (by Month 1 arrears)				Residential (by Month 1 arrears)			
Ratio of Month 23 Arrears to Month 1 Arrears	1- 6 months	21-24 months	$0	$1-$250	>$250	Total	$0	$1 - $250	>$250	Total
0	48%	40%	---	9%	6%	8%	---	10%	7%	9%
.01 - .49	12%	10%	---	2%	12%	6%	---	3%	11%	6%
.50 - .99	17%	11%	---	8%	18%	12%	---	7%	20%	12%
1	0%	0%	---	0%	1%	0%	---	0%	0%	0%
>1	23%	38%	---	80%	63%	74%	---	80%	61%	73%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zero Month 1 Arrears	31	1,251	202	-	-	202	172	-	-	172
Accounts with Month 1 Arrears	82	743	0	619	372	991	0	503	309	812

A different way to assess the level of arrears for utility customers is to determine the number of bills-behind a customer is at any given point in the year. In introducing the "bills-behind" statistic, [51] the Pennsylvania Bureau of Consumer Services (BCS) noted that any assessment of

[51] The use of "weighted arrears" as a mechanism to assess payment outcomes is based on a foundation first provided by the Bureau of Consumer Services (BCS) of the Pennsylvania Public Utilities Commission. According to a 1983 BCS analysis, contrary to the argument by that state's utility companies, the Pennsylvania winter shutoff moratorium did not result in an increase in the number of unpaid bills, or the amount of unpaid bills, that would have existed in the absence of a moratorium. The BCS study reported that:

> Average overdue bills are at a low in November and rise to a high point in March or April. The apparent relationship of this pattern to Public Utility Commission regulations is obvious. That is, arrears are greatest at the end of the Commission's winter termination restrictions (December 1 to March 31 of the following year) and have been reduced to their lowest point immediately prior to the introduction of those restrictions for the following year. This pattern is consistent with the assertion put forward by utilities that they would be able to control arrearages if there were no winter termination restraints. However, the seasonal fluctuations are substantial only for heating accounts. Arrearages for non-heating accounts show only minor seasonal fluctuations. A comparison of [the data] suggests a simple explanation for this difference, that is, that the size of arrearages is related to the size of monthly bills. Heating customers' bills grow radically in the winter and so do their arrearages. Non-heating customers' bills change very little seasonally and their arrearages follow suit. In other words, if the assertion that winter termination restraints invite nonpayment was correct, then non-heating arrearages should show the same seasonal pattern of variations as do heating arrearages. That they do not casts substantial doubt on the assertion that PUC winter termination restraints are responsible for willful non-payment and consequent collection problems.

Farrell (1983). *Utility Payment Problems: The Measurement and Evaluation of Responses to Customer Nonpayment*, at 19, Pennsylvania Public Utility Commission: Harrisburg, PA

arrears must control for the impact of monthly bills. The BCS report is consistent with the BCS recommendation, often stated, to use a "weighted arrears" or "bills behind" statistic to factor out the impact of increased arrears caused by factors other than nonpayment. BCS explains that its "bills behind" statistic "permits comparisons to be drawn between companies by eliminating the effects of different customer bills on arrearages."

Without a measure such as the "bills-behind" metric, "the interpretation of average arrearages, either over time or in comparison between companies, presents some difficulties." The two Figures below separately compare: (1) the long-term PEAP participant population (21-24 months) to the short-term PEAP participant population; and (2) the long-term PEAP participant population to the LEAP recipient and general residential population. The comparison is of the percentage of accounts in arrears that are fewer than 0.5 bills-behind.[52]

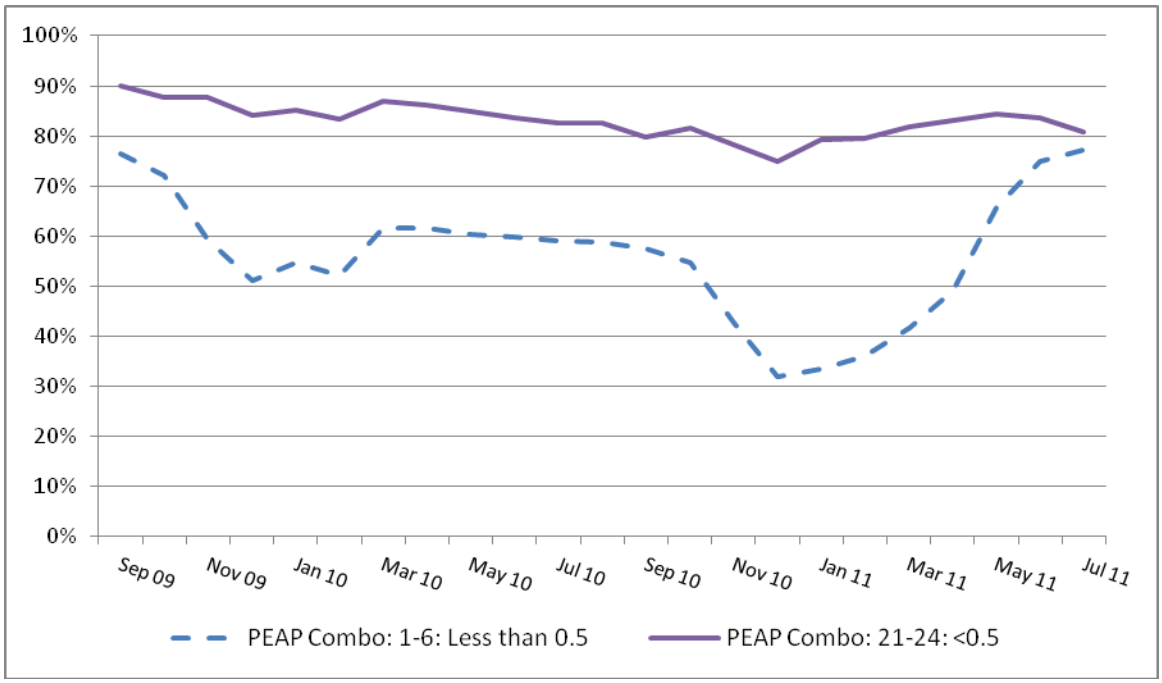

Figure 15. Monthly Bills-Behind <0.5 by Length of PEAP Particpation.

As can be seen from the two comparisons, the PEAP participant population out-performs the short-term PEAP participants (1 – 6 months) as well as both the LEAP and residential comparison groups. While between 80% and 90% of PEAP participants had a bills-behind statistic of 0.5 or less (i.e., the level of their arrears was less than 0.5x their average monthly bill), the three comparison populations had a substantially lower percentage of accounts in arrears with arrears that low.

The short-term PEAP participant population, in its own way, further documents the impact of PEAP on the bills-behind statistic. As the comparison moves into the later months of the study

[52] The bills-behind (or "weighted arrears") statistic is calculated by dividing the arrears in any given month to the average bill in the year in which the month occurs. So, arrears in Month 1 through Month 12 are divided by the average bill for Months 1 – 12. Arrears in Months 13 – 23 are divided by the average bill for Months 13 – 24.

period, those months in which the short-term participants would have begun their PEAP participation, the improvement in their bills-behind statistic is evident.

Remember, however, the bills-behind statistic considers only the level of arrears of accounts in arrears. It offers no insight into the incidence of arrears (i.e., the number of accounts in arrears). The incidence of arrears is considered in other parts of this evaluation.

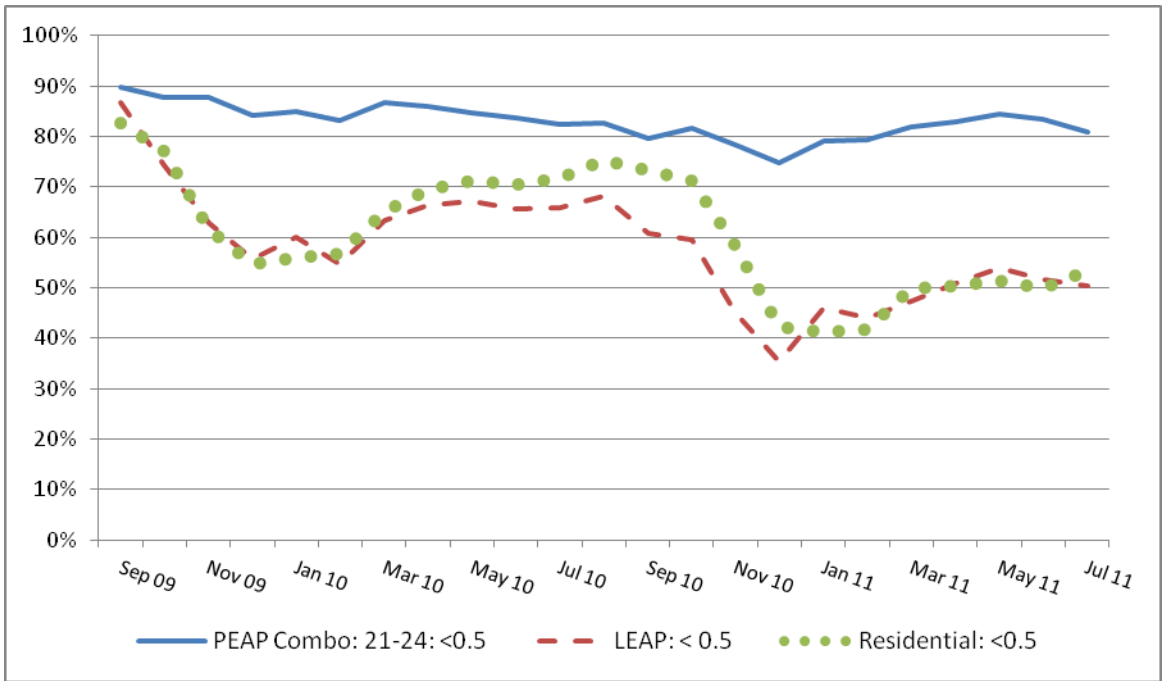

Figure 16. Monthly Bills-Behind <0.5 for Combination (G/E) PEAP (21 – 24 months) compared to LEAP and Residential Accounts.

Figure 16 shows that the LEAP and residential populations closely mirror each other but the PEAP out-performs each. Remember, the bills-behind statistics is calculated on the basis of accounts in arrears. The incidence of arrears is measured through other metrics discussed elsewhere in this report.

Regularity: Payment-to-Bill Ratios

One attribute of sustainable bill payment by utility customers is the "regularity" of payment. A utility does not seek merely to have *complete* bill payment over a set period of time. The utility wants its revenue to be generated through customer payments as bills are rendered. Two customers who both receive an annual bill of $1,200 and both make annual payments of $1,200 do not present identical risks (or costs) to the utility, if one of those customers makes twelve payments of $100 each and the other customer makes three payments of $400 each. Nor do those customers present identical risks (or costs) if one customer makes a payment each month, and the other customer makes a payment in January, a payment in June, and then payments in September through November.

In the discussion below, the Final Evaluation seeks to measure the "regularity" of payments. Within this discussion, the analysis will consider the number of payments (irrespective of the size of payment), the number of $0 payments (where a customer misses making a payment at all in a particular month), and the number of payments resulting in a $0 balance.

Number of Payments

The basic regularity of payments is measured through the calculation of a payment-to-bill ratio. If the ratio is equal to 1.0, the customer has made exactly one payment (of any size) for each bill that was issued to the customer. If the ratio is less than 1.0, the customer makes fewer payments than bills received. If the ratio is greater than 1.0, the customer makes more than one payment for each bill rendered. The payment-to-bill ratio does not consider either the size of the bill or the size of the payment. A payment of $100 is counted the same as a payment of $10. A payment of the entire bill is counted the same as a payment of a quarter of the bill.

It is, of course, important to remember that merely because a bill has been rendered does not mean that a payment is due. For example, a customer may receive a LEAP payment in November of any particular year, with that LEAP benefit creating a credit on the customer's account. Setting aside whether it is a "good" practice or a "bad" practice, that customer may quite legitimately not make a customer payment so long as his or her account has a credit.

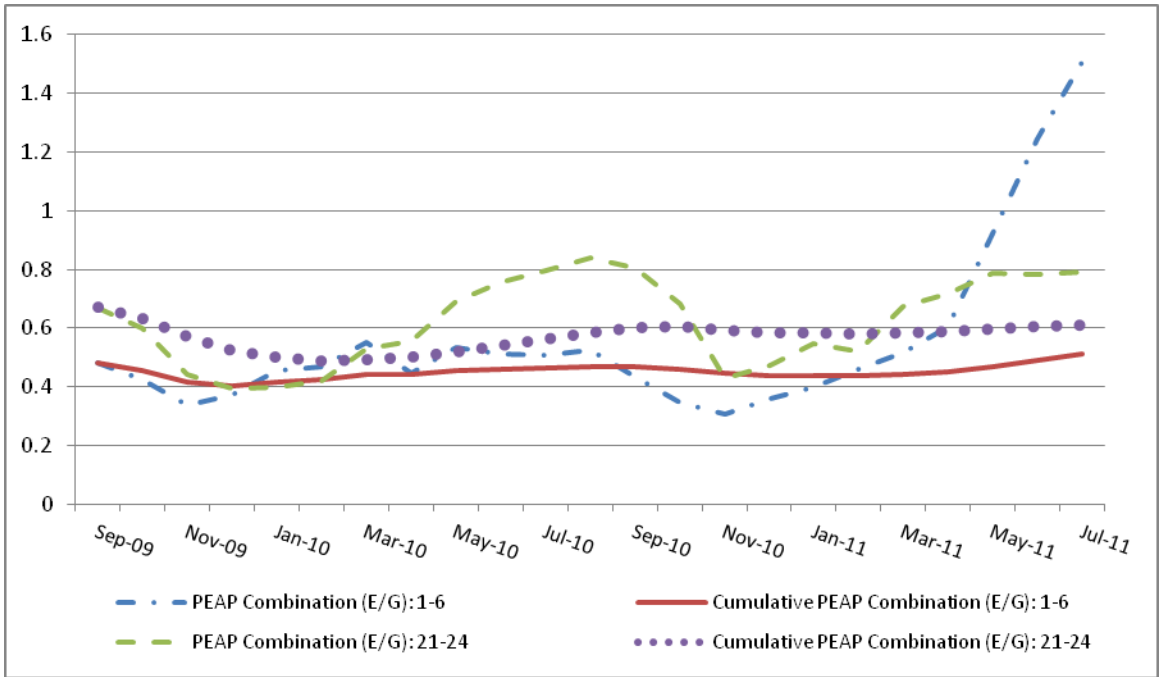

Figure 17. Number of monthly and cumulative customer payments per bill issued by length of PEAP participation.

Long-term PEAP participants (21 – 24 months) have a slightly better performance over time than the short-term PEAP participants (1 – 6 months). **Figure 17** sets forth the data. On a month-to-month basis, both sets of PEAP participants demonstrate a seasonal variation in the number of payments they make per number of bills issued. The longer-term participants not only have a

higher ratio in warm weather months, but have a greater increase between warm weather and cold weather months, despite being on levelized budget billing year-round. By the end of the study period, the cumulative payment-to-bill ratio for both sets of PEAP participants had begun to converge. While the trend of the cumulative ratio for short-term PEAP participants was slightly upwards (which would be consistent with improved payment patterns resulting from PEAP enrollment), the upward incline of the trend is not substantial. In contrast, the cumulative ratio for the long-term PEAP participants was virtually flat.

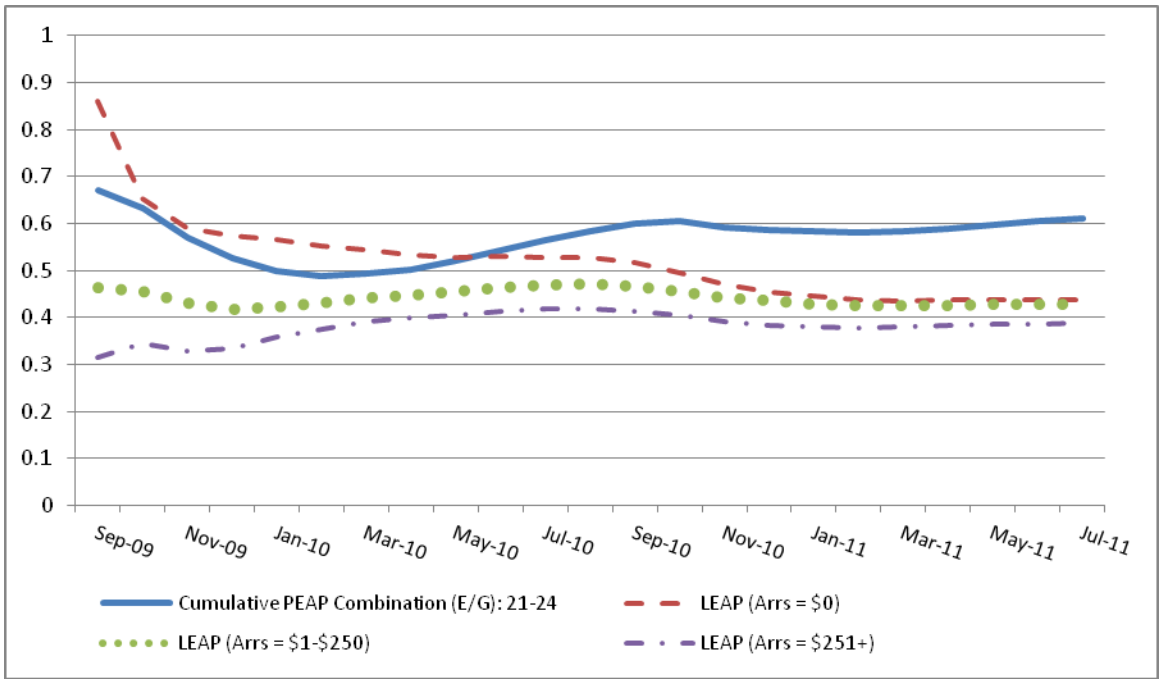

Figure 18. Number of monthly and cumulative payments per bill issued for PEAP (21-24 months) as compared to LEAP Recipients by Month 1 Arrears

In contrast to the comparison between short-term and long-term PEAP participants, the long-term PEAP participants demonstrate a noticeable performance improvement relative to LEAP participants. While PEAP participants made roughly six payments for each 10 bills issued (0.6 payments/bill), LEAP recipients made only four (0.4 payments/bill). The cumulative payment-to-bill ratio for LEAP recipients with differing levels of arrears in Month 1 of the study period tended to converge over time.

Number of $0 Payments

One aspect of bill payment regularity is the extent to which, if at all, customers make *no* payment in months in which they receive bills. Utilities encourage customers to make *some* payment each month, even if those payments do not cover the entire bill. Particularly during the high-cost cold weather months, for customers not on levelized budget billing, a pattern of completely missing payments can lead quickly to the acquisition of an insurmountable level of arrears. The data below considers the extent to which customers skip payments entirely rather than the extent to which customers make payments.

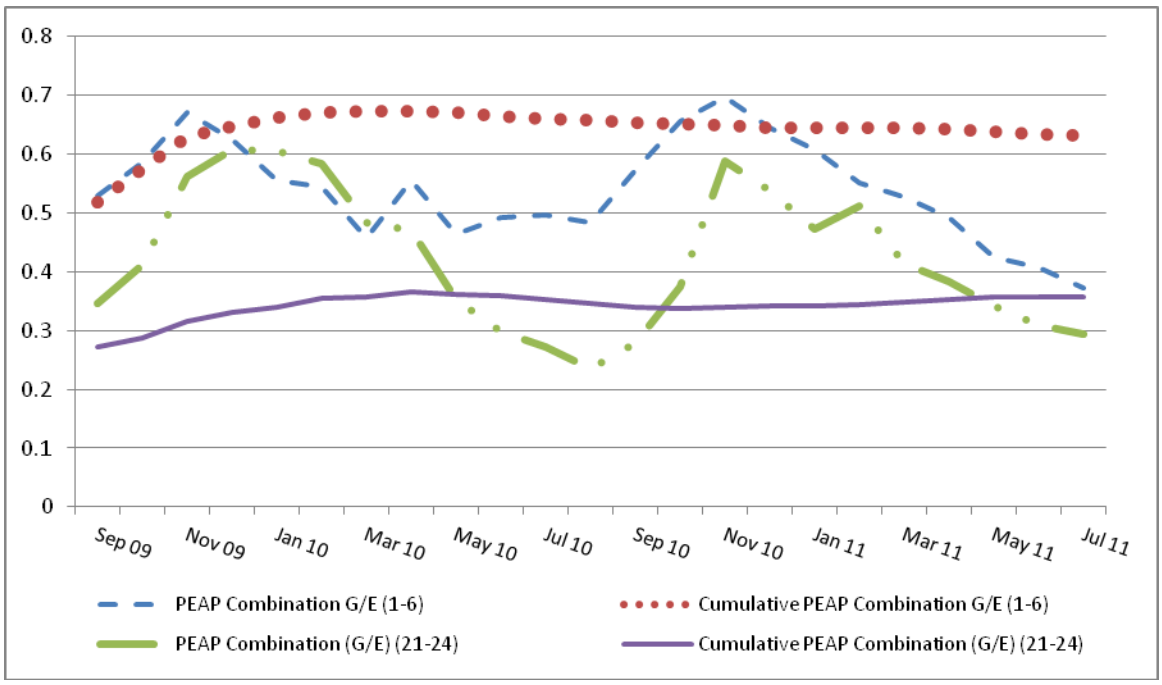

Figure 19. Monthly and Cumulative Accounts with Bills >$0 and $0 Customer Payments by Length of PEAP Participation.

Three observations appear to be significant in the data presented in **Figure 19**. First and foremost, the long-term cumulative proportion of bills to PEAP customers that are met with no payment at all is significantly lower for long-term PEAP customers than for short-term PEAP customers. Long-term PEAP participants had a rate of $0 payment less than half of their short-term counterparts.

Second, even within the short-term participant population, the performance improvement upon enrollment of customers in PEAP (in the final six months of the study period) is noticeable, with the monthly data trending down toward the monthly data of the long-term participants and the improvement being sufficiently large to begin to bring the "cumulative" total down as well. The convergence of performance for the short-term and long-term PEAP participants in the warm-weather months of 2011 (compared to the warm-weather months of 2010) is noticeable. While in the warm-weather months prior to their enrollment in PEAP, the PEAP (1-6) customers show a 50% nonpayment rate during the warm-weather months of 2010, the non-payment performance post-enrollment during the warm-weather months trended substantially downward.

Finally, while the addition of payment performance in any given month to the cumulative performance in all prior months is difficult to be substantial enough to generate a line-shifting result in the cumulative total, the overall improvement in the cumulative trend for the short-term PEAP participants is noticeable. While the monthly performance of the two populations will tend to converge before the cumulative performance does, the movement of the performance of the two populations (the long-term cumulative flat and the short-term cumulative line downward) is unmistakable.

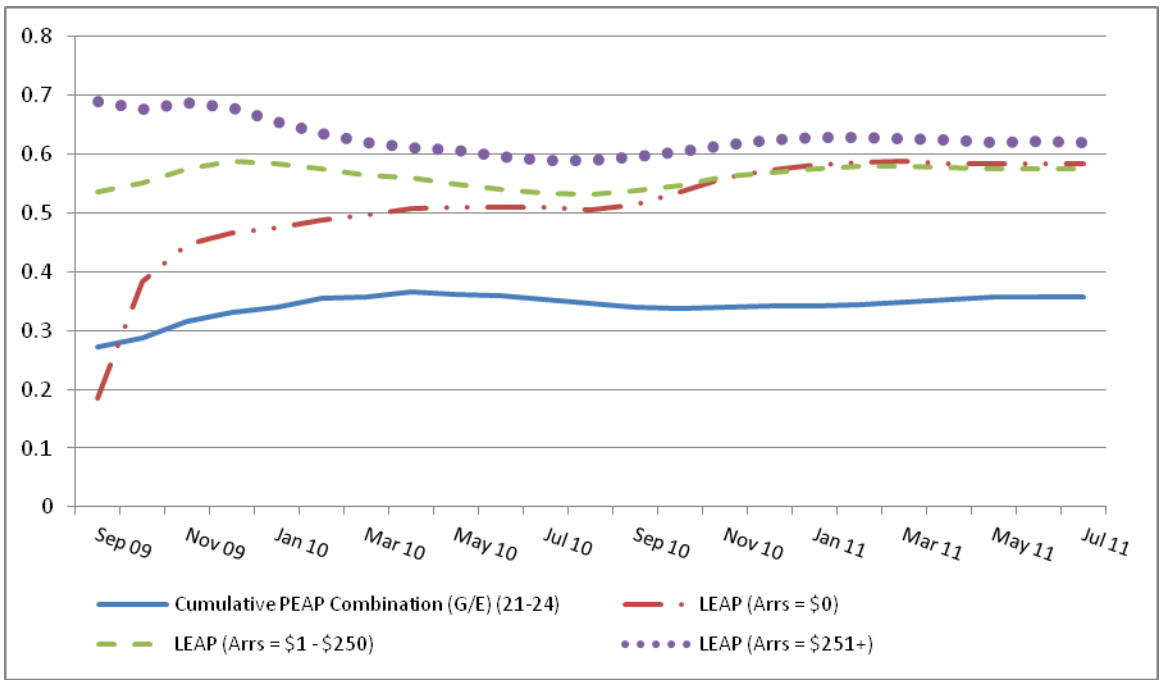

Figure 20. Cumulative Number of Accounts with Bills >$0 and $0 Customer Payments for PEAP (21-24) and LEAP by Level of Month 1 Arrears

As with other data, the payment performance of the long-term PEAP participant population shown in Figure 20 is substantively better than the payment performance of the LEAP populations. The proportion of cumulative LEAP bills on which a $0 payment is made converges on a nonpayment rate of roughly 60%. The nonpayment yielding a Month 1 LEAP arrears of more than $250, as well as the payment yielding a Month 1 LEAP arrears of $0 both appear to be relatively temporary impacts, even though the high-arrears LEAP customers appear to have a continuing higher proportion (though at a narrowing rate) of nonpayment than the other two LEAP populations.

In all instances, however, the PEAP performance was consistently and markedly improved relative to LEAP customers.

Number of Payments Resulting in $0 Balances

Ultimately, the outcome that a utility seeks from its customers is a payment that results in a $0 balance. That outcome has been examined from a variety of perspectives elsewhere throughout this evaluation (e.g., the payment coverage ratio, the level of arrears, the bills-behind represented by arrears). The discussion below, however, looks at the *regularity* with which "complete" bill payment occurs. The regularity of complete bill payment is examined below from two perspectives.

- On the one hand, the discussion considers the extent to which complete bill payments are made as a proportion of the number of bills rendered.

- On the other hand, the discussion considers the extent to which complete bill payments are made as a proportion of the number of payments that are made.

While a utility would prefer to have customer make bill payments that result in a $0 balance in response to each bill (i.e., a ratio of 1.0), a customer that exhibits a higher proportion of payments resulting in $0 balances of the payments that are made is less risky, and lower cost, than a customer that makes a lower proportion of payments that result in a $0 balance.

Long-term PEAP participants out-perform short-term PEAP participants in the proportion of bills that are met with payments that result in a $0 balance. **Figure 21** presents the data. The data in this Figure involves monthly (not cumulative) data. Three observations stand out. First, and most significantly, the extent to which long-term PEAP participants out-perform short-term PEAP participants is notable. While 50% or more of warm-weather bills result in a $0 balance for the long-term PEAP (21-24) population, fewer than 20% of the warm-weather bills result in a complete retirement of outstanding balances for the short-term population.

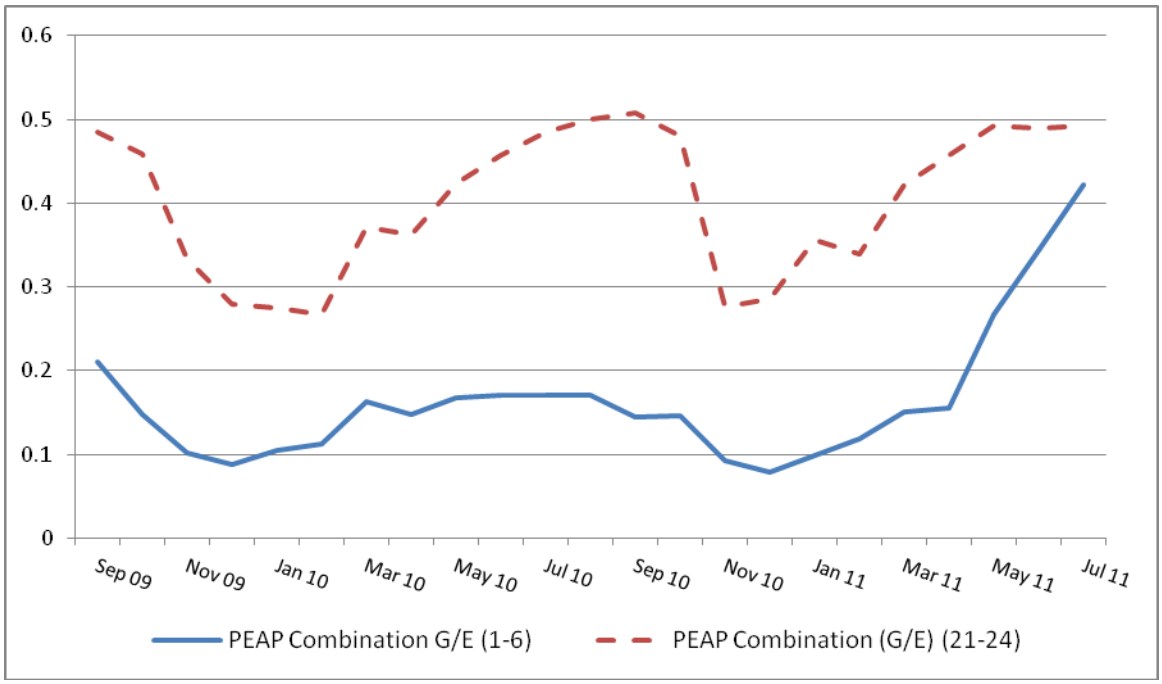

Figure 21. Ratio of Number of Payments Resulting in $0 Balance to Number of Bills by Length of PEAP Participation

Second, in this regard, the performance of short-term PEAP participants notably improves in the months after which these customers enroll in PEAP. During the final six months of the study period, during which the short-term PEAP participants have enrolled in the program, the rate at which monthly payments result in a $0 balance moves about the 40% level toward the level of the other PEAP participants.

Finally, despite the presence of levelized budget billing for PEAP participants, there is a significant seasonal variation in the extent to which PEAP participants completely retire their

outstanding balances in any given warm-weather month. **Figure 21** above shows that the long-term PEAP participants move from a balance retirement to bill ratio of roughly 30% in the cold weather months to 50% or more in the warm-weather months. In contrast, the short-term PEAP participants not only have a lower proportion of bills that are met with a complete retirement of outstanding bill balances in each month, the improvement in the warm-weather months in lesser than their long-term counterparts (i.e., the difference between cold-weather performance and warm-weather performance is lesser; the line is flatter).

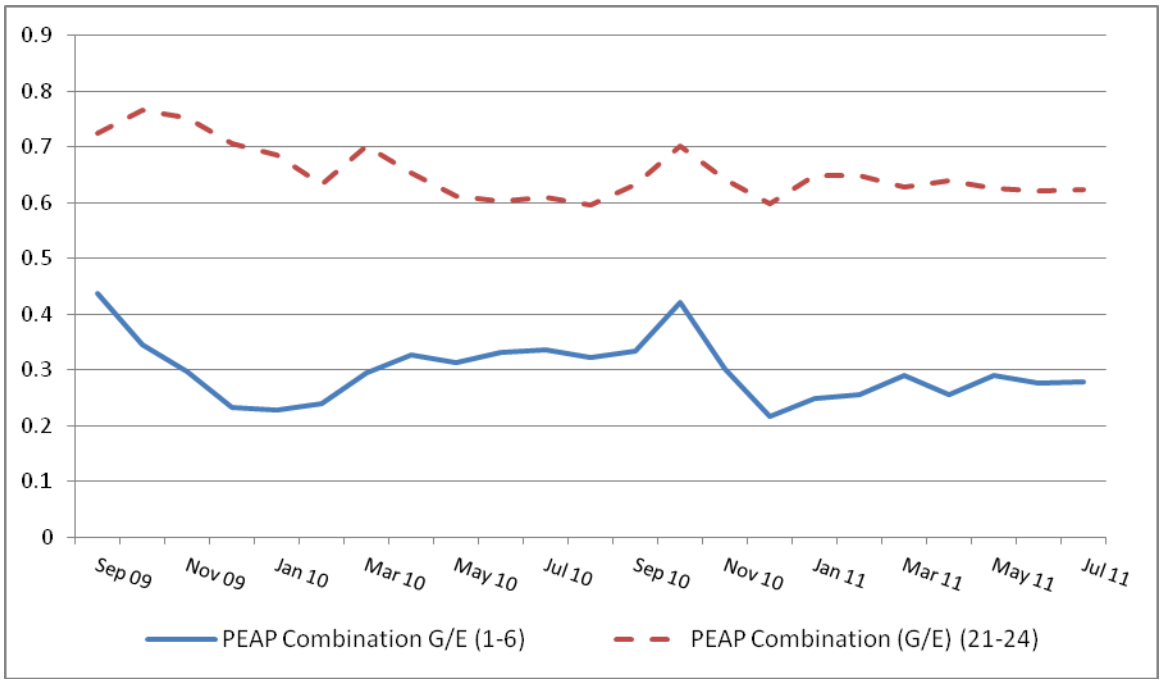

Figure 22. Ratio of Number of Payments Resulting in $0 Balance to Number of Payments by Length of PEAP Participation.

Figure 22 shows that when PEAP participants *do* make payments, they tend to frequently make payments sufficient to retire their entire balances. While these customers tend to make payments retiring their entire balance in response to 50% or less of the bills that are rendered, they also tend to make payments retiring their entire outstanding balance in between 60% and 70% of the payments that they make. In contrast, while the short-term PEAP participants tend to make payments retiring all outstanding balances in response to between 10% and 20% of bills they receive, they tend to make payments retiring their entire outstanding balance in only 20% to 30% of the payments that they make.

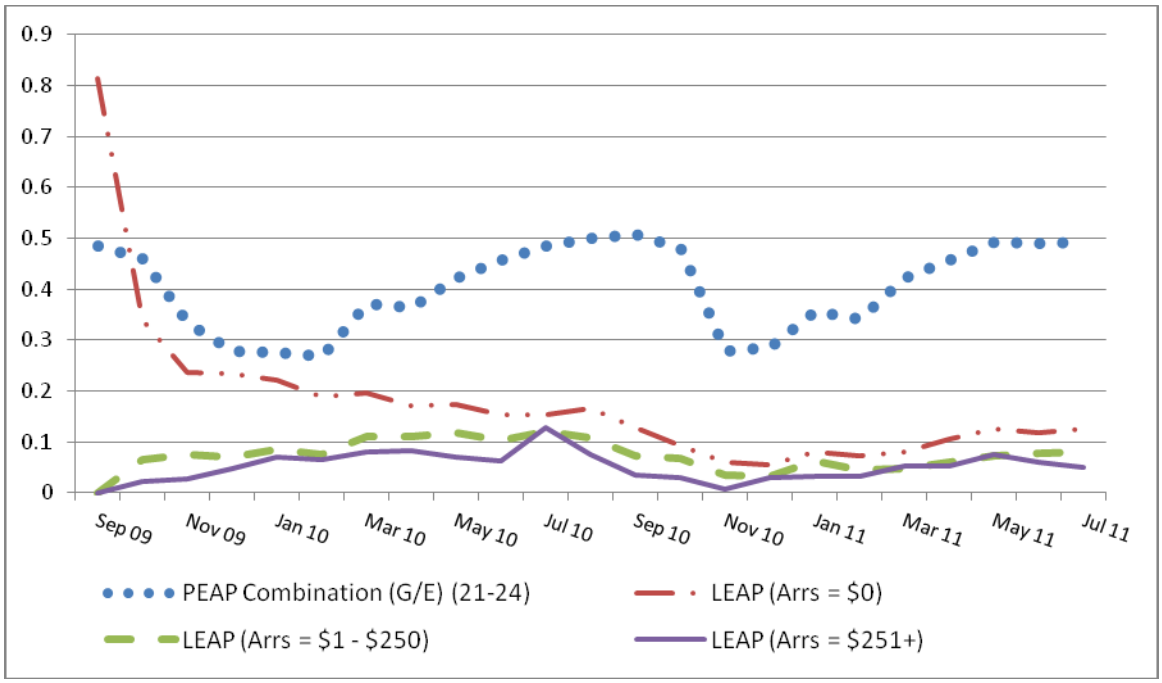

Figure 23. Ratio of Number of Payments Resulting in $0 Balance to Number of Bills for PEAP as compared with LEAP by Level of Month 1 Arrears.

The PEAP population outperforms the LEAP population as measured by both metrics involving payments that yield $0 balances. **Figure 23** shows that the proportion of bills met with payments resulting in a $0 balance is much greater for PEAP participants than for LEAP recipients.

As with other performance metrics discussed throughout this Final Evaluation, it appears as though the payment performance of LEAP recipients with differing levels of Month1 arrears converge over the long-term. The payment performance yielding a $0 arrears in Month 1 for certain LEAP recipients, in other words, tends not to be sustainable in the long-term.

In contrast, **Figure 24** indicates that there is a slight difference in the rate at which payments that are made result in a $0 balance for customers with a $0 balance in Month 1. The LEAP population with a Month 1 arrears of $0 consistently make a slightly higher proportion of payments that completely retire their entire balance than the other LEAP recipients. Nonetheless, the PEAP population again shows that 60% to 70% of all payments yield a $0 balance, while the percentage of payments yielding a $0 balance for LEAP is much smaller.

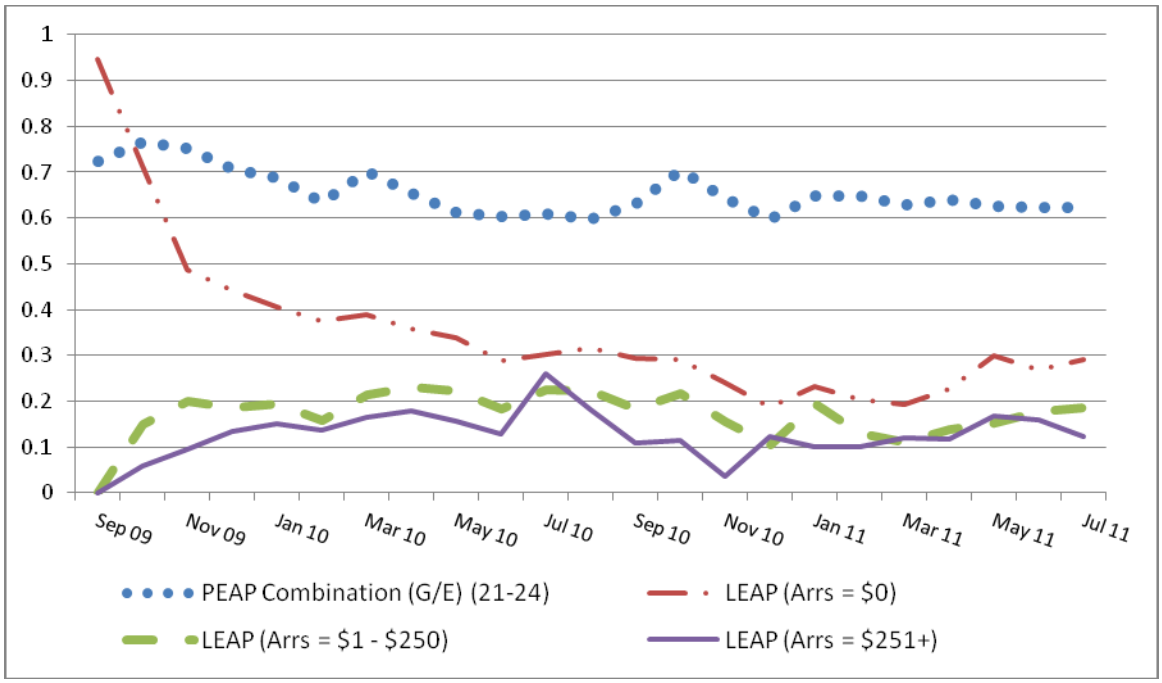

Figure 24. Ratio of Number of Payments Resulting in $0 Balance to Number of Payments for PEAP as compared with LEAP by Level of Month 1 Arrears.

Unsolicited Bill Payments: Level of Collection Activity

When a utility issues a bill to a customer, that company seeks not simply full and timely payment of the bill, but seeks also the payment of the bill without need for follow-up collection activity. The customer who pays his or her bill without need for collection activity not only represents a lower cost customer, but represents a lower risk customer as well.

PEAP appears to allow Public Service to reduce both the rate and intensity of the use of notices of disconnection for nonpayment (DNP notice) as a collection activity. Table 28 presents information on both the incidence of DNP notices per account and the rate at which customers receive DNP notices

Customers who participated in PEAP for between 21 and 24 months in the study period received one-third the number of DNP notices (0.14/participant) as did short-term PEAP participants (0.42/participant). While the difference was narrower between long-term PEAP participants and both LEAP recipients and residential customers having $0 in Month 1 arrears, there still existed a significant drop in the number of DNP notices per account (0.14/participant compared to LEAP [at 0.36/recipient] and to the general residential population ([at 0.30/account]). Both LEAP and residential customers having a positive level of arrears in Month 1 of the study period had a rate of receiving DNP notices higher than those accounts with $0 of Month 1 arrears (between roughly 0.50 and 0.60).

Table 28. Incidence of Disconnect Notices by PEAP Participation, LEAP (by pre-existing arrears), Residential (by pre-existing arrears)

	PEAP by months of participation		LEAP (by Month 1 arrears)			Residential (by Month 1 arrears)		
	1 – 6	21-24	$0	$1 - $250	$251+	$0	$1 - $250	$251+
Average no. of DNP notices per account /a/	0.42	0.14	0.36	0.51	0.52	0.30	0.57	0.62
Average no. of DNP notices per account receiving a DNP notice	7.7	5.7	6.9	9.4	9.4	5.9	10.7	11.3

NOTES:
/a/ Count of accounts as of Month 24. DNP = disconnect non-payment.

Aside from the incidence of DNP notices in the three overall populations (PEAP, LEAP, residential), the long-term PEAP participant population experienced a much less intense use of DNP notices for those having received DNP notices. Table 28 presents the number of DNP notices issued over the 24-month study period for each account having received a DNP notice. The customers who participated in PEAP for all (or nearly all) of the study period received far fewer notices as compared to all other populations except the general residential population with $0 in Month 1 arrears. While PEAP participants received fewer than six (6) DNP notices (per each billed account having received DNP notice) over the 24-month period, LEAP accounts with a Month 1 arrears received more than nine (9), while residential accounts with a Month 1 arrears received roughly eleven (11).

The same observations cannot be made about the actual disconnection of service for nonpayment (DNP). While there appears to be a lower overall incidence of DNPs within the PEAP population shown in Table 29, the intensity of the use of DNPs does not demonstrate the same reduction per each account having experienced a disconnection for nonpayment.

Table 29. Incidence of Disconnections for Nonpayment by PEAP Participation, LEAP (by pre-existing arrears), Residential (by pre-existing arrears)

	PEAP by months of participation		LEAP (by Month 1 arrears)			Residential (by Month 1 arrears)		
	1 – 6	21-24	$0	$1 - $250	$251+	$0	$1 - $250	$251+
Average no. of DNPs per account /a/	0.03	0.003	0.02	0.02	0.03	0.02	0.02	0.02
Average no. of DNPs per account experiencing a DNP	1.39	1.23	1.34	1.35	1.36	1.27	1.29	1.36

NOTES:
/a/ Count of accounts as of Month 24. DNP = disconnection for non-payment.

The reasonable conclusion to draw from this data, particularly when placed within the context of the remainder of the data in this Final Evaluation, is that disconnections for nonpayment are not a commonly-used collection activity with which to begin. It is, as a result, difficult to reduce the absolute number, let alone the relative number of nonpayment disconnections. While the

issuance of disconnect notices is a variable activity, implementing the disconnection of service for nonpayment is not. The actual use of a DNP is relatively infrequent and PEAP did not significantly further decrease the frequency of use.

The reduced number of notices of disconnection does not simply result from the dollars of bill reductions provided to PEAP participants. Even when one controls for the size of bills, long-term PEAP participants demonstrate a generally lower rate at which they receive nonpayment disconnect notices. Figure 25 shows the number of disconnection notices received by customers who had participated in PEAP for one to six months out of the study period compared to customers who had participated for 21 or more months of the 24-month study period. Not only do the long-term PEAP participants have a "flatter" rate at which they receive disconnect notices per $1,000 of bills received, they have a lower rate as well.

Most notable in Figure 25 is the post-winter spike in DNP notices during the early months for the population of customers who participated in PEAP for only one to six months of the study period. While the long-term PEAP participants avoided this seasonal variation, those customers who were not participating in PEAP at the time moved to a high rate of DNP notices starting immediately after the winter season and continuing well into the warm weather season. Note, also, the extent to which the performance of the PEAP (1-6) population improved as they enrolled in the PEAP program later in the study period.

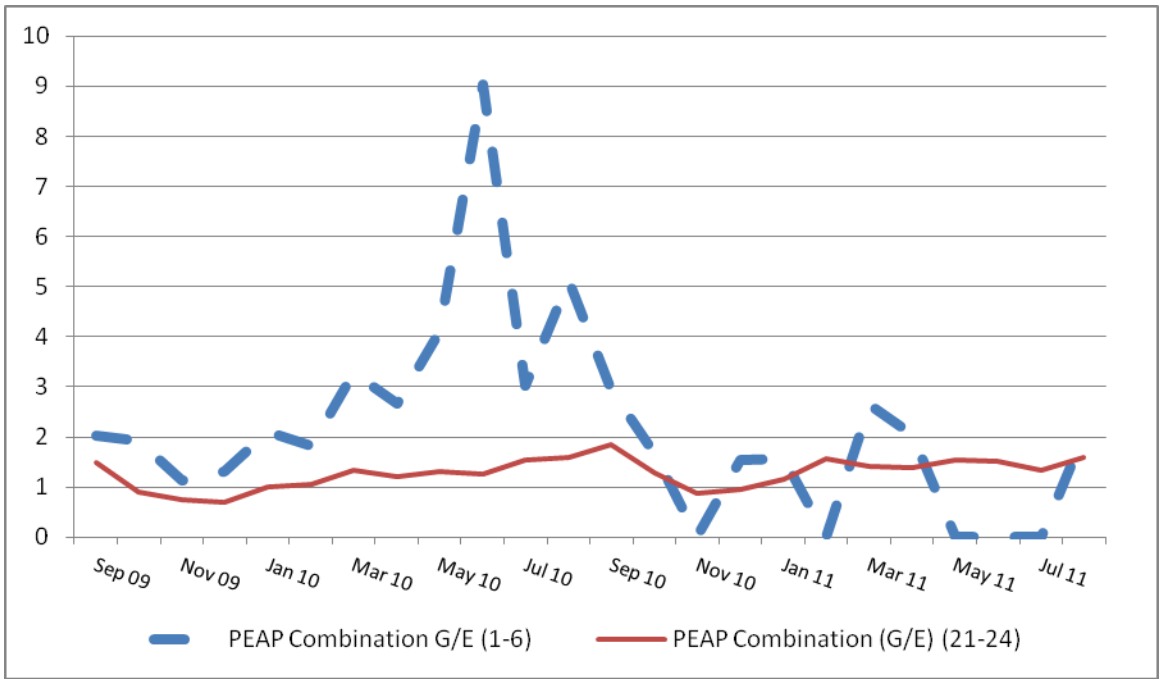

Figure 25. Notices of Disconnection for Nonpayment per $1,000 in Monthly Bills by Length of PEAP Participation.

The impact of PEAP on reducing a reliance on the use of notices of disconnection as a collection mechanism is even more evident in Figure 26, comparing the collection activities directed toward PEAP participants to the collection activities directed toward LEAP recipients. While PEAP participants receive fewer disconnect notices than do LEAP recipients, the PEAP program

does *not* eliminate either the seasonal variation in the rate at which DNP notices are issued or the fact that that rate increased for all for populations from the end of 2009 through the middle of 2011. The rate of increase for the PEAP population was smaller.

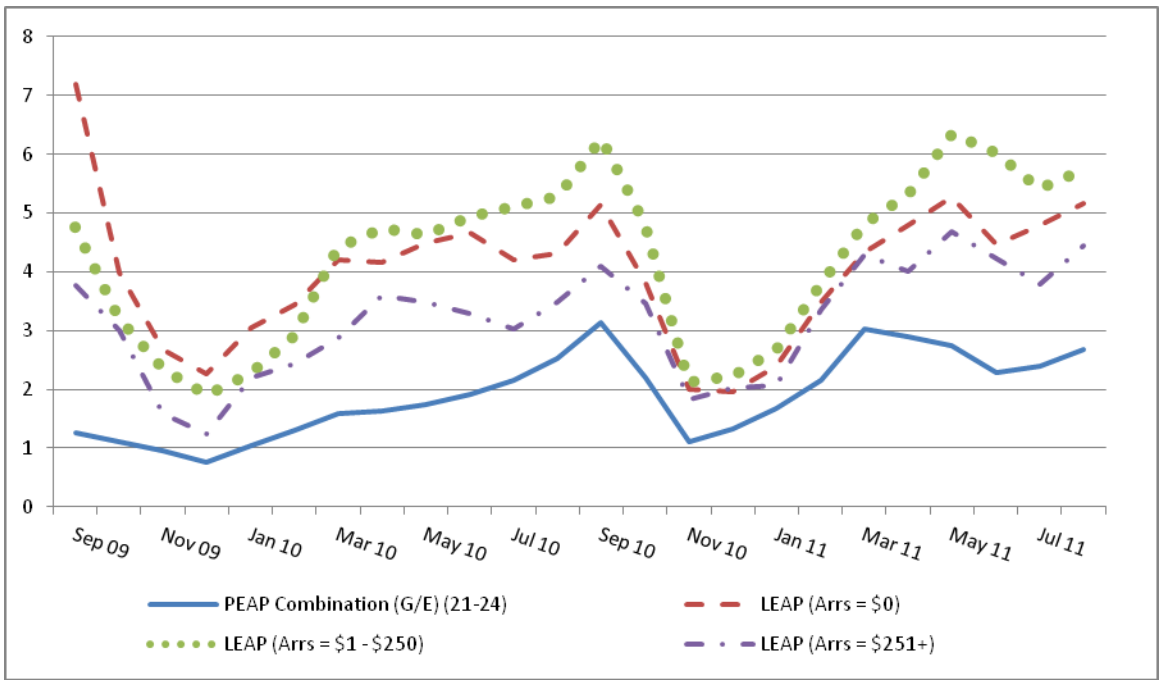

Figure 26. Notices of Disconnection per $1,000 in Monthly Bills for Combination PEAP (E/G) (21-24) compared to LEAP by Level of Month 1 Arrears

Indeed, as Figure 27 demonstrates, the long-term PEAP population out-performs even the residential population on the basis of the number of notices of disconnection for nonpayment on a per-$1,000 of bills received basis.

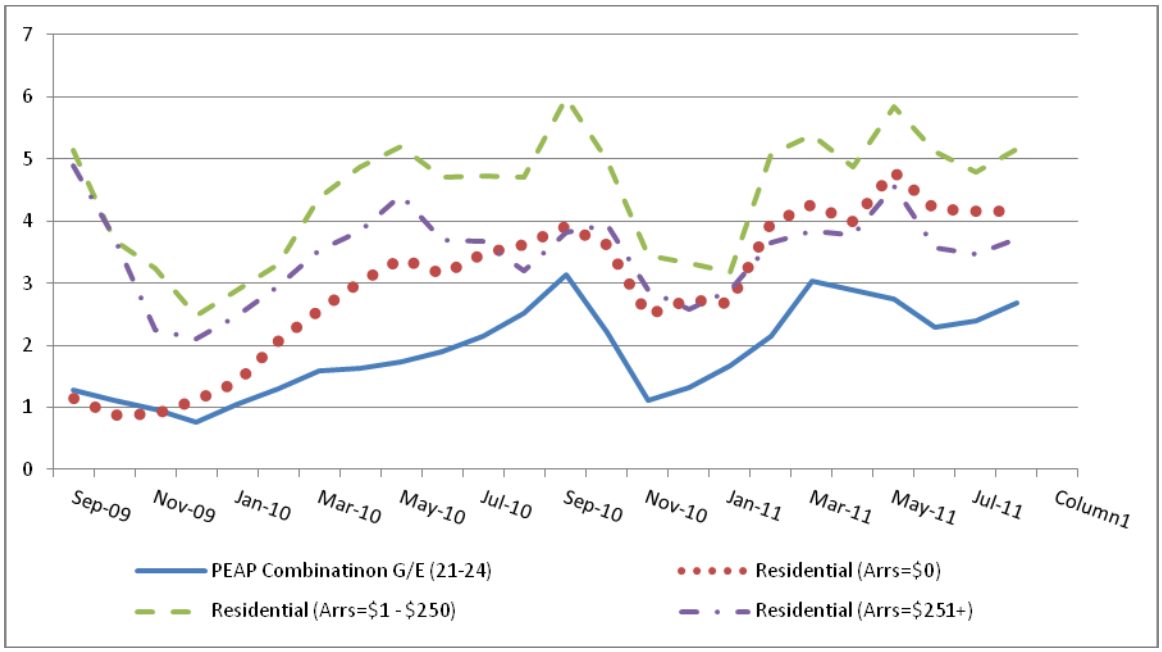

Figure 27. Notices of Disconnection for Nonpayment per $1,000 in Bills for Long-Term PEAP (21-24) compared to Residential Accounts by Level of Month 1 Arrears

Finally, Figure 28 indicates that aside from the number or rate of disconnect notices, the number of customers receiving disconnect notices who ultimately progressed to the actual disconnection of service for nonpayment was lower for PEAP participants. The difference was particularly pronounced in the warm weather and early Fall months.

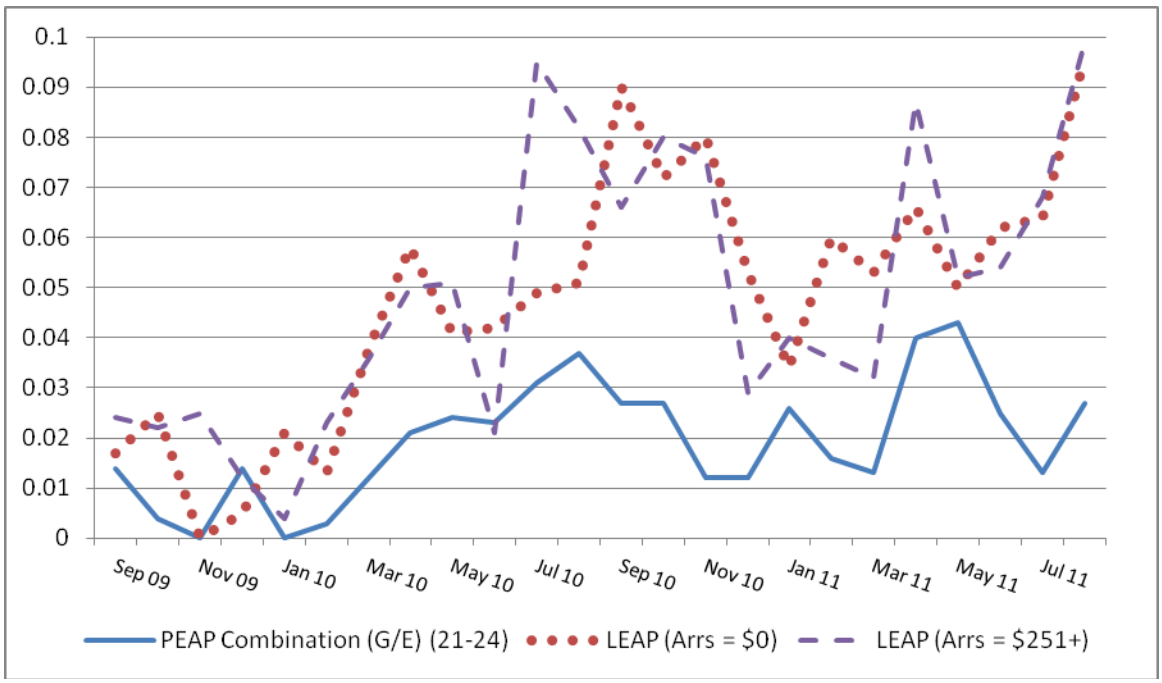

Figure 28. Number of Disconnections for Nonpayment per Each Notice of Disconnection for Nonpayment by PEAP

Dollarizing the "Cost-Effectiveness" of the PEAP Initiative

One objective of the PEAP initiative is to generate positive benefits for Public Service and its ratepayers. In seeking to determine whether such benefits exist, the question is not whether the PEAP initiative produces a benefit-cost ratio of 1.0 or more, but rather whether a "business case" can be constructed for the implementation of the programs.[53] A business case is built on a test of cost-effectiveness, not a benefit-cost ratio. Consider, for example, that no other collection activity is subjected to a benefit-cost test.[54] Public Service does not seek to determine whether the activities of disconnecting service, or of issuing shutoff notices, or of entering into deferred payment agreements, or of providing levelized monthly budget billing produce savings that more than offset the costs of those activities. The appropriate "business case" test is instead whether the extent to which the objectives underlying each activity are achieved merit the costs of pursuing or implementing those activities.[55]

In assessing the "cost-effectiveness" of a collection activity, the appropriate test to employ is the concept referred to as "net-back." One collection professional described "net back" as follows:

> The second and most important way to determine the true value of a collection agency is to calculate its Net Back figure and compare it with those of other collection agencies. Collection agencies charge for their services in different ways, but the end result is usually a single fixed rate or a variable contingency rate that is charged as a percentage of recoveries: a commission.
>
> Because some collection agencies are more effective than others, the rate of recovery must also be considered in determining the true value. When you consider both an agency's commission rate and its recovery rate, you can arrive at a figure for comparison, the Net Back figure.[56]

A different collections professional states it similarly:

> Too many times you see Requests for Proposals or Invitations to Bid and the agency selection criteria is heavily weighted to cost. While this is understandable reasoning, it often results in less money to the bottom line of your organization.

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[53] ". . .many opponents of [cost-benefit analysis], defined as a procedure that seeks to monetize benefits, do not oppose cost effectiveness analysis. . .Cost effectiveness analysis evaluates the costs of different means of achieving a pre-determined goal." Driesen (2005). *Is Cost-Benefit Analysis Neutral*, Syracuse University College of Law. A significant body of literature exists distinguishing a "cost-effectiveness" analysis from a cost-benefit analysis. See generally, Stewart, A New Generation of Environmental Regulation, 29 *Cap.U.L.Rev.* 21, 41 (contrasting cost effectiveness analysis with cost-benefit analysis); Hahn et al., Empirical Analysis: Assessing Regulatory Impact Analysis: The Failure of Agencies to Comply with Executive Order 12866, 23 *Harv.J.L. & Pub.Pol'y* 859, 872-74 (2000) (cost effectiveness analysis does not involve monetization of benefits); Anderson et al, Regulatory Improvement Legislation: Risk Assessment, Cost-Benefit Analysis, and Judicial Review, 11 *Duke Ent'l L. & Pol.* 89, 93 (2000 – 2001) (cost effectiveness analysis is used instead of cost-benefit analysis for many applications in public health and medicine); Posner, Transfer Regulations and Cost-Effectiveness Analysis, 53 *Duke L.J.* 1067, 1069 (2003) (cost effectiveness analysis compares different means of achieving the same regulatory end).

[54] If this were not the case, then a utility would never seek to include the costs of collections in rates since the costs of the collection activity would be more than offset by the savings generated by the collection activity.

[55] It seems evident that the CPUC does not anticipate that the savings of a low-income program will more than offset its costs, thus yielding a net cost of $0. If the Commission had expected that, it would not have provided for cost-recovery of low-income program costs.

[56] Statewide Credit Association, Inc. (January 12, 2012).
http://www.statewidecredit.net/ProductsServices/TheNetBackConcept/tabid/87/Default.aspx

> Net Back Dollars is THE most important financial criteria to look at in evaluating agencies. Net Back Dollars is defined as the amount of money that is returned to the Client/Creditor **after** the agency takes its fee.[57]

Yet another collection professional states it this way:

> Instead of a low collection fee rate, a creditor should focus on a measure called "net back." Simply stated, net back means the amount of money returned to a company from accounts placed for collection after the agency has been paid its fee. Money that the company can use in its business. This is true cash flow! Often, agencies that charge low collection fees do not produce high net back.[58]

The "net back" criterion focuses on whether the Company experiences an increase in net revenues if customer bills are paid in either a more complete or more timely fashion as part of the low-income program. While generally viewed as a measure of cost-effectiveness, in fact, "net back" combines "effectiveness" and "cost-effectiveness" into one comprehensive evaluation criterion. It provides not only a measurement of the effectiveness of the low-income programs (through the "payment coverage ratio" measure), it also provides for a measurement of the cost of the programs as well. By combining the two measurements into one criterion, "net back" provides for a balancing of both factors (effectiveness of the programs on the one hand and costs of the programs on the other hand).

The Revenue Side of Revenue Neutrality

As discussed earlier in this Final Evaluation, the first test of whether or not the program generates positive benefits is to determine whether the program operates with a "revenue neutrality."[59] The revenue neutrality of a low-income program examines the extent to which, if at all, a low-income rate affordability program generates the same dollars of revenues to the utility as would have been generated without the offer of discounted rates or bills. Revenue neutrality is based on the observation that it is better to collect 90% of a $70 bill ($63 revenue) than it is to collect 60% of a $90 bill ($54 revenue). Revenue neutrality occurs when a low-income program increases collected revenue sufficiently to offset any reduction in billing attributable to the program's bill discount.

Assessing whether PEAP results in revenue neutrality is determined by calculating whether the Company would have collected more or less revenue if non-participating customers would have been billed at the same discount and made payments that would equal the PEAP "customer payment coverage ratios" generated by program participants. A hypothetical illustrates this approach. Based on the data above, assume that program participants are effectively billed given a 25% discount and generate an 85% customer payment coverage ratio. Assume that program non-participants are billed given no discount and generate a 60% customer payment coverage ratio. For two customers with base bills of $100, the results would be as follows:

[57] Professional Recovery Consultants (September 2010). "Net Back is the Most Important Thing." http://prorecoveryinc.com/net-back-is-the-most-important-thing.
[58] NRS (January 2012). https://www.nrs.us/welcome/collection_agency_fees
[59] The second test, whether the program operates in a more cost-effective fashion than alternatives that accomplish the same outcomes, will be examined in the next Chapter.

	Non-participant	PEAP Participant
Standard bill for current usage	$100	$100
Discount	0%	25%
Billed revenue	$100	$75
Payment coverage ratio	60%	85%
Collected revenue	$60	$63.75
Revenue excess/(deficit)	---	$3.75

Given these parameters, even if the collections costs between the two populations are identical, the PEAP program would have generated "revenue neutrality" on behalf of the Company and its remaining ratepayers. Even though the hypothetical PEAP participant population was billed with a 25% discount, the Company generated $3.75 in revenue because the rate of collection evidenced by the "payment coverage ratio" was higher.[60] Table 30 sets out the results of this analysis.

Table 30 presents the results of this revenue neutrality calculation involving a comparison of the PEAP participant population (who participated for 21 -24 months) to two comparison groups:

(1) the federal energy assistance (LEAP) population; and

(2) the general residential population.

The LEAP and residential populations were further disaggregated based on their Month 1 arrearage levels to assess whether there would be a difference in the results if the comparison groups were broken down by prior payment history.[61]

[60] To the extent that the collections costs for the participant population were lower than for the non-participant population, the "revenue neutrality" would be even higher, given that the reduced expenses would be added to the additional revenue to determine the total revenue neutrality. To the extent that the collection costs for the participant population were higher than the non-participant population by more than the difference in added revenue (i.e., the increase in collection costs exceeded the $3.75 in additional revenue for the hypothetical), the net revenue neutrality (generally called "net back") would be negative and the program would not meet a revenue neutrality test.

[61] As noted previously, the "residential" population is *not* a non-low-income population. The residential population was randomly selected irrespective of whether someone received LEAP assistance. In contrast, the LEAP population excluded all customers who were or had participated in PEAP at any time.

Table 30. Cumulative Dollars of Revenue Excess/(Deficit) if LEAP/Residential Bills Collected at the PEAP Customer Payment Coverage Ratio and Discount Level for By Selected Months over 24-Month Study Period

Population	Sep 09	Jan 10	May 10	Sep 10	Jan 11	May 11	Jul 11
LEAP (arrears = $0)	$24,441	$28,563	$48,546	$12,920	($124,490)	($145,548)	($151,525)
LEAP (arrears = $1 - $250)	($5,129)	($40,180)	$682	($41,075)	($134,006)	($148,060)	($154,442)
LEAP (arrears = $251+)	($15,889)	($44,789)	($2,773)	($57,652)	($131,161)	($143,873)	($156,769)
Residential (arrears = $0)	$28,421	$72,410	$144,961	$176,473	$245,652	$278,996	$284,189
Residential (arrears = $1 - $250)	$4,131	$72,267	$168,031	$177,312	$241,051	$269,277	$276,052
Residential (arrears = $251+)	($5,866)	$43,057	$118,912	$108,998	$144,825	$144,644	$145,720

As Table 30 indicates, the PEAP program generated a revenue neutrality when PEAP participants were compared to other low-income customers, but not when compared to the residential population as a whole. Within the LEAP comparison population, the PEAP program generated very slightly more benefits when compared to customers with higher pre-existing arrears. In contrast, within the residential population as a whole, the revenue neutrality compared to customers with higher pre-existing arrears was somewhat lower.[62]

The lesson learned from Table 30 is that PEAP generates a sufficiently substantial improvement in payment coverage ratios relative to the low-income (LEAP) population to more than offset the discount provided. To the extent that the low-income customers have a prior history of non-payment, the revenue neutrality will be somewhat (but not substantially) greater. However, because the payment coverage ratios of the residential population as a whole are higher with which to begin, the revenue that is being "lost" to nonpayment in the absence of the discount is smaller, and the increase in payment coverage ratios is insufficiently large to offset the effects of the discount.[63]

The Expense Side of Revenue Neutrality

Given the relative efficiency and effectiveness of collection activities for the PEAP and EAP customer populations, it is possible further to estimate the difference in costs that the Company would have incurred for the two populations in the absence of the PEAP initiative. This can be

[62] The explanation for this lies in the way the "payment coverage ratios" are calculated. Payment coverage ratios are calculated relative to the bill for current usage. In the residential population as a whole, it is more likely that customers will make additional payments toward their pre-existing arrears, thus making their "coverage" of the bill for current usage somewhat higher. What Table 30 indicates is that payments toward pre-existing arrears are more likely to be made in the residential population as a whole than in the LEAP population.

[63] Again, whether or not there is a ***net*** revenue neutrality (i.e., a positive "net back") when collection activity is layered on top of this revenue neutrality analysis will be considered in the Section below.

done by comparing the incremental costs to generate the customer payments received from the comparison LEAP population had those payments been generated at the same efficiency as the PEAP payment were.

The calculation is based on a simple three-step process:

1. To calculate the cost of the collection activity given the efficiency and effectiveness of the PEAP population's collection activities;

2. To calculate the cost of the collection activity given the efficiency and effectiveness of the alternative comparison population(s); and

3. To compare the two resulting cost figures.

This comparison resolves the problems that face a traditional benefit/cost analysis, both conceptually and in-practice. Most importantly, this comparison resolves the conceptual problems that reside in a traditional benefit/cost analysis and make such an analysis inappropriate to use in assessing the "cost-effectiveness" of a low-income rate affordability program.

Two such problems are addressed. First, this analysis does not ask whether the low-income program is "cost-effective" in the abstract. Rather, it asks whether the low-income program is cost-effective relative to the available alternatives. Second, this analysis does not ask whether the low-income program is "cost-effective" irrespective of outcome-based performance. Instead, the calculation determines cost-effectiveness after normalizing for performance.[64]

In addition, from an application (or methodological) perspective, this comparison resolves the issue of accurately and completely (or, rather the problem of inaccurately and incompletely) capturing the full range of collection activities (and expenses) for both a participant and non-participant population. For each activity identified, an efficiency and effectiveness rate can be generated. Each activity is then either included or excluded in its entirety. The cost for each collection activity would be the same for each population[65] and thus yield comparable results. Even if the costs per activity are not entirely accurate in an absolute sense, they would present an accurate relative result, thus allowing a comparison to be made.[66] On the other hand, this process does *not* resolve other process questions. The primary outstanding issue is to comprehensively identify and measure all relevant collection activities.[67]

[64] For example, if Activity A costs $40 to collect $100 and Activity B costs $30 to collect $200, it would clearly be incomplete and inappropriate to assert simply that Activity B "saves" $10 of cost. The two activities do not achieve the same outcome. The cost-savings much be normalized to reflect similar achievements.
[65] No reason exists, for example, to find that a notice of disconnection for nonpayment would differ for a LEAP customer and a PEAP customer.
[66] Ultimately, of course, the results of the expense analysis and the results of the revenue analysis should be combined to determine a final "net back" as described above.
[67] For example, for this Evaluation, the effort to generate data on outbound phone calls, mail collection activities, and field collection activities, did not generate useful information.

Given this introduction, the expense comparison for the PEAP and LEAP populations is set forth in Table 31 below.

Table 31. Relative Costs of Disconnection for Nonpayment for LEAP and PEAP Populations

	LEAP Population by Month 1 Arrears		
	Arrears = $0	Arrears = $1 - $250	Arrears = $251+
Dollars of payments (LEAP)	$1,662,038	$1,720,224	$1,337,655
Payments ($000) (LEAP)	$1,662	$1,720	$1,338
DNP notices per $1,000 pyts (LEAP)	6.9	6.8	5.4
Cost per DNP notice /a/	$1.50	$1.50	$1.50
Total cost	$17,202	$17,546	$10,835
Dollars of payments	$1,662,038	$1,720,224	$1,337,655
Payments ($000) (LEAP)	$1,662	$1,720	$1,338
DNP notices per $1,000 pyts (PEAP)	2.3	2.3	2.3
Cost per DNP notice	$1.50	$1.50	$1.50
Total cost	$5,734	$5,934	$4,615
Cost increase/(savings)	$11,468	$11,612	$6,220
Percent savings of LEAP costs	67%	66%	57%

NOTES:

/a/ Under this analysis, the actual cost becomes less important. If, for example, only a $0.50 "incremental" cost were used, while the absolute dollar savings would be less, the "percent savings" would remain identical.

This assessment of expense savings could well be important in the event that the "revenue analysis" presented above determines that the low-income affordability program does not generate a revenue neutrality for the utility. For PEAP, for example, the savings from DNP notices would be insufficient to overcome the revenue shortfalls of $145,720 to $284,189 when PEAP is compared to the collections outcomes of the residential population as a whole set forth in Table 30. In contrast, the expense savings from DNP notices expand further the revenue neutrality of PEAP when the program is compared to the LEAP population.

Twelve Important Findings

1. PEAP participant payments did not demonstrate significant seasonal variability. In both Years 1 and 2 of the study period, PEAP participant payments remained reasonably constant during the cold weather and non-cold weather months. Payments declined somewhat in Year 2 of the study period, reflecting a corresponding decline in the underlying bills. However, in neither year did overall payments show an abrupt seasonal decline.

2. Customer payments remain relatively constant, if not somewhat expanded, during the cold weather months. Accordingly, the proportion of total payments represented by

customer payments declines because the agency (LEAP) payments represent an incremental addition to the payments being directed toward customer accounts. Agency (LEAP) payments in the PEAP program reasonably clearly supplement, and do not supplant, customer payments made toward bills for current usage.

3. PEAP customers make payments that are both lower, and more constant, than their LEAP counterparts. The lower payments will result from the receipt of discounted bills. The more constant payments result from the receipt of levelized monthly bills.

4. PEAP appears to have generated a positive impact on PEAP participant bill payment coverage ratios. Continuing participation in the Company's PEAP appears to help low-income customers increase their customer payment coverage ratio. The population of PEAP participants with the lowest customer payment coverage ratio is the population with the least number of months of PEAP participation. Low-income customers who had participated in PEAP for more than 12 months had customer payment coverage ratios of roughly 80%.

5. PEAP customers and residential customers are *not* making the same level of payments. Rather, PEAP participants are paying virtually the same percentage of their discounted bills as residential customers in general are paying of their non-discounted bills.

6. Overall, PEAP appears to help low-income customers improve their payment coverage ratio. Combination gas/electric customers who participate in both EAP and PEAP demonstrate a distinctly improved cumulative customer payment coverage ratio relative do either LEAP recipients or residential customers generally.

7. PEAP was successful in maintaining the number of accounts in arrears at the same levels as those which were experienced in the residential and federal energy assistance populations overall. Differences began to appear in the winter heating season of the first year of the study period. At that time, the number of energy assistance (LEAP) accounts with $0 in arrears began to decrease, while the number of PEAP accounts instead continued to reflect the payment patterns of residential customers as a whole. During the warm weather months of the first year of the study period, the improvement of PEAP payment patterns relative to LEAP increased further.

8. In contrast to the percentage of accounts with $0 in arrears is an examination of the percentage of accounts with more than $250 in arrears. Beginning in the second year of the study period, the performance of PEAP customers saw a substantial improvement. Starting in the Spring of 2011 and continuing for the remainder of the study period, the percentage of high arrearage accounts for the PEAP population was substantially lower than for the two comparison groups.

9. Overall, long-term PEAP participants had significantly improved payment patterns as measured by the incidence of arrears. A higher proportion of customers had arrears in six or fewer months. A lower proportion of PEAP customers had arrears in both 13 to 18

months and in 19 to 23 months than for either LEAP or the residential population generally.

10. PEAP appears to reduce both the rate and intensity of the use of notices of disconnection for nonpayment (DNP notice) as a collection activity. Customers who participated in PEAP for between 21 and 24 months in the study period received one-third the number of DNP notices (0.14/participant) as did short-term PEAP participants (0.42/participant). While the difference was narrower between long-term PEAP participants and both LEAP recipients and residential customers having $0 in Month 1 arrears, there still existed a significant drop in the number of DNP notices per account (0.14/participant compared to LEAP [at 0.36/recipient] and to the general residential population ([at 0.30/account]).

11. The same observations cannot be made about the actual disconnection of service for nonpayment (DNP). While there appears to be a lower overall incidence of DNPs within the PEAP population, the intensity of the use of DNPs does not demonstrate the same reduction per each account having experienced a disconnection for nonpayment.

12. The PEAP program generated a revenue neutrality when PEAP participants were compared to other low-income customers, but not when compared to the residential population as a whole. PEAP generates a sufficiently substantial improvement in payment coverage ratios relative to the low-income (LEAP) population to more than offset the discount provided. To the extent that the low-income customers have a prior history of non-payment, the revenue neutrality will be somewhat (but not substantially) greater. However, because the payment coverage ratios of the residential population as a whole are higher with which to begin, the revenue that is being “lost” to nonpayment in the absence of the discount is smaller, and the increase in payment coverage ratios is insufficiently large to offset the effects of the discount.

Part 3: Utility Perspective: Collection Effectiveness and Productivity

Any evaluation of a low-income program affordability program should consider the effectiveness of the program in accomplishing the articulated outcomes. No matter what level of costs is being incurred, by the program or by the alternatives against which the program is being compared, the "cost-effectiveness" of the activity is impeded to the extent that the objectives are not being accomplished.

In contrast to the discussion above, which considers the outcomes of the PEAP from the perspective of the customer (as measured by payment and arrearage levels), the discussion below considers the outcomes of PEAP from the perspective of the Company. This Company focus examines data primarily relating to collection efforts.

The objective of this chapter is to consider the effectiveness and efficiency of the Company's collection efforts as affected (if at all) by participation in the PEAP. In measuring net revenue neutrality (often called "net back"), it is necessary not only to consider the revenue generated from customers, but also the costs of the collection activity underlying that revenue. In its essence, this chapter examines how hard the Company must work, to generate customer payments.

Before turning to the measures of effectiveness, however, the discussion below considers simply the incidence of disconnect notices and disconnections for nonpayment.

The Productivity of Collection Activities

In addition to assessing the extent of collection activities, the discussion below will consider the impact of the PEAP on the ability of the Company to accomplish its desired outcomes. In doing this, it is necessary to judge both the effectiveness and the productivity of the program in accomplishing those desired outcomes as well. Addressing the productivity of utility efforts helps the utility assess whether there is a proper match between the tool being employed and the type of payment problem that is sought to be remedied. On the one hand, in other words, evaluating the productivity of the program (relative to its alternatives) helps to determine whether the company is using a tool that exceeds the need for collection. On the other hand, evaluating productivity will help the company evaluate whether it is using a tool that is insufficient given the types of problem extent on the utility's system. Productivity implies not only some absolute level of output (i.e., "effectiveness") but some level of output given a designated level of input as well.

Improvements in the productivity of collection activities can occur in either of two ways:

- The need for collection interventions can be reduced thus allowing an increased payment per each collection intervention performed; in the first instance, improvement can be seen even if total dollars collected remains the same (but the interventions needed to generate those dollars decreases); or

- The customer response to the collection activity can improve thus allowing an increased payment per each collection intervention performed. In this second instance, improvement can be seen if the total number of collections activities remains the same but the dollars generated by those activities increase.[68]

In essence, this evaluation process considers the effectiveness and efficiency of collection activities from two different but related perspectives. On the one hand, it examines how much revenue is generated by each collection intervention. On the other hand, it examines how many collection activities are associated with the generation of the revenue.

In undertaking this analysis, the discussion focuses on two particular collection activities: (1) the issuance of notices of disconnection for nonpayment; and (2) the actual performance of disconnections for nonpayment (DNPs). After presenting some basic data on the incidence of both disconnect notices and DNPs, the analysis focuses on the effectiveness and efficiency of these two types of activities. Rather than simply measuring how frequently the activities occur, in other words, the discussion below examines how well the two collection activities accomplish the objective of generating payments and generating revenue.

Accordingly, the measures of effectiveness and efficiency used below use two metrics:

[68] Productivity is measured by the ratio: DC / CE, where "DC" = dollars collected; and "CE" = collection effort. In the first illustration, "CE" (the denominator) is reduced. In the second illustration, "DC" (the numerator) is increased.

- The number of each collection activity per 1,000 customer payments (without regard to the size of the payment); and

- The number of each collection activity per $1,000 in customer payments.

In this analysis, a lower number is "better" than a higher number. To the extent that the number of payments (or dollars of payments) occurs without need for a collection activity, the ratio of activities per result decreases.[69] A decreasing ratio, in other words, can indicate one of two results: either the number of collection activities is decreasing (with the number or dollars of paying staying the same), or the response to any given collection activity is improving. This analysis does not seek to parse these two effects.

The collection activities that Public Service directs toward non-PEAP participants are not as productive at generating payments as those collection activities directed toward PEAP participants. As Figure 29 indicates, Public Service needs to engage in from three to five times more collection activities (in this case, issuing notices of disconnection for nonpayment) for each 1,000 customer payments it receives. As discussed in more detail above, this result might occur for one of two reasons. On the one hand, more PEAP participants might make payments without need of *any* DNP notices being issued. Indeed, the data discussed above regarding the intensity of collection would support that conclusion. On the other hand, more PEAP participants might respond to the receipt of a disconnect notice by making payments. This conclusion, too, is supported by the data (discussed below). PEAP further dampens the seasonal variation in the number of DNP notices per number of customer payments received.

[69] The denominator (either the number of payments, or the dollars of payments) increases while the numerator stays the same.

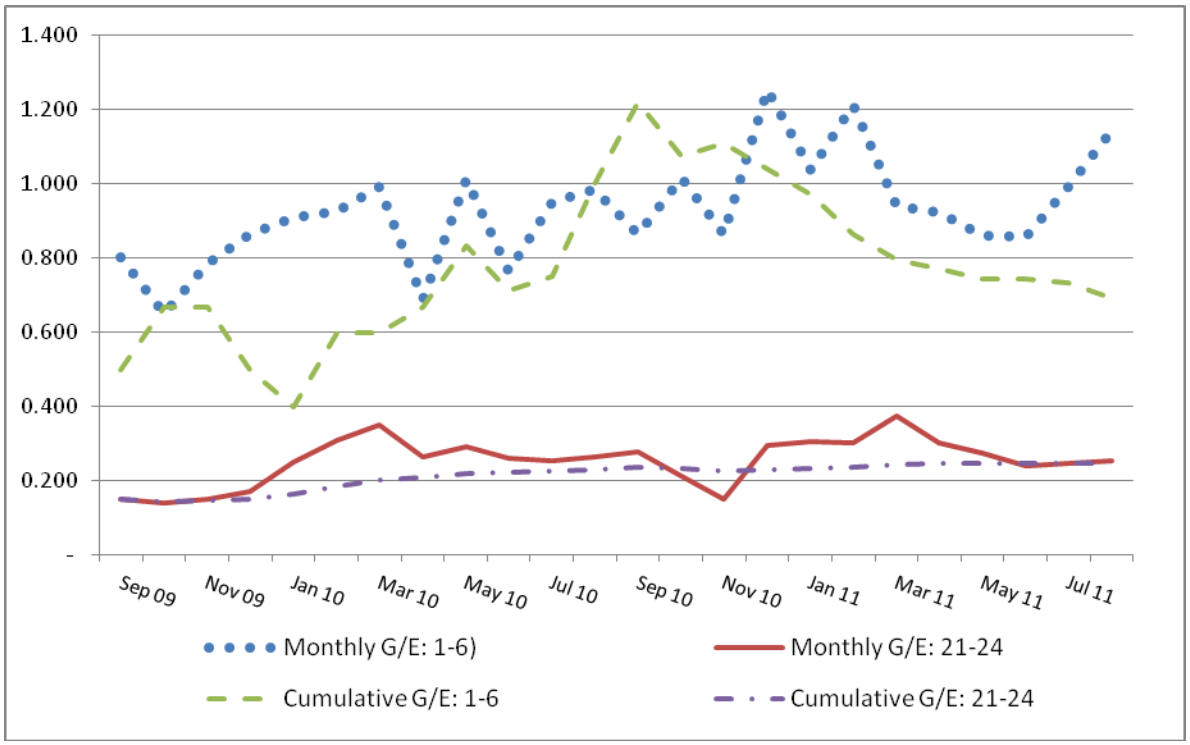

Figure 29. Disconnect Notices for Nonpayment per 1,000 Customer Payments by Length of PEAP Participation.

The disparity in performance between PEAP participants and non-participants is even more evident when the long-term PEAP population is compared to low-income customers who received LEAP benefits, but never participated in PEAP. Figure 30 shows that low-income customers who receive only LEAP received, on a cumulative basis over the 24-month study period, more DNP notices per 1,000 customer payments than did PEAP participants. Moreover, while the rate at which DNP notices are issued per 1,000 customer payments received is seen to be increasing for each population, Figure 30 shows the rate of increase for the PEAP population to be slower than for the LEAP recipients.

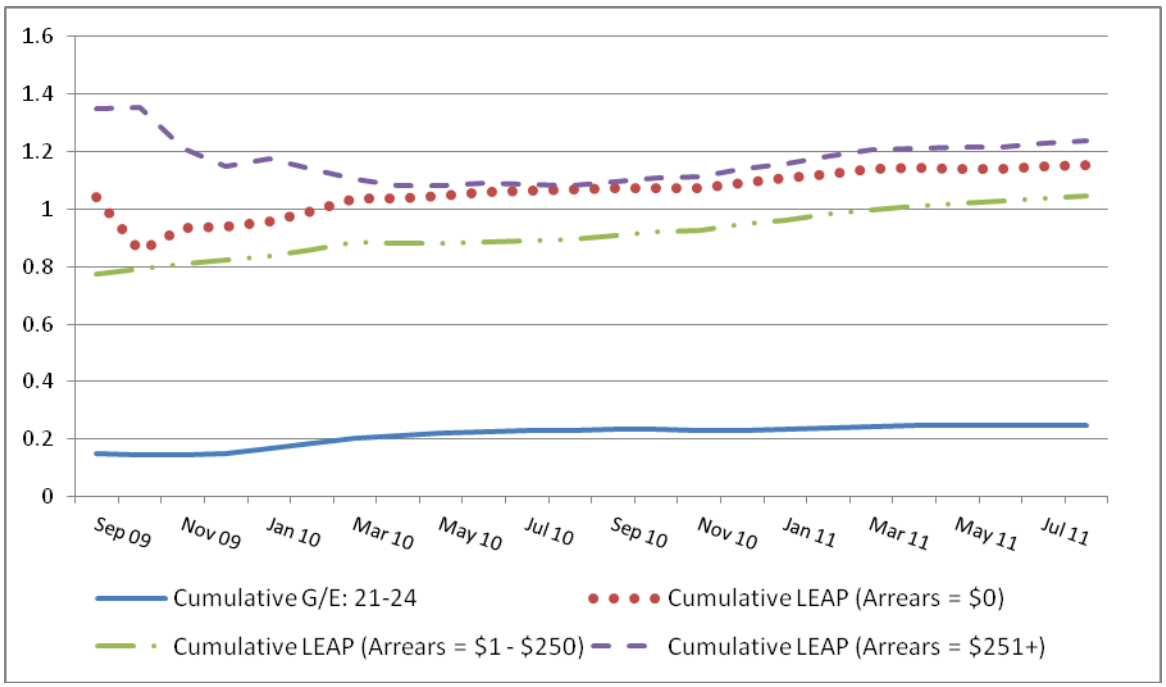

Figure 30. Cumulative Disconnect Notices per 1,000 Customer Payments for Combination (G/E) PEAP (21 – 24 months) compared with LEAP Accounts by Month 1 Arrears.

With this metric of collection efficiency, the Company operates more efficiently with the PEAP population than with either the LEAP population or the general residential population. Figure 31 shows that the rate at which PEAP participants receive DNP notices per 1,000 customer payments made to PSCo is substantially lower than the rate at which residential customers receive DNP notices.

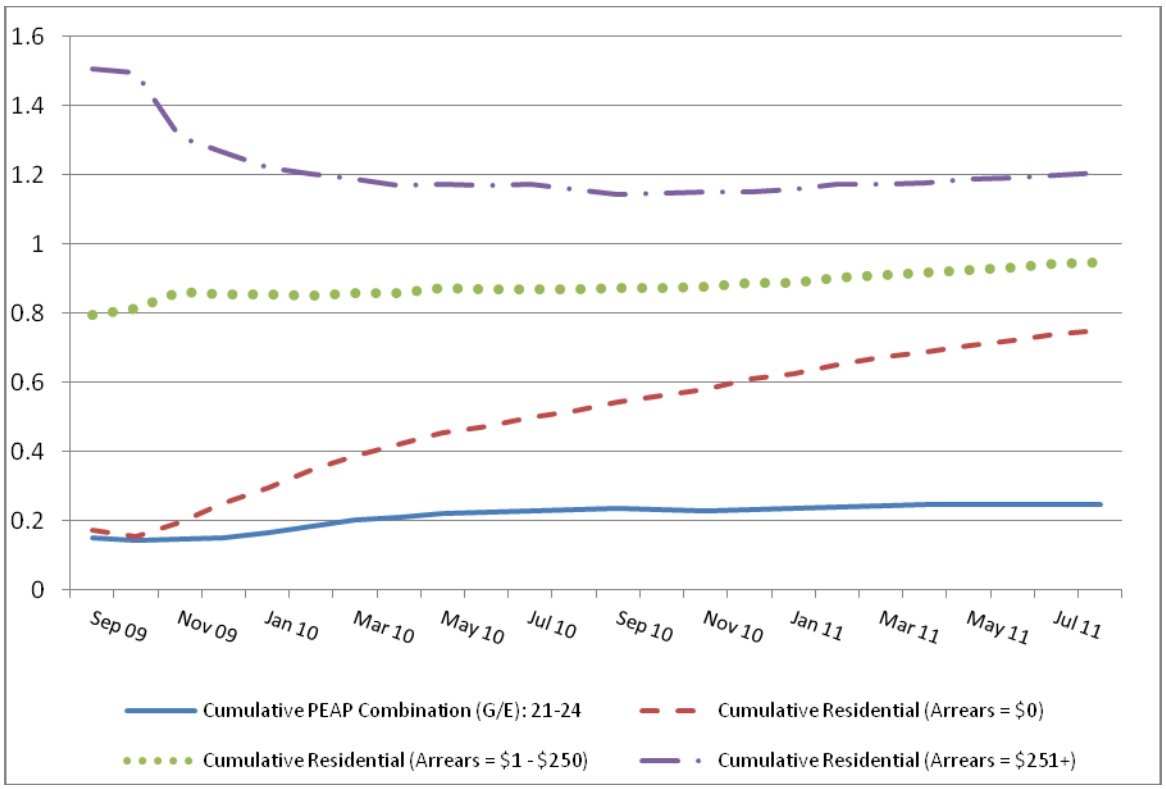

Figure 31. Disconnection Notices for Nonpayment per 1,000 Payments for Combination (G/E) PEAP (21 -24 months) compared to Residential Accounts by Level of Month 1 Arrears.

The need for collection activity does not change when one normalizes for the *dollars* of payment rather than for the *number* of payments. According to the data in Figure 32, PEAP helps to eliminate the seasonal variation in the number of disconnection notices that must be issued for each $1,000 in customer payments received. While Public Service issued between 1.5 and two (2.0) DNP notices to long-term PEAP participants for every $1,000 in customer payments received, it issued between roughly four (4) and eight (8) DNP notices to short-term PEAP participants.

Figure 32 shows that the conclusions do not change when viewed from the perspective of how hard the Company must work to generate dollars of customer payments (rather than numbers of customer payments). The short-term PEAP participants require a higher number of DNP notices for each $1,000 in customer payments they make to the Company. In addition, the volatility in the number of DNP notices is greater than the long-term PEAP participants as well. Particularly in the late winter and spring months, Public Service issues far more DNP notices for each $1,000 in customer payments received. While the cumulative number of DNP notices for both short-term and long-term PEAP participants is relatively smooth, the month-to-month variation for short-term participants is quite dramatic.

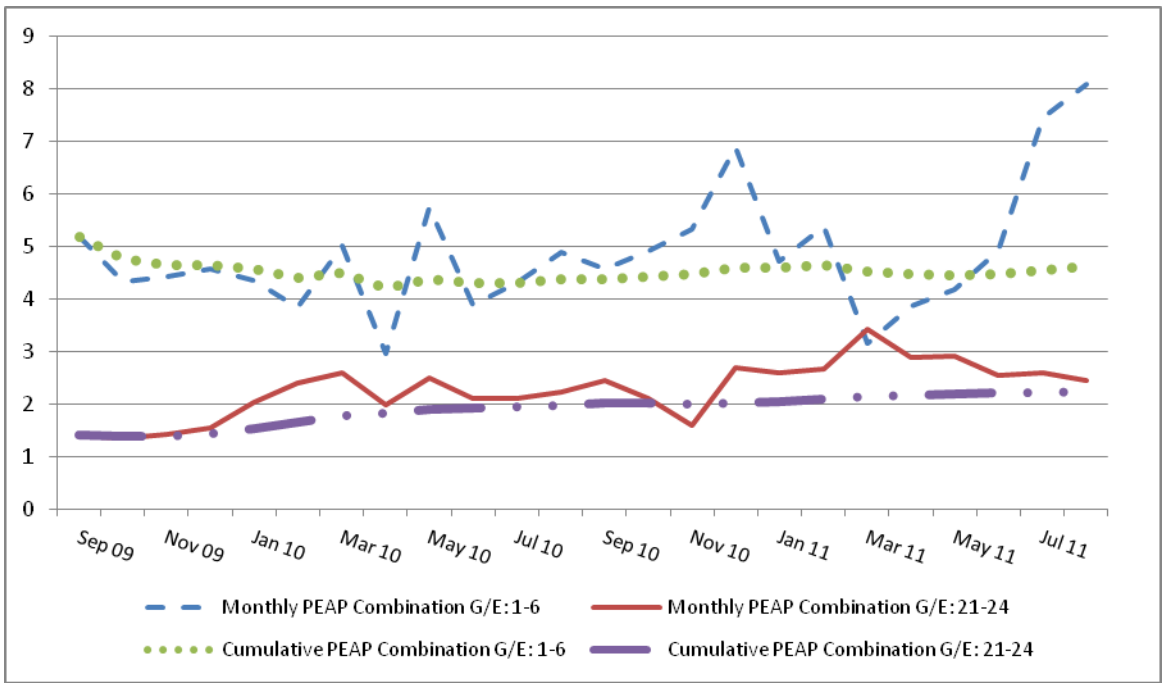

Figure 32. Disconnection Notices for Nonpayment per $1,000 in Customer Payments by Months of PEAP Participation.

Similar to this comparison between short-term and long-term PEAP participants, the comparison of long-term PEAP participants to LEAP recipients shows that PEAP participation reduces the reliance of DNP notices as a collection activity. While PEAP participants require between one (1) and two (2) DNP notices for each $1,000 in customer payments, LEAP recipients require between five (5) and seven (7). Overall, not only does Public Service collect more revenue from its PEAP participants (as discussed above), but the Company appears to engage in fewer collection activities to generate those payments.

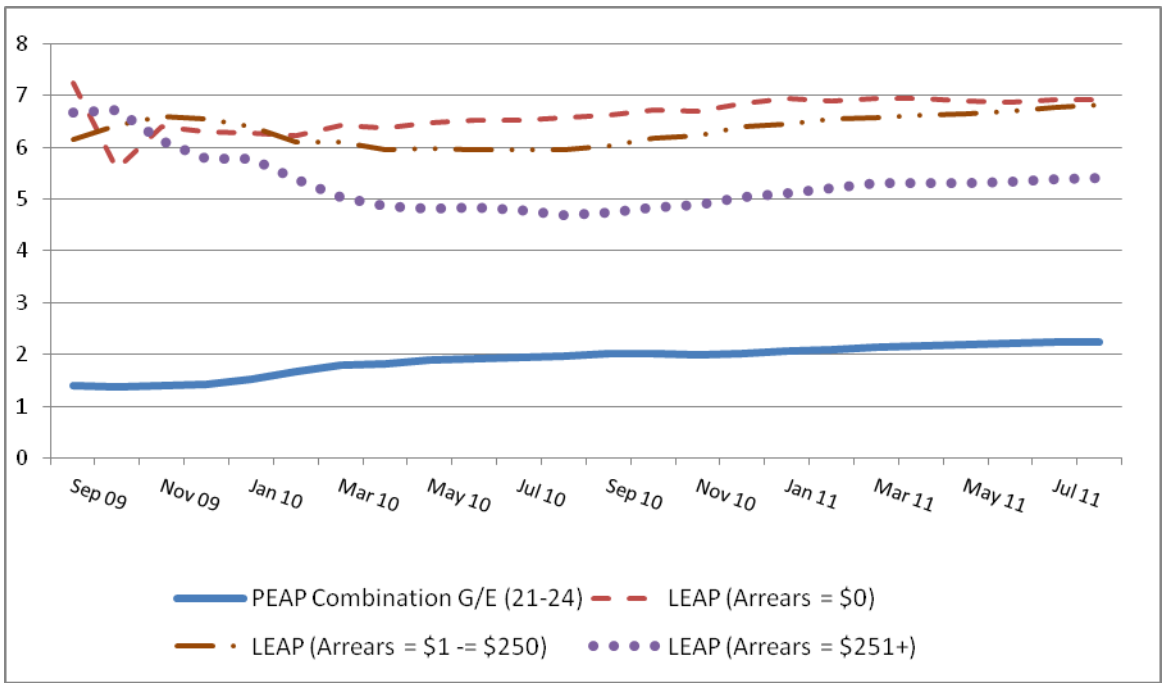

Figure 33. Cumulative Disconnection Notices for Nonpayment per $1,000 in Customer Payments for Combination (G/E) PEAP (21 -24 months) compared to LEAP Accounts by Level of Month 1 Arrears.

While the difference between PEAP participants and residential customers generally is less than between PEAP participants and LEAP recipients, the result remains the same. Figure 34 demonstrates that Public Service issues fewer notices of nonpayment disconnection to long-term PEAP participants than it issues to residential customers, irrespective of the level of Month 1 arrears experienced by those residential customers.

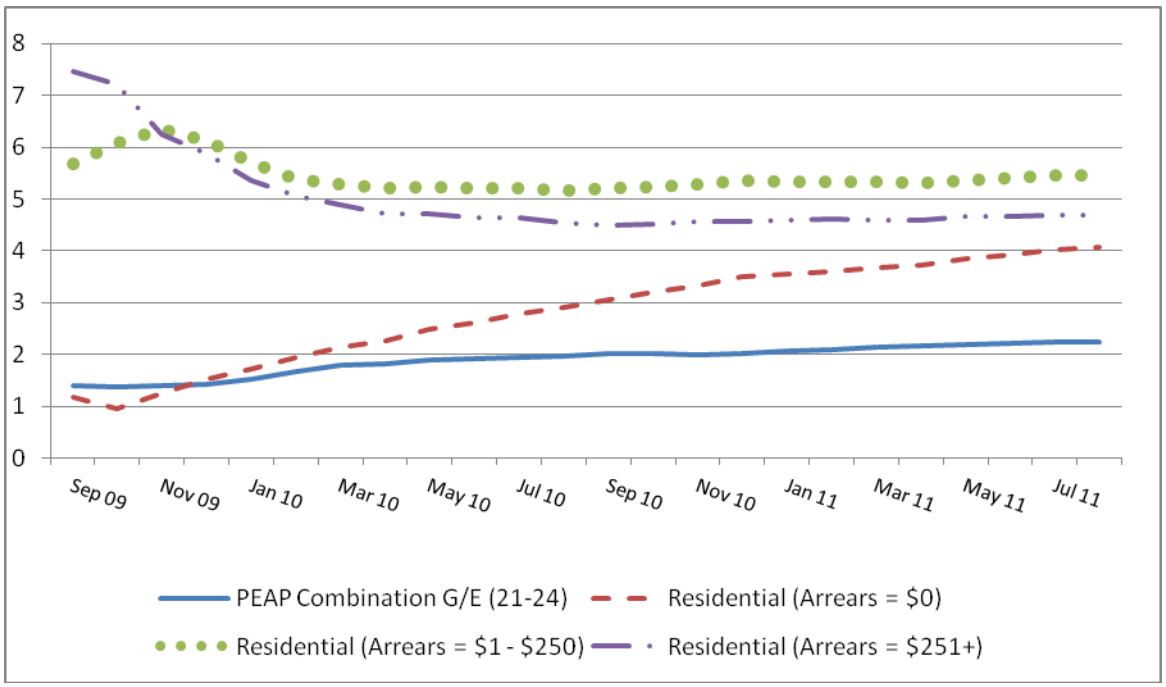

Figure 34. Cumulative Disconnection Notices for Nonpayment per $1,000 in Customer Payments for Combination (G/E) PEAP Participants (21 -24 months) compared to Residential Accounts by Level of Month 1 Arrears.

The Effectiveness of Company Collection Activities

The "effectiveness" of Company collection activities reviews the extent to which those activities accomplish the objective which they seek. The objective is defined to be the generation of customer payments, overlaid with the intent that those customer payments equal or exceed the bills being rendered to customers. As with above, the metric used to measure the "completeness" of bill payment is called the "bill payment coverage ratio." The bill payment coverage ratios presented below focus on two aspects of bill payment: (1) bill payments made by customers; and (2) the coverage of bills rendered for current usage. To the extent that these customer bill payment coverage ratios are greater than 1.0, the customer is paying his or her bill for current usage and making a contribution toward his or her arrears. To the extent that customer bill payment coverage ratios are less than 1.0, the customer payment is not even covering the bill for current usage, let alone any arrears.

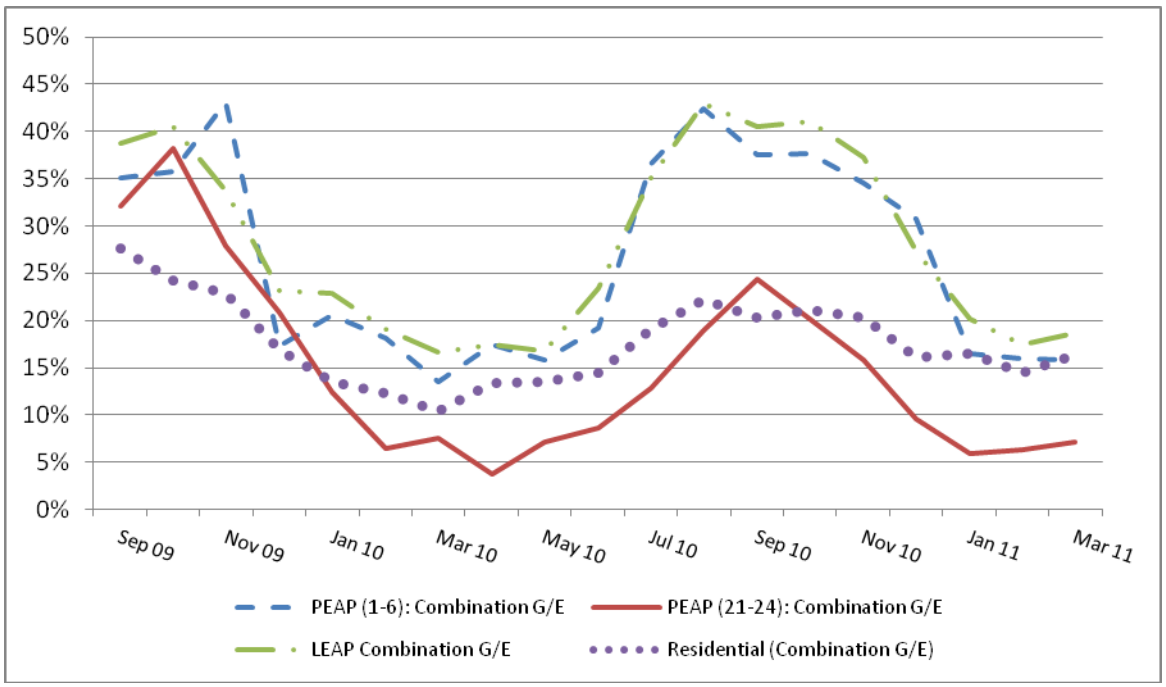

Figure 35. Customer Payment Coverage Ratio > 0 <0.50 for Customers Receiving DNP Notice in 4-Months after Receiving DNP Notice

A "successful" (or "effective") collection activity in this analysis is measured not merely by the extent to which customers make payments in the month in which the activity occurs, but also over a period of time immediately subsequent to that collection activity. A collection activity that generates a payment in the month of the activity, only to see the customer fall back into a pattern of nonpayment in the immediate subsequent months, is deemed to be "less effective" than a collection activity that generates a series of more timely (or more complete) payments over a period of months. Figure 35 show a comparison between the percentage of accounts where the collection activity is less successful, as measured by a customer bill payment coverage ratio of less than 0.50 in the four months immediately subsequent to the receipt of a notice of disconnection for nonpayment. A customer payment coverage ratio of less than 0.50 means, in other words, that the customer payments in the four month period after receipt of a DNP notice were less than one-half of the bills for current usage in those four months.[70]

In Figure 35, a lower number is "more successful" and a higher number is "less successful." A higher figure means that a greater percentage of customers receiving a DNP notice made customer payments equal to less than half of their bill for current usage in the ensuing four months. As can be seen, the long-term PEAP participants out-perform the short-term PEAP participants, as well as both LEAP recipients and residential customers generally.

[70] To illustrate, assume a customer receives a DNP notice in February. This four-month customer payment coverage ratio thus examines the customer payments in March through June as compared to the bills for current usage in March through June. A customer receiving a DNP notice in July is assessed to determine the extent to which payments in August through November cover the bills for current usage in August through November.

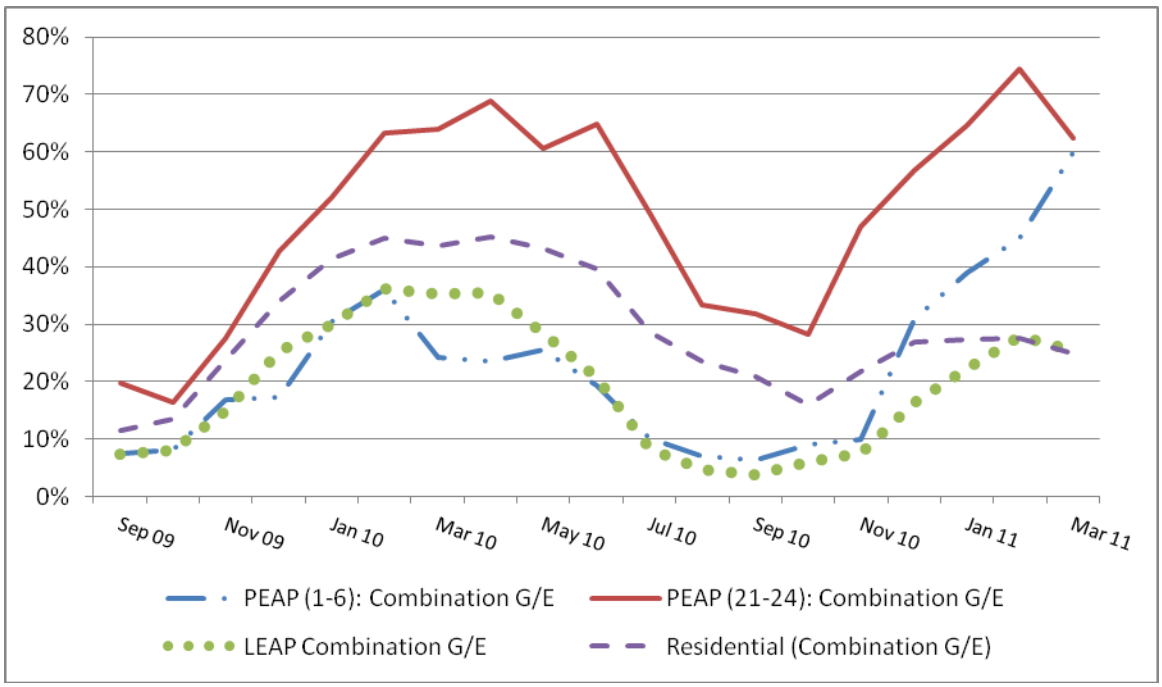

Figure 36. Percent of Customers Receiving DNP Notices with Customer Payment Coverage Ratio > 1.0 in 4-Months After DNP Notice

Figure 36 presents the flip side of this performance metric. In Figure 36, which considers the percentage of accounts receiving DNP notices that have a customer payment coverage ratio of more than 1.0 in the ensuing four months, a higher number is "more effective" while a lower number is "less effective." A higher number in Figure 36 indicates that a greater proportion of accounts having received a DNP notice make customer payments in the immediately following four months greater than the level of their bill for current usage. While PEAP participation does not eliminate the seasonal variation in this level of payment success after a DNP notice, the proportion of PEAP participants making customer payments of more than 1.0 is consistently higher than the proportion of either short-term PEAP participants, LEAP recipients or residential customers generally. The residential population as a whole out-performs the low-income LEAP recipient population, but does not achieve the same level of multi-month payment success after receipt of a DNP notice as does the PEAP population.[71]

[71] Each month's disconnection notices are viewed as an independent event. Thus, if the same customer receives a DNP notice in three straight months (June, July, August), that customer is examined independently in each of those months (July-October, August-November, September-December payments vs. bills).

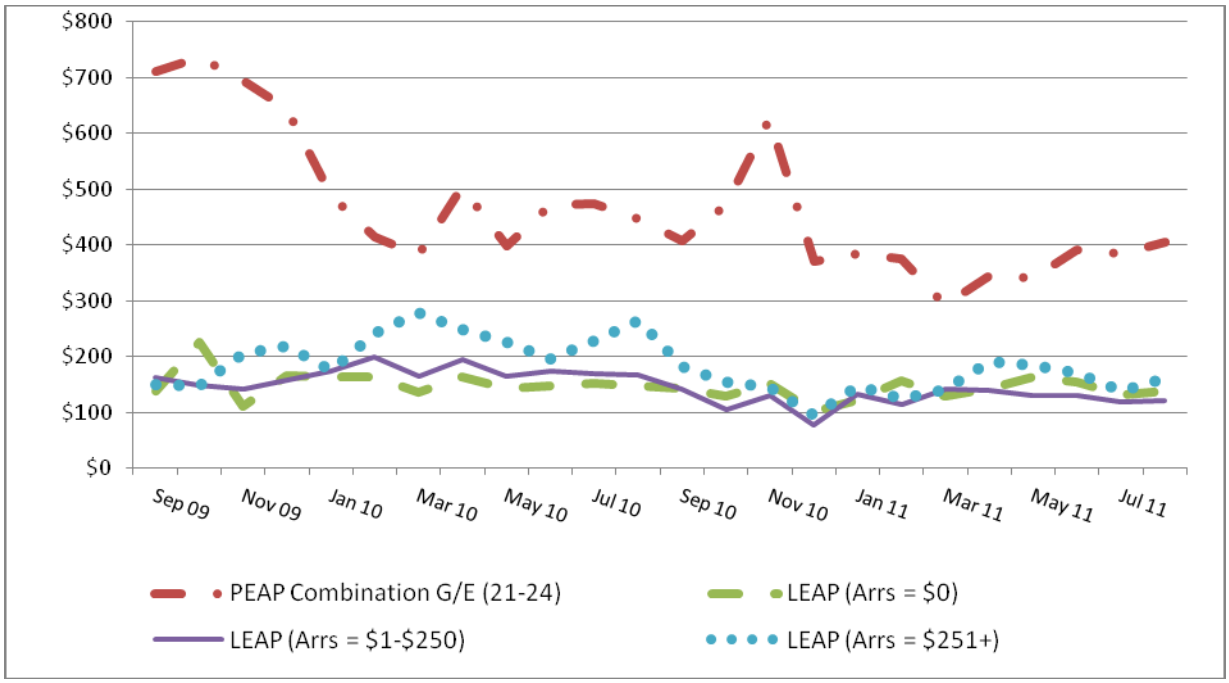

Figure 37. Monthly Customer Payments per DNP Notice by PEAP Participation and LEAP Month 1 Arrears

Figure 37 provides insight into why these higher proportions exist. This figure shows that the four-month payment level –remember that these are multi-month payments, not monthly payments—are substantially higher for PEAP participants than for LEAP recipients. Indeed, the four-month payment levels of LEAP recipients remain reasonably constant over the 24-month study period. What is evident from Figure 37, however, is that PEAP participants receiving DNP notices make between $250 and $350 more in absolute dollar payments in the four months after receiving a DNP notice (about $60 to $90 per month) than do LEAP recipients having received a DNP notice.

Looking simply at customer payments, of course, does not fully report whether a customer's bill is being paid in full. Customer payments may be smaller because the account has received an agency (non-customer) payment to help pay the current bill. In addition to examining customer payments, therefore, this analysis considers the success of the collection activity in generating a positive outcome as measured by the level of the customer's arrears in the fourth month after having received a DNP notice. In this regard, the discussion considers the two flip-sides of this question: (1) to what extent are customer arrears *lower* in the fourth month than they were in the month in which the DNP notice was issued (Figure 38); and (2) conversely, to what extent are customer arrears *higher* in the fourth month than they were in the month in which they DNP notice was issued (Figure 39).

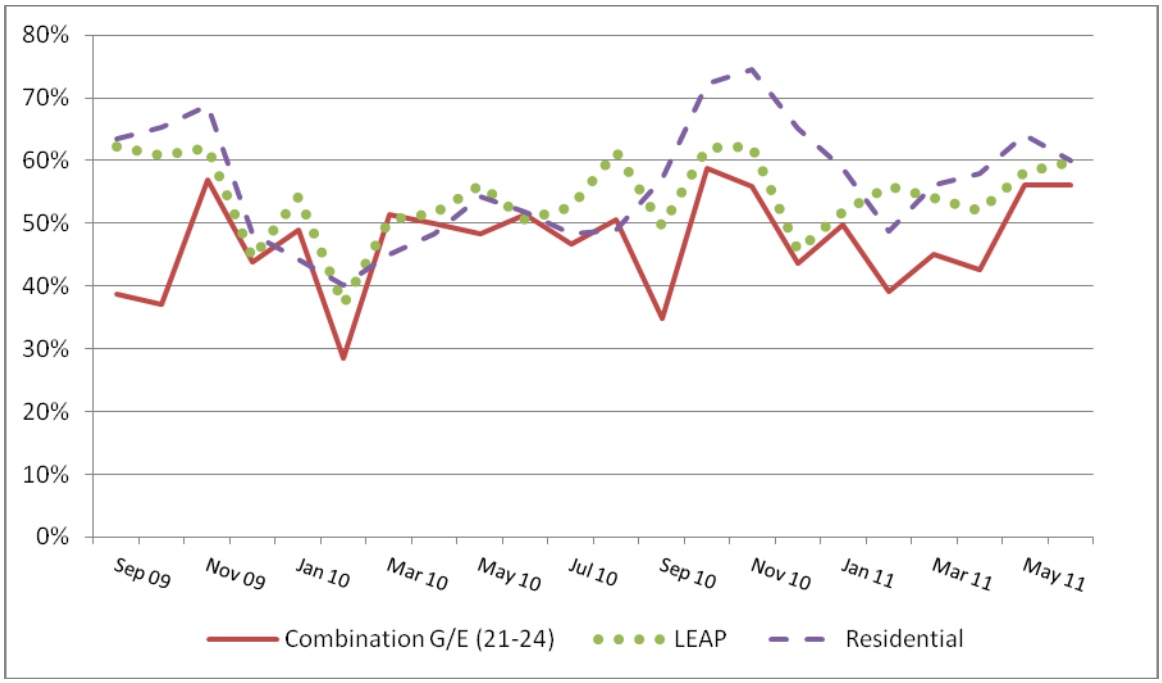

Figure 38. Percentage of Accounts Receiving DNP Notices by Whether Arrears were Higher 4-Months after Receiving Notice

The Figure indicates that while the level of performance is much closer, the PEAP participant population continues to outperform both the LEAP and the residential population. A lower proportion of PEAP customers had an arrearage that was higher in the fourth month after receiving a DNP notice than in the month having received a DNP notice. When viewed on a monthly basis, there is a noticeable seasonal variation in this metric. Consistent with the prior data, we find that PEAP participants have both a lower proportion of accounts with higher arrearages (Figure 38) and a higher proportion of accounts with lower arrearages (Figure 39).

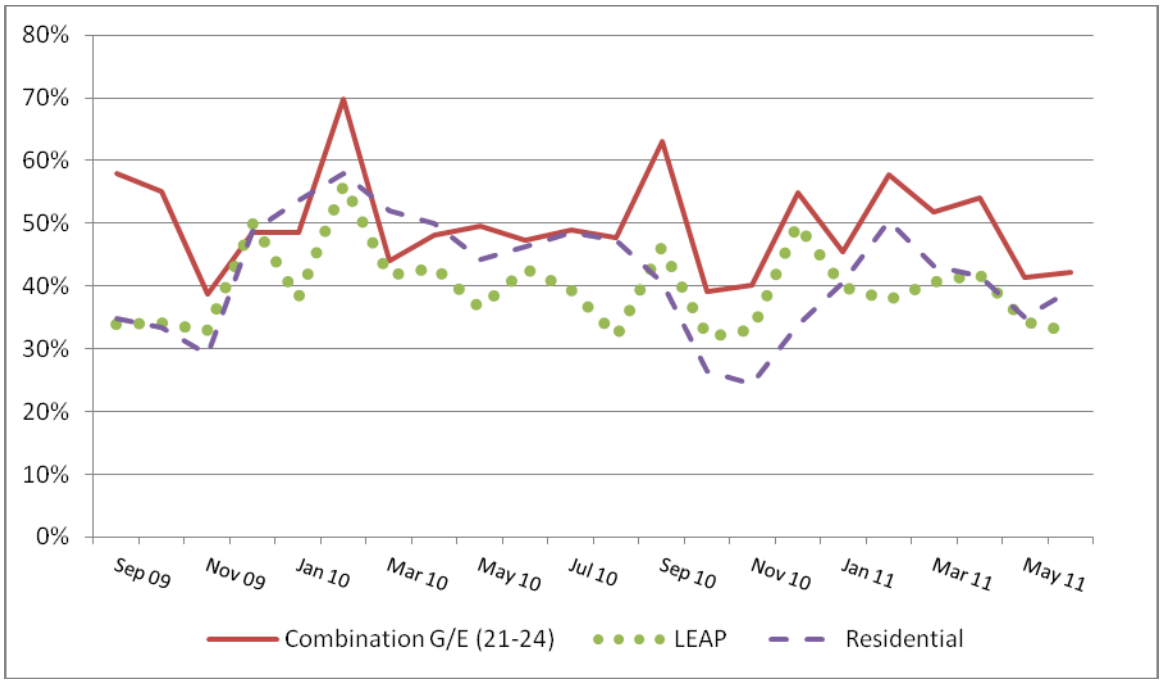

Figure 39. Percentage of Accounts Receiving DNP Notices by whether Arrears were Lower 4-Months after Receipt of Notice

One striking observation from each of the Figures about the effectiveness of DNP notices, however, is what is *not* evident in the data. It is frequently asserted that the presence of winter shutoff restrictions, whether uniformly promulgated by state regulators or whether adopted by a utility on a case-by-case company-specific basis, results in a sizable proportion of customer who stop making payments during the cold weather months during which period the disconnection of service is not available as a collection device. Should this observation be accurate for Public Service, it would be possible to observe a constantly-growing proportion of accounts (within all three populations) that have a customer payment coverage ratio of less than 0.50 during the winter heating season, and a level of arrears that grows during the winter heating season. That observation, however, cannot be made.

All three perspectives presented above[72] support the conclusion that neither low-income customers, nor residential customers in general, routinely stop making cold weather payments in the Public Service service territory, whether or not assisted through PEAP.

Six Important Findings

1. The collection activities that Public Service directs toward non-PEAP participants are not as efficient at generating payments as those collection activities directed toward PEAP participants. The Company needs to engage in from three to five times more collection activities (in this case, issuing notices of disconnection for nonpayment) for each 1,000 customer payments it receives.

[72] The number of accounts making payments, making $0 payments, and making payments resulting in $0 balances, is directly measured in the discussion above. See, Regularity: Payment-to-Bill Ratios, page 56, et seq. above.

2. The disparity in performance between PEAP participants and non-participants is even more evident when the long-term PEAP population is compared to low-income customers who received LEAP benefits, but never participated in PEAP. Low-income customers who receive only LEAP received, on a cumulative basis over the 24-month study period, more DNP notices per 1,000 customer payments than did PEAP participants. Moreover, while the rate at which DNP notices are issued per 1,000 customer payments received is seen to be increasing for each population, the rate of increase for the PEAP population is slower than for the LEAP recipients.

3. In the converse analysis, which considers the percentage of accounts receiving DNP notices that have a customer payment coverage ratio of *more* than 1.0 in the ensuing four months, a higher number is "more effective" while a lower number is "less effective." While PEAP participation does not eliminate the seasonal variation in this level of payment success after a DNP notice, the proportion of PEAP participants making customer payments of more than 1.0 is consistently higher than the proportion of either short-term PEAP participants, LEAP recipients or residential customers generally. The residential population as a whole out-performs the low-income LEAP recipient population, but does not achieve the same level of multi-month payment success after receipt of a DNP notice as does the PEAP population.

4. The data comparing the four-month payment level –remember that these are multi-month payments, not monthly payments—are substantially higher for PEAP participants than for LEAP recipients. Indeed, the four-month payment levels of LEAP recipients remain reasonably constant over the 24-month study period. PEAP participants receiving DNP notices make between $250 and $350 more in absolute dollar payments in the four months after receiving a DNP notice (about $60 to $90 per month) than do LEAP recipients having received a DNP notice.

5. While the level of performance is much closer, the PEAP participant population continues to outperform both the LEAP and the residential population. A lower proportion of PEAP customers had an arrearage that was higher in the fourth month after receiving a DNP notice than in the month having received a DNP notice. When viewed on a monthly basis, there is a noticeable seasonal variation in this metric. Consistent with the prior data, we find that PEAP participants have both a lower proportion of accounts with higher arrearages (Figure 38) and a higher proportion of accounts with lower arrearages.

6. One striking observation about the effectiveness of DNP notices is what is *not* evident in the data. It is frequently asserted that the presence of winter shutoff restrictions, whether uniformly promulgated by state regulators or whether adopted by a utility on a case-by-case company-specific basis, results in a sizable proportion of customer who stop making payments during the cold weather months during which period the disconnection of service is not available as a collection device. Should this observation be accurate for Public Service, it would be possible to observe a constantly-growing proportion of accounts (within all three populations) that have a customer payment coverage ratio of less than 0.50 during the winter heating season, and a level of arrears that grows during the winter heating season. That observation, however, cannot be made. Across-the-board, the data support the conclusion that neither low-income customers, nor residential

customers in general, routinely stop making cold weather payments in the PSCo service territory, whether or not assisted through PEAP.

Part 4: Summary of Findings and Recommendations

This Chapter of the Final Evaluation sets forth both a summary of the Findings supported by the discussion above and the Recommendations based on the discussion above.

Findings

Based on the data and discussion above, the following findings are supportable:

Attributes of PEAP Participants

The Pilot Energy Assistance Program (PEAP) delivered benefits through two primary mechanisms.

- On the one hand, the PEAP delivered benefits through a percentage of income "Fixed Credit" program. Through this program component, natural gas bills were set equal to an affordable percentage of income. The program began by defining "affordable" as a home energy burden equal to 5% of income. A mid-course modification was made to lower that affordable percentage to 3% of income.

- On the other hand, PEAP customers whose home energy burdens were already at or below the affordable level were offered a discounted rate. Depending on the ratio of household income to Poverty Level, tiered discount levels were set at 15%, 20% or 25% of the bill at standard residential rates.

The findings below summarize some of the attributes of the Public Service PEAP populations.

1. A substantial majority of customers participated in ***both*** the gas ***and*** electric affordability programs of Public Service. Even through the electric and gas programs were independent of each other, combination customers who participate in the gas program are most likely to participate in the electric program also. Nearly two-thirds of gas program participants (65%) also participated in the electric program.

2. Low-income gas customers tend to be reasonably divided between the percentage of income Fixed Credit program component and the bill discount program component. More than half (55%) of all PEAP participants took service under the Fixed Credit program component, while 45% took service under the discount. Low-income electric service was substantively different. More than 8-of-10 customers (82%) participated in the electric Fixed Credit program component, rather than the Discount program.

3. Only 391 PEAP participants lived in homes that had been weatherized. This includes an overwhelming majority of high use participants. Of the 666 Fixed Credit participants with usage more than 150% of the average, 629 had not been weatherized. Of the 194 Discount participants with usage greater than 150% of the average, 183 had not been weatherized. A similar pattern exists for participants with bills greater than 130% of the average.

4. Public Service did a reasonably good job at estimating annual bills for PEAP and PEAP/EAP participants. In the first year of participation, 58% of actual combination gas/electric bills fell between 90% and 110% of the billing estimates. Estimates for gas-only customers were not quite as accurate.

5. The PEAP participation population tended to have somewhat higher natural gas consumption than both the residential population in general and the federal energy assistance population. Gas-only PEAP participants had a higher gas usage than did the gas-only LEAP participant or the gas-only residential customer. Each type of combination (electric/gas) PEAP participant (PEAP/EAP, PEAP/no-EAP) also evidenced higher consumption than did either the LEAP population or general residential population.

6. In contrast, with a few exceptions, the low-income consumption tends to be lower than the general residential consumption. In particular, the consumption of the high-arrears non-participant low-income population of gas-only customers tends to be lower than the high-arrears residential population as a whole. The usage of the low-income combination customers at all arrearage levels is lower than the usage of the residential customers at all arrearage levels.

7. While the incidence of pre-existing arrears was noticeably higher for Fixed Credit customers, the level of pre-existing arrears was not. Across all ranges of pre-existing arrears, the average arrears for Discount customers was roughly equal to the average arrears for Fixed Credit customers.

8. When one overlays whether a customer participates in the PEAP program (gas) alone, or in both the PEAP *and* EAP programs, the combination customers bring a higher level of pre-existing arrears into the program. The same pattern between Discount and Fixed Credit program participants.

9. The benefits of the PSCo PEAP initiative flow not simply from the amount of the discount provided, but also from the levelized budget billing under which bills for current usage are presented to program participants. The levelized budget billing makes a considerable difference in the reduction in monthly volatility in bills. The "flatness" in the variation in month-to-month bills for all months from months 1 through 24 becomes evident as the length of PEAP participation increases. For PEAP participants in the program for only one to six months, the volatility in monthly bills is quite high. For customers in PEAP for 21 to 24 months, the volatility in monthly bills is quite low. The same impact can be seen for both the all-PEAP population and the PEAP population taking combination gas/electric service.

10. The seasonal variation in bills for customers with fewer than 12 months of PEAP participation is evident in both the warm and cold weather months. The "smoothing" effect of the budget billing requirement of PEAP is evident for those customers participating in PEAP for 21 – 24 months. One importance of PEAP appears to lie with its requirement of levelized billing. While both the LEAP and residential populations experience a substantial seasonal variation in their monthly bills, approaching $200 a month in some months, the PEAP population does not.

11. PEAP discounts ranged between 20% and 25% for all customers who participated in PEAP for between 21 and 24 months in the study period. For customers who also participated in the electric discount (EAP), the discounted bill represented a somewhat lower percentage. The lesson to be learned from the data is that the PEAP program discount demonstrates a roughly 25 discount on a total-population basis, with a somewhat higher percentage discount for combination gas/electric customers who participate in both the gas and electric affordability programs.

Customer Perspective: Participant Payment Characteristics

Providing rate affordability assistance to low-income utility customers in Colorado should provide low-income customers with the capacity to sustain bill payment. "Sustaining bill payment" (referred to in this evaluation as "payment compliance" involves the following payment attributes with respect to bills for current usage:

- Complete bill payment;
- Prompt bill payment;
- Regular bill payment; and
- Unsolicited bill payment.

In sum, the second objective of the Company's PEAP is to improve customer management of their own bills as bills become more affordable. Rather than having partial, late or periodic payments, or payments that are made only in response to Company collection activity, the objective is for low-income customers to address their bills for current usage in a complete, regular, timely and unsolicited fashion on a monthly basis.

The findings below summarize some of the payment attributes of the Public Service PEAP population:

1. PEAP participant payments did not demonstrate significant seasonal variability. In both Years 1 and 2 of the study period, PEAP participant payments remained reasonably constant during the cold weather and non-cold weather months. Payments declined somewhat in Year 2 of the study period, reflecting a corresponding decline in the underlying bills. However, in neither year did overall payments show an abrupt seasonal decline.

2. Customer payments remain relatively constant, if not somewhat expanded, during the cold weather months. Accordingly, the proportion of total payments represented by customer payments declines because the agency (LEAP) payments represent an incremental addition to the payments being directed toward customer accounts. Agency (LEAP) payments in the PEAP program reasonably clearly supplement, and do not supplant, customer payments made toward bills for current usage.

3. PEAP customers make payments that are both lower, and more constant, than their LEAP counterparts. The lower payments will result from the receipt of discounted bills. The more constant payments result from the receipt of levelized monthly bills.

4. PEAP appears to have generated a positive impact on PEAP participant bill payment coverage ratios. Continuing participation in the Company's PEAP appears to help low-income customers increase their customer payment coverage ratio. The population of PEAP participants with the lowest customer payment coverage ratio is the population with least number of months of PEAP participation. Low-income customers who had participated in PEAP for more than 12 months had customer payment coverage ratios of roughly 80%.

5. PEAP customers and residential customers are ***not*** making the same level of payments. Rather, PEAP participants are paying virtually the same percentage of their discounted bills as residential customers in general are paying of their non-discounted bills.

6. Overall, PEAP appears to help low-income customers improve their payment coverage ratio. Combination gas/electric customers who participate in both EAP and PEAP demonstrate a distinctly improved cumulative customer payment coverage ratio than do either LEAP recipients or residential customers generally.

7. PEAP was successful in maintaining the number of accounts in arrears to the same levels as those which were experienced in the residential and federal energy assistance

populations overall. Differences began to appear in the winter heating season of the first year of the study period. At that time, the number of energy assistance (LEAP) accounts with $0 in arrears began to decrease, while the number of PEAP accounts instead continued to reflect the payment patterns of residential customers as a whole. During the warm weather months of the first year of the study period, the improvement of PEAP payment patterns relative to LEAP increased further.

8. In contrast to the percentage of accounts with $0 in arrears is an examination of the percentage of accounts with more than $250 in arrears. Beginning in the second year of the study period, the performance of PEAP customers saw a substantial improvement. Starting in the Spring of 2011 and continuing for the remainder of the study period, the percentage of high arrearage accounts for the PEAP population was substantially lower than for the two comparison groups.

9. Overall, long-term PEAP participants had significantly improved payment patterns as measured by the incidence of arrears. A higher proportion of customers had arrears in six or fewer months. A lower proportion of PEAP customers had arrears in both 13 to 18 months and in 19 to 23 months than for either LEAP or the residential population generally.

10. PEAP appears to reduce both the rate and intensity of the use of notices of disconnection for nonpayment (DNP notice) as a collection activity. Customers who participated in PEAP for between 21 and 24 months in the study period received one-third the number of DNP notices (0.14/participant) as did short-term PEAP participants (0.42/participant). While the difference was narrower between long-term PEAP participants and both LEAP recipients and residential customers having $0 in Month 1 arrears, there still existed a significant drop in the number of DNP notices per account (0.14/participant compared to LEAP [at 0.36/recipient] and to the general residential population ([at 0.30/account]).

11. The same observations cannot be made about the actual disconnection of service for nonpayment (DNP). While there appears to be a lower overall incidence of DNPs within the PEAP population, the intensity of the use of DNPs does not demonstrate the same reduction per each account having experienced a disconnection for nonpayment.

12. The PEAP program generated a revenue neutrality when PEAP participants were compared to other low-income customers, but not when compared to the residential population as a whole. PEAP generates a sufficiently substantial improvement in payment coverage ratios relative to the low-income (LEAP) population to more than offset the discount provided. To the extent that the low-income customers have a prior history of non-payment, the revenue neutrality will be somewhat (but not substantially) greater. However, because the payment coverage ratios of the residential population as a whole are higher with which to begin, the revenue that is being “lost” to nonpayment in the absence of the discount is smaller, and the increase in payment coverage ratios is insufficiently large to offset the effects of the discount.

Utility Perspective: Collection Effectiveness and Productivity

Improvements in the productivity of collection activities can occur in either of two ways:

- The need for collection interventions can be reduced thus allowing an increased payment per each collection intervention performed; in the first instance, improvement can be seen even if total dollars collected remains the same (but the interventions needed to generate those dollars decreases); or

- The customer response to the collection activity can improve thus allowing an increased payment per each collection intervention performed. In this second instance, improvement can be seen if the total number of collections activities remains the same but the dollars generated by those activities increase.

In essence, this evaluation process considers the effectiveness and efficiency of collection activities from two different but related perspectives. On the one hand, it examines how much revenue is generated by each collection intervention. On the other hand, it examines how many collection activities are associated with the generation of the revenue.

The findings below summarize some of the attributes of collection activity directed toward the Public Service PEAP population.

1. The collection activities that Public Service directs toward non-PEAP participants are not as efficient at generating payments as those collection activities directed toward PEAP participants. The Company needs to engage in from three to five times more collection activities (in this case, issuing notices of disconnection for nonpayment) for each 1,000 customer payments it receives.

2. The disparity in performance between PEAP participants and non-participants is even more evident when the long-term PEAP population is compared to low-income customers who received LEAP benefits, but never participated in PEAP. Low-income customers who receive only LEAP received, on a cumulative basis over the 24-month study period, more DNP notices per 1,000 customer payments than did PEAP participants. Moreover, while the rate at which DNP notices are issued per 1,000 customer payments received is seen to be increasing for each population, the rate of increase for the PEAP population is slower than for the LEAP recipients.

3. In the converse analysis, which considers the percentage of accounts receiving DNP notices that have a customer payment coverage ratio of ***more*** than 1.0 in the ensuing four months, a higher number is “more effective” while a lower number is “less effective.” While PEAP participation does not eliminate the seasonal variation in this level of payment success after a DNP notice, the proportion of PEAP participants making customer payments of more than 1.0 is consistently higher than the proportion of either short-term PEAP participants, LEAP recipients or residential customers generally. The residential population as a whole out-performs the low-income LEAP recipient

population, but does not achieve the same level of multi-month payment success after receipt of a DNP notice as does the PEAP population.

4. The data comparing the four-month payment level –remember that these are multi-month payments, not monthly payments—are substantially higher for PEAP participants than for LEAP recipients. Indeed, the four-month payment levels of LEAP recipients remain reasonably constant over the 24-month study period. PEAP participants receiving DNP notices make between $250 and $350 more in absolute dollar payments in the four months after receiving a DNP notice (about $60 to $90 per month) than do LEAP recipients having received a DNP notice.

5. While the level of performance is much closer, the PEAP participant population continues to outperform both the LEAP and the residential population. A lower proportion of PEAP customers had an arrearage that was higher in the fourth month after receiving a DNP notice than in the month having received a DNP notice. When viewed on a monthly basis, there is a noticeable seasonal variation in this metric. Consistent with the prior data, we find that PEAP participants have both a lower proportion of accounts with higher arrearages (Figure 38) and a higher proportion of accounts with lower arrearages.

6. One striking observation about the effectiveness of DNP notices is what is *not* evident in the data. It is frequently asserted that the presence of winter shutoff restrictions, whether uniformly promulgated by state regulators or whether adopted by a utility on a case-by-case company-specific basis, results in a sizable proportion of customer who stop making payments during the cold weather months during which period the disconnection of service is not available as a collection device. Should this observation be accurate for Public Service, it would be possible to observe a constantly-growing proportion of accounts (within all three populations) that have a customer payment coverage ratio of less than 0.50 during the winter heating season, and a level of arrears that grows during the winter heating season. That observation, however, cannot be made. Across-the-board, the data support the conclusion that neither low-income customers, nor residential customers in general, routinely stop making cold weather payments in the Public Service service territory, whether or not assisted through PEAP.

Recommendations

The discussion below offers a series of recommendations for Public Service to pursue to improve its delivery of low-income energy assistance. The recommendations, while flowing from and supported by the data and analysis presented through this Final Evaluation, represent the conclusions and recommendations of the author. They may or may not be endorsed by the Company. Recommendation #1 is based simply on the observation that the PEAP/EAP initiative appears to effectively, and cost-effectively, accomplish the objectives articulated for the program

at its inception. It should be continued beyond its "pilot" stage as a permanent fixture of the Company's low-income rate and customer service offerings. .

Recommendation #2 through Recommendation #6 are designed to improve the efficient design of the Company's low-income program. It is acknowledged, however, that implementation of these recommendations are not exclusively within the province of the Company. Recommendation #2, for example, involving an automatic enrollment process for LEAP recipients, would require future conversations between the state LEAP office and the Company. Recommendation #5, involving inter-utility sharing of information to facilitate the enrollment of low-income customers using electricity for other than primary heating would require future conversations between PSCo and those utilities with whom PSCo "shares" its service territory.

Recommendation #7 through Recommendation #11 are designed to improve the efficient operation of the Company's low-income programs. They address a variety of issues ranging from the accurate determination of discount levels (Recommendation #8) to both medium-term (Recommendation #7) and long-term (Recommendation #9) cost-control mechanisms.

Finally, Recommendation #12 seeks to take the learning arising from the PEAP/EAP pilots with respect to the positive impacts of levelizing bills (and payments) through equal monthly budget billing and extending it beyond the confines of the study population. While Recommendation #12 exceeds the scope of the specific "low-income" population treated through PEAP and EAP, and recommends a service offering that may or may not be a part of any proposed permanent low-income plan to be filed with the Commission in the Spring of 2012, it identifies important lessons regarding the positive effects of budget billing and recommends that Company (and other stakeholders) begin a conversation that would appear to deliver positive benefits to participants and non-participants in the same fashion as PEAP/EAP has delivered positive benefits.

Given this introduction, the Recommendations flowing from the data and analysis presented in the narrative above include the following:

1. The Pilot Energy Assistance Program (PEAP) and Electric Assistance Program (EAP) offered by Public Service Company of Colorado (PSCO) were found above to be cost-effective mechanisms for delivering rate affordability assistance to low-income customers. These programs were found not only to be revenue-neutral from the perspective of the Company, but were also found to increase the productivity, efficiency and effectiveness of existing collection mechanisms. Accordingly **Recommendation #1** is for Public Service to continue the PEAP/EAP as a permanent feature of its rate and customer service offerings to low-income customers.

2. Consistent with this primary recommendation, PSCO should work with the Colorado LEAP office to devise a mechanism for the automatic enrollment of LEAP recipients in

PEAP/EAP. Participation in the PEAP/EAP appears clearly to improve the payment patterns of low-income customers. An enrollment process, however, that requires the utility to solicit participation and that, correspondingly, requires a customer to take some affirmative action-step to enroll, creates a barrier to enrollment that redounds to the detriment of both the customer and the Company. **Recommendation #2** is for the state LEAP office and Public Service to enter into a conversation to develop and implement a process through which an application for LEAP assistance would be deemed an application for PEAP/EAP participation (and that, consistent with the observation in Appendix 2 that PEAP/EAP is in effect a form of ratepayer-funded "supplement" to the federal LEAP benefits, the LEAP application would constitute or contain a consent to share the information necessary for customers to access those ratepayer-provided benefits without further administrative action on the customer's part).

3. In addition to working with the state LEAP office, the Public Service should work with other state agencies to assess the feasibility of an automatic enrollment process for non-LEAP customers. The data clearly indicates that in the absence of PEAP/EAP participation, LEAP recipients have consistently poorer payment performance than does the residential customer base as a whole. No reason exists to believe that a low-income customer receiving federal energy assistance has a poorer payment performance than a low-income customer not receiving federal energy assistance. As a result, it is likely that the cost-effectiveness and revenue neutrality found for LEAP participants would extend to other low-income non-LEAP recipients. Given that the sharing of information between government agencies and public utilities has been approved as a "routine use" under federal privacy law,[73] when such sharing facilitates enrollment in public assistance programs, the commencement of such a conversation to implement such an exchange with Public Service is merited.[74] **Recommendation #3** is for Public Service to pursue an agreement under which an application for non-LEAP public assistance (e.g., SNAP/Food Stamps, SSI WIC, Medicaid) would be deemed an application for PEAP/EAP (and a consent to share necessary information solely for the purposes of allowing such enrollment).

4. While it was generally the case that customers enrolling in PEAP also enrolled in EAP, that dual enrollment was not universally the case. As the data discussion above notes, it is not possible to determine whether a combination gas/electric customer who participates

[73] See e.g., 70 *Federal Register* 10456, 10460 (March 3, 2005).
[74] The electronic exchange of data with a public utility has long been approved by the federal government. In a 1994 letter to the Public Utility Law Program (PULP) of New York, for example, the Social Security Administration (U.S. Department of Health and Human Services) (SSA) stated "we are authorizing approval for a confidential, computerized data exchange of SSI recipient data between the New York State Department of Social Services and New York Telephone (NYNEX), a regulated public utility. This exchange of information which you described is considered "routine use" under the Privacy Act regulations."

in the natural gas program (PEAP) without also participating in the electric program (EAP) involves a customer taking electric service from a vendor other than PSCO or whether that customer has simply failed to enroll in both available programs. **Recommendation #4** is for PSCO to ensure that enrollment of a combination gas and electric customer in either the gas or electric affordability program will be deemed to be an enrollment in both programs.

5. The door through which low-income customers enter the PEAP/EAP programs involves an application for federal energy assistance (LEAP) benefits. As a result, while customers who are combination gas/electric customers taking both services from the Company, or who are customers using electricity as their primary heating source, tend to enroll in the PEAP/EAP initiatives when those initiatives affect the customer's primary heating fuel, or in the combined PEAP/EAP initiatives when a combination customer. In contrast, EAP (in particular) tends *not* to reach electric-only customers when the customer has a non-electric primary heating fuel supplied by a vendor other than PSCO. This failure to reach non-heating electric-only service occurs notwithstanding the fact that the data supports the conclusion that electric non-heating bills appear to represent a greater threat to affordability than do natural gas heating bills. **Recommendation #5** is for PSCo to establish an inter-utility information sharing mechanism through which PSCO may share the fact of PEAP participation with the electric vendor(s) serving the geographic area in which the PEAP participant resides exclusively for the purpose of enrolling that customer in the corresponding electric-only affordability program. Moreover, **Recommendation #6** is for Public Service to convene a work group of interested stakeholders to determine an appropriate procedure for identifying and enrolling customers purchasing primary heating fuel from a non-regulated energy vendor in the PSCO electric affordability program.

6. One of the primary attributes of PEAP/EAP participants who enroll in the Fixed Credit rather than the Tiered Rate Discount program component is a consistently higher annual (and thus average monthly) bill. Under the Fixed Credit program, where the credit provided by the Company is "fixed" (and not the customer payment), the impact of bill volatility (either due to changes in consumption or due to changes in prices) lies with the customer. If the bill increases, the customer pays the difference. If the bill decreases, the customer pockets the reduction. In contrast, under the discount program, where the discount is fixed (and not the monthly credit), the impact of bill volatility is shared between the customer and the Company in proportion to the extent of the discount. The Company appears to do an adequate job of estimating Year 1 energy bills when customers enroll in the PEAP/EAP (although it appears to be more difficult to accurately estimate natural gas bills). **Recommendation #7** is to convert the Tiered Rate Discount program into a fixed credit program along with the percentage-of-income based Fixed Credit program component. Under this approach, a customer would not be offered a 15%

discount, but rather would be offered a monthly fixed credit equal to a 15% discount if the customer incurs a bill at the level of the estimated bill.

7. While the Company appears to accurately estimate annual home energy bills for low-income customers who enroll in PEAP/EAP (although it appears to be more difficult to estimate natural gas bills than to estimate electric bills), as the period of participation extends beyond Year 1, the bill estimates become less and less accurate. Moreover, to the extent that a customer with higher consumption (and thus a customer with higher Fixed Credits or Tiered Discount amounts) is weatherized using utility or government funds, the benefits of the reduced consumption redound exclusively to the benefit of the customer. While a customer should bear the risk of higher bills in the short-term, and pocket the benefit of reduced bills in the short-term, the program should neither pay affordability amounts (whether discounts or fixed credits) at a higher-than-needed or lower-than-needed rate over the long-term. **Recommendation #8** is to re-estimate the participant natural gas/electric bills on an annual basis to re-determine both the Fixed Credit amount and/or the Tiered Rate Discount amount.

8. Participation in the Fixed Credit program component appears to be largely driven by the size of the low-income customer's annual bill. Not only are average bills for Fixed Credit participants somewhat higher than the average bills of Tiered Rate Discount participants, but also the incidence of Fixed Credit participants in the groups of customers with bills higher than designated ranges (130% of average; 150% of average) is higher as well. High bills for Fixed Credit program participants in particular are costly to the program, as the bills above the designated affordable percentage of income are paid (albeit through a fixed credit) on a dollar-for-dollar basis (rather than as a percentage discount). Despite these higher bills, and the structure of the affordability rate component, an overwhelming majority of high-use customers have received no weatherization services. On a long-term basis, weatherizing homes of participants with fixed credits that are high-cost (due to high use) should present a substantial opportunity for program cost reduction. **Recommendation #9** is for the Company to create a close tie-in between the provision of high-cost fixed credits to high use customers and available weatherization programs.

9. Participation in both the PEAP and EAP initiatives appears to increase the productivity, efficiency and effectiveness of company collection activities directed toward program participants. Not only are fewer collection activities directed toward program participants, but fewer collection activities are directed toward program participants on a per-unit of bills basis (e.g., per-1,000 bills per-$1,000 of billed revenue). Despite this increase in the productivity, efficiency and effectiveness of company collection activities, and despite the fact that program participants out-perform their low-income LEAP counterparts on important bill-sustainability metrics, a substantial proportion of

PEAP/EAP program participants fail to make consistently full and timely payments on a monthly basis. The PEAP/EAP programs are designed to provide bill credits as the Company's contribution toward helping bills be "affordable" (and thus subject to sustainable bill payment). In the event that payments are *not* made, however, PEAP/EAP participants should be subject to the same collection activities and same collection opportunities (e.g., deferred payment arrangements) as customers that do not participate in the program(s) are. **Recommendation #10** is for the Company to review its collection activities to ensure that, for purposes of collection, PEAP/EAP participants are subject to the same collection activities and collection opportunities as residential customers not participating in PEAP/EAP are.

10. This Final Evaluation represents a comprehensive evaluation of the success (or lack thereof) of the Public Service PEAP/EAP initiatives in achieving the program objectives articulated for PEAP/EAP before the programs ever began. Despite its comprehensive nature, the PEAP/EAP initiative will continue to evolve and will generate different impacts responsive to different social and economic conditions existent in different years. One attribute of good program planning involves an on-going evaluation of the activities, outputs and outcomes of the PEAP/EAP initiatives. Nonetheless, a program can be "over-evaluated," with the expenses of evaluation outweighing the benefits of added learning generated by the evaluation. **Recommendation #11** is for the PEAP/EAP initiatives to be subjected to a periodic evaluation by an independent third-party on a six-year cycle with the results of that evaluation provided to the Company, the Commission, and other interested stakeholders.

11. A substantial population of low-income customers receives gas and/or electric bills that fall below an affordable percentage of income without assistance (as indicated by the customer's participation in the Tiered Rate Discount rather than the Fixed Credit program component). While the data supports the observation that Tiered Rate Discount participants tend to have substantively lower home energy bills, given the distribution of both gas and combination gas/electric bills, it is reasonable to expect that as household income increases, it is increasingly likely that a "low-income" customer receives a bill that does not reach the designated percentage-of-income based threshold of "unaffordability." Despite the receipt of bills that are at or below this percentage-of-income based affordability level, the Company's PEAP initiative appears to offer substantive advantages in levelizing bill payments over the course of the year. Moreover, when monthly payments are compared to monthly bills, it further appears that levelizing bills has the effect of levelizing bill payments as well. **Recommendation #12** is for the Company to provide financial incentives, in an amount determined to be effective and reasonable, for customers with income above the eligibility level for PEAP/EAP but below a level considered to be adequate for a household to make consistently full and

timely payments, to incentivize such customers to enter into levelized budget billing (known on the PSCO system as Equal Payment Plans, EPPs).

Appendix 1 (page 1 of 3): Study Group

Study Group		
Population Description	**Code**	**Population Count**
Electric Only Customer	E	692
Gas Only Customer	G	1663
Combination Customer - EAP Participant	EGY	5169
Combination Customer - Not EAP Participant	EGN	1430
	Total	*8954*
PEAP Participant: 0 months	A	835
PEAP Participant: 1 - 6 months	B	801
PEAP Participant: 7 - 12 months	C	398
PEAP Participant: 13 - 20 months	D	1775
PEAP Participant: 21 - 24 months	E	5145
	Total	*8954*
Combination	E-A	470
Combination	E-B	40
Combination	E-C	49
Combination	E-D	74
Combination	E-E	59
Combination	G-A	68
Combination	G-B	84
Combination	G-C	88
Combination	G-D	294
Combination	G-E	1129
Combination	EGY-A	52
Combination	EGY-B	524
Combination	EGY-C	105
Combination	EGY-D	1132
Combination	EGY-E	3356
Combination	EGN-A	245
Combination	EGN-B	153
Combination	EGN-C	156
Combination	EGN-D	275
Combination	EGN-E	601
	Total	*8954*

Appendix 1 (page 2 of 3): LEAP-based Control Group

LEAP-based Control Group		
Population Description	**Code**	**Population Count**
Electric Only Customer: No EPP	E	333
Gas Only Customer: No EPP	G	1008
Combination Customer: No EPP	EG	3070
All EPP Customers	L	46
Indeterminate	NA	2
	Total	*4459*
Month 1 Arrears <=0	A	2136
Month 1 Arrears >0 and <=$250	B	1512
Month 1 Arrears >$250	C	811
	Total	*4459*
Combination	E-A	165
Combination	E-B	107
Combination	E-C	61
Combination	G-A	538
Combination	G-B	375
Combination	G-C	95
Combination	EG-A	1405
Combination	EG-B	1016
Combination	EG-C	649
Combination	L-A	26
Combination	L-B	14
Combination	L-C	6
Combination	NA-A	2
Combination	NA-B	0
Combination	NA-C	0
	Total	*4459*

Appendix 1 (page 3 of 3): Residential-based Control Group

Residential-based Control Group		
Population Description	**Code**	**Population Count**
Electric Only Customer: No EPP	E	992
Gas Only Customer: No EPP	G	886
Combination Customer: No EPP	EG	2492
All EPP Customers	L	78
Indeterminate	NA	0
	Total	*4448*
Month 1 Arrears <=0	A	2232
Month 1 Arrears >0 and <=$250	B	1554
Month 1 Arrears >$250	C	662
	Total	*4448*
Combination	E-A	595
Combination	E-B	296
Combination	E-C	101
Combination	G-A	478
Combination	G-B	372
Combination	G-C	36
Combination	EG-A	1111
Combination	EG-B	876
Combination	EG-C	505
Combination	L-A	48
Combination	L-B	10
Combination	L-C	20
Combination	NA-A	0
Combination	NA-B	0
Combination	NA-C	0
	Total	*4448*

Appendix 2: The Posting of LEAP Payments to PEAP Accounts

The manner in which the Public Service Company of Colorado (PSCo) PEAP and EAP programs post federal energy assistance to participant accounts is consistent with other percentage of income-based programs around the nation. The basic approach used by PSCo incorporates the following principles:

1. A program participant receives a full bill calculated at standard residential rates. The customer is responsible for payment of that full bill.

2. Three sources of funds are available to pay the full bill for PEAP participants: (1) a customer-supplied payment; (2) an agency-supplied payment (LEAP; and (3) a ratepayer-supplied payment (PEAP).

3. Within limits, the utility ensures that the customer-supplied payment will not exceed an affordable percentage of income. To the extent that the agency-supplied LEAP payment does not result in achieving that objective of an affordable payment, the PEAP payment is paid as a ratepayer-funded LEAP supplement to achieve that affordability objective.

4. Ratepayer funds will not be used to create a credit on a PEAP participant's bill. If a bill is fully paid through a combination of customer-supplied and agency-supplied funds, no further ratepayer-funded payment is required. Similarly, if the affordability objective is

achieved without need for ratepayer-supplied funds, no further ratepayer-funded payment is required.[75]

The Illinois Percentage-of-Income Program

The PSCo PEAP is closely aligned to the Illinois statutory "percentage of income program" in its use of ratepayer funds to supplement federal energy assistance to achieve an affordability target.

In Illinois, ratepayer funds are combined with LIHEAP dollars to fund what is called the "PIPP Credit." PIPP represents the state Percentage of Income Payment Plan ("PIPP"). As with the PSCo program, Illinois divides the bill of a program participant into two parts: (1) that portion of a low-income customer's bill that is at or below a burden deemed to be "affordable" by the state (set at 6% in Illinois); and (2) that portion of a low-income customer's bill that is greater than that affordable percentage of income. The "PIPP Credit" denotes that second portion, the portion that is above the affordable percentage of income. The asked-to-pay amount in Illinois is set at 6% of the PIPP participant's income.

In Illinois, the "PIPP Credit" is comprised of a combination of ratepayer funds and LIHEAP funds. The PIPP Credit provided in Illinois (which includes LIHEAP) is *not* applied against the asked-to-pay amount, but rather against the portion of the bill that is in *excess* of the asked-to-pay amount. The Illinois statute states quite explicitly that "a plan participant is responsible for all actual charges for utility service in excess of the PIPP credit." Pursuant to the Illinois program, in other words, LIHEAP goes into helping fund the "PIPP credit" (which is designed to reduce the bill to 6% of income). Customers are responsible for "all actual charges in excess of" that credit.

The Illinois program treats its LIHEAP/no-PIPP customers differently from its LIHEAP/PIPP customers. Under the statute, the "monthly credit" "will be applied to PIP Plan participants' utility bills based on the portion of the bill that is the responsibility of the participant provided that the percentage shall be no more than 6%. . ." Under this section, in other words, LIHEAP/no-PIPP customers have LIHEAP applied against their asked-to-pay amount. LIHEAP/PIPP customers have their LIHEAP applied to their PIPP credits, which are designed to bring the bills down to 6% of income.

The Nevada Percentage of Income Program

The Nevada Energy Assistance Program ("EAP") is a percentage of income payment program. The program is funded in part by federal LIHEAP dollars and in part by a "universal energy charge" ("UEC") imposed on utility ratepayers. Under the Nevada EAP, rather than setting the percentage of income payment at a level deemed to reflect some determination of "affordability," the goal "is, to the extent practicable provide assistance in an amount sufficient to reduce the percentage of the applying household's income spent on natural gas and electricity to the median

[75] A different approach is used for the Tiered Rate Discount program, which is explicitly directed toward customers who have a PSCo bill that, without ratepayer-funded payments, experience bills that have reached an affordability objective.

percentage of household income spent on same statewide." (Nevada Division of Welfare and Supportive Services, Energy Assistance Program Manual: 2009, at 1).[76]

In Nevada, on an annual basis, the state determines the median percentage of household income spent on natural gas and electricity statewide. That percentage of income, when applied to each specific household's income, yields the household's payment responsibility (the asked-to-pay amount). The state pays a fixed credit against the difference between that asked-to-pay amount and the bill that would have been rendered to the customer at standard residential rates. The FEAC State Plan details the calculation of the fixed credit (referred to as the "Fixed Annual Credit" or "FAC") as follows:

> Determining the FAC benefit:
>
> a. Identify eligible household's gross annual income and apply 2.21% to determine the amount the household is expected to pay for their energy burden.[77]
>
> b. Identify eligible household's annual energy usage in dollars (to include all energy sources).
>
> c. Compare the 2.21% figure to the eligible household's annual energy burden (usage in dollars).
>
> d. If the household energy burden is greater than 2.21% of the household's annual income, the difference is the Fixed Annual Credit (FAC) amount for that household. The FAC is the benefit amount the household receives not to exceed UEC annual usage or the program benefit cap.
>
> If the eligible household energy burden is less than 2.21% of the household's annual income, the household may receive a payment of $180 paid with non-UEC monies.

As can be seen, the Fixed Annual Credit ("FAC") is used to reduce the shortfall between the percentage of income payment and the bill at standard residential rates. The percentage of income payment is the "asked to pay" amount. The FEAC State Plan refers to this percentage of income payment as "the *amount the household is expected to pay* for their energy burden." (emphasis added). Under paragraph "d" above, the FAC is used to pay "*the difference*" between the percentage of income asked-to-pay amount and the energy bill at standard residential rates.

As can be seen, in Nevada, as in Illinois and as in the PSCo PEAP, LIHEAP is used to help fund the FAC. The FEAC State Plan states quite explicitly that: "FAC benefits to eligible households may be funded using federal Low Income Home Energy Assistance (LIHEA) funds or monies from the state Fund for Energy Assistance and Conservation."

[76] The 2009 Program Manual remains in effect for the Fiscal Year 2011 program.
[77] The 2.21% was the median household percentage for the current year.

In Nevada, the LIHEAP funds are used to fund the shortfall between the percentage of income payment and the bills that would have been rendered to program participants at standard residential rates. In Nevada, the LIHEAP funds are *not* applied against the asked-to-pay amount. Nonetheless, in Nevada, the state LIHEAP office not only approves of the process, but actively administers the use of utility and LIHEAP funds. In Nevada, the calculation of the asked-to-pay amount, and the application of LIHEAP funds to the shortfall between that asked-to-pay amount and the bills at standard residential rates, is specifically detailed in the LIHEAP State Plan. (Nevada LIHEAP State Plan, at 18).

The Ohio Percentage of Income Program

The Ohio Percentage of Income Payment Plan (PIPP) is a rate affordability program directed toward low-income electric and natural gas customers. This discussion, however, is limited to the electric part of the Ohio PIPP. Under the Ohio PIPP, electric baseload customers are required to pay 6% of their income toward their electric bill. Electric heating customers are required to pay 10% of their income. The Ohio PIPP is administered by the Ohio Department of Development ("ODOD"), which is also the Ohio state LIHEAP agency.

The Ohio PIPP is funded through a combination of two sources of dollars. The first source involves federal LIHEAP funds. The second source involves utility ratepayer dollars generated by a "Universal Service Rider," a surcharge imposed on all retail electric bills. The combined LIHEAP and ratepayer dollars fund what Ohio refers to as its "Universal Service Fund" ("USF"), which in turn is used to fund the PIPP.

Under the Ohio PIPP, the asked-to-pay amount for program participants is set at a percentage of income (6% for electric baseload; 10% for electric space heating). The *difference* between that asked-to-pay amount and the bills that reflect standard residential rates are paid by the USF, which is comprised in part of the state's LIHEAP funds.

In Ohio, in other words, the LIHEAP grant provided to a PIPP participant is *not* applied against a PIPP participant's asked-to-pay amount, but rather is applied to retire the shortfall between the percentage of income-based asked-to-pay amount and the bill at standard residential rates.

The Ohio state LIHEAP agency ("ODOD") explained the operation of its PIPP in a presentation after ODOD made program changes in 2010. According to the ODOD: "baseload electric customers under 150% of poverty guidelines pay 6% of their income. Electric heat customers under 150% of poverty guidelines pay 10% of their income." The Ohio LIHEAP agency specifically refers to these percentage of income payment obligations as the "asked to pay amounts." The Ohio LIHIEAP agency then explains that under the Ohio program, "customer earns a credit for the *difference* between the PIPP Plus installment and the current month's utility charge." (emphasis added). ODOD further explained: "payments to electric companies by ODOD are limited to the *amount of the difference* between charges for actual service and amounts to be paid by PIPP customers." (emphasis added). ODOD provided a numerical illustration:

	5% Payment
Annual Income	$10,874
Monthly PIPP Payment (paid by customer)	$47
Monthly Electric Bill	$85
Difference	$38
USF Bill (paid by LIHEAP and ratepayer-funded program)	$38

As can be seen, the LIHEAP payment in Ohio is used to offset the difference between the customer's asked-to-pay amount ($47) and the bill at standard residential rates ($85), LIHEAP is used to pay the $38 shortfall, not the $47 asked-to-pay amount.

The ODOD explains the interaction between its LIHEAP funds and its PIPP in the LIHEAP state plan. The Ohio LIHEAP State Plan for the current program year explains the current operation and historical development of the Ohio PIPP, stating: "to try to incentivize better payment behavior under the new rules, every month a PIPP customer pays their installment on-time and in-full, they will receive. . .a credit of *the remainder of the bill* (delta) for that particular month." The LIHEAP payment, in other words, is *not* used to pay the PIPP participant's asked-to-pay amount, but rather is used to pay "the remainder of the bill."

Summary and Conclusion

It is entirely appropriate for a utility such as PSCo to use ratepayer dollars to supplement federal fuel assistance benefits. If by policy, a state (such as Illinois, Nevada, Ohio) or a utility (such as PSCo) determines that it is in the best interests of its low-income customers to limit home energy bills to an affordable percentage of income, and if federal energy assistance grants to particular households are insufficient to achieve that objective, it is appropriate to use ratepayer-supplied dollars to further reduce the home energy burden (i.e., bill as a percentage of income) to be borne by those low-income customers.

In this fashion, the PSCo PEAP nearly exactly reflects the Illinois and Ohio PIPPs, and the Nevada EAP.[78]

[78] The PEAP does not exactly reflect the Illinois, Nevada and Ohio programs. Under PEAP, it is the ratepayer-supplied credit that is fixed, not the customer payment.