Final Report

Utah HELP: Program Evaluation

Prepared for:
PacifiCorp

January 27, 2005

Prepared by:
M. Sami Khawaja, Ph.D.
John Willey
Quantec, LLC

K:\2004 Projects\2004-56 (PC) Utah HELP\reports\Utah Help Report_012605.doc

Quantec Offices

720 SW Washington, Suite 400
Portland, OR 97205
(503) 228-2992
(503) 228-3696 fax
www.quantecllc.com

1722 14th St., Suite 210
Boulder, CO 80302
(303) 998-0102
(303) 998-1007 fax

3445 Grant St.
Eugene, OR 97405
(541) 484-2992
(541) 683-3683 fax

28 Main St., Suite A
Reedsburg, WI 53959
(608) 524-4844
(608) 524-6361 fax

6 Ridgeland Rd
Barrington, RI 02806
(401) 289-0059
(401) 289-0287 fax

1038 E. Bastanchury Rd. #289
Fullerton, CA 92835-2786
(714) 626-0275
(714) 626-0563 fax

Table of Contents

Executive Summary

Utah Power, at the request of the Utah Division of Public Utilities, hired Quantec, LLC, to perform an evaluation of the Utah Home Energy Lifeline Program (HELP, the Program), which was designed to provide a bill discount to Utah Power's low-income customers without being burdensome to non-recipient customers. The Program offered a fixed credit toward enrolled participants' bills. This evaluation is intended to assess the Program delivery (process evaluation) and impacts on key indicators (impact evaluation).

Data Collection

The following data collection steps were undertaken to evaluate the impact and delivery of the Program:

1. Utah Power provided Quantec with customer billing and payment data for all Program participants from September 1999 to September 2004.
2. Quantec obtained census data to estimate the number of eligible households in Utah.
3. Quantec reviewed all filed tariffs and previous Department of Public Utilities evaluation reports.
4. Quantec conducted interviews with key stakeholders and a sample of Program participants.

Process Evaluation Findings

Poverty in Utah

According to data collected during the 2000 United States Census, the State of Utah ranked 39th with regard to the percentage of its households living in poverty (11.9% versus 15.0% nationally). However, Utah was one of only 12 states to exhibit an increase in the level of poverty since the 1990 Census. There are approximately 75,000 households within Utah Power's service territory currently living at or below 125% of the Federal Poverty Guidelines (FPG).

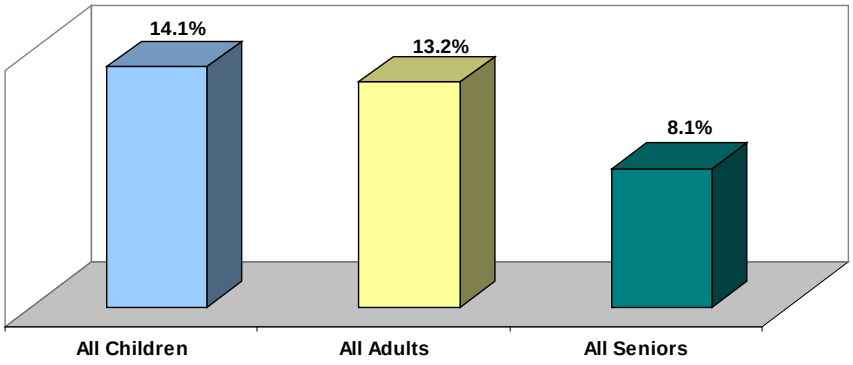
The State of Utah received $14 million in Low-Income Home Energy Assistance Program (LIHEAP) funding in 2004. This represents a decline of about 3.5% from the previous year. At the same time, the number of households receiving energy assistance (35,362 in 2004) increased by about 4%. Only 2% of LIHEAP recipients received weatherization services.

The following statistics also help describe the poverty situation of Utah's low-income households:

- 65% of LIHEAP recipients in Utah made less than $8,500 annually (75% of the FPG)
- 60% are on a fixed income
- 40% have a disabled person
- 23% are elderly
- 22% have preschool children
- 49% received food stamps

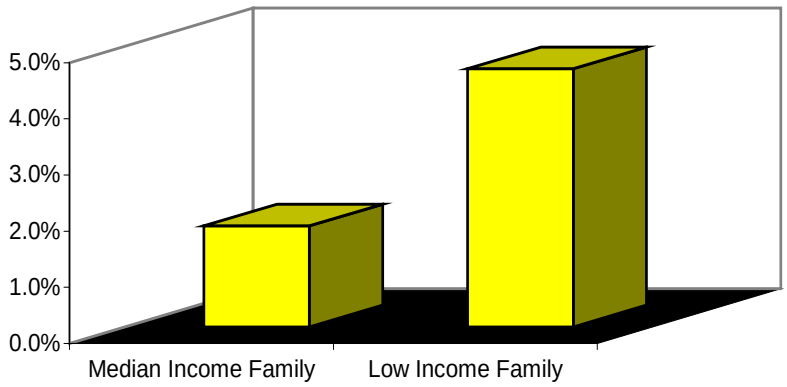
As evident in Figure ES.1, a higher percentage of Utah children (17 years and under) live in poverty than adults or seniors. The highest percentage of these children is under five years of age (16.1%).

Figure ES.1: Proportion of People Living at or below 125% of FPG



While basic poverty statistics, such as those provided above, offer insight into the size of the population needing assistance within a service territory, the monetary impact of a utility's assistance can be better understood by examining the financial situation of median- and low-income customers. In the case of Utah Power, a customer's *electricity burden* – the share of household resources needed to cover electric expenses – can be calculated by dividing a household's annual electric bill by their annual post-tax household income. As Figure ES.2 shows, the median-income family spent about 1.8% of their income on electricity. A low-income family, on the other hand, spent about 4.6%.

Figure ES.2: Electricity Burden



We estimated that $378 in electric assistance is needed to bring the average low-income family's energy burden to a level comparable to median-income families.

Goals of the Program

Based on the documents we reviewed, the Program was designed to provide a bill discount *without being burdensome to non-recipient customers*. In conducting our interviews, we were unable to find much of a common ground on the Program goals. Specifically, there was no consensus among key stakeholders on whether the Program needed to pass a cost-effectiveness test. Furthermore, we were unable to find consensus on the best perspective to use in assessing such cost effectiveness.

A clear definition of the purpose and the goals of the Program will have great consequences on the design and delivery of Program services as variances in these components can produce drastically different results. For example, if the emphasis is on producing cost savings within the non-recipient population, then client segmentation and better targeting are more likely to lead to the desired results. Customers with high levels of arrears are more likely to respond to incentives and, consequently, produce more cost savings to the utility and ratepayers. If the emphasis is on equity and helping people in need, then a program design that targets those individuals is more appropriate. This may include graduated discounts based on income levels. If the emphasis in on simplicity and ease of delivery, then universal intake with simple flat discounts or fixed credits are most appropriate.

Amount and Nature of Credit

Utah Power offers a straight $8/month discount against a household's bill. (Customers that use life support equipment are provided with an additional $10 discount.) Another option is a discount in the form of a percent reduction

in the bill. Some programs provide targeted rate discounts, allowing higher levels of savings for lower income groups or combine the discount with other mechanisms to encourage improved payment behavior. The only advantage the flat discount offers is ease of delivery and clarity to participants.

Funding

Funding for the Program comes from a surcharge on ratepayers' bills. Non-participating residential customers pay $0.12/month. Non-residential customers' contributions are capped at $75 annually. The charge appears as a line item on customers' bills.

In conducting our interviews, we found these contributions to be the most contested area of the program. Some of those interviewed felt that funds should be collected from a surcharge against all customer classes; some felt it should be limited to residential customers, while others felt that no funds at all should be collected, except on a voluntary basis. The industrial customers felt that they did not need to subsidize the Program as they did not see direct benefits accruing to them. Light and Truth, in its filed opinion, did not think the Commission had the authority to impose a "tax" against customers.

This issue is likely to continue to be contested. We are unable to offer any specific opinion regarding the legality of the Commission order. We are aware, however, that the issue of cost allocation in most areas of the utility business involves cross-class subsidies to some extent.

Quality Control

Currently the agencies and the Utah Department of Community and Economic Development (DCED) do not have quality control procedures in place. Although we did not conduct a full-scale investigation of this issue, we found evidence to suggest that such procedures would be beneficial to the Program.

For example, in an interview with a participant and review of her Utah Power bill, we found that she was paying into the Program rather than receiving credit. She was confused by the line item titled "Home Electric Lifeline Program." She assumed this meant that she was receiving the credit. It turned out that a data entry error at the Salt Lake Community Action and Crossroads Urban Center (SLCAP/CUC) might have caused a few clients to be accidentally omitted from the Program. We requested a review of 35 randomly selected participants' files. Of these, ten had moved or were disconnected; one was not on the Program.

In conducting data analysis for estimating Program impacts on arrears, we found nearly 15% of the HELP recipients did not receive HEAT dollars. Initially, this was surprising given our understanding that that the majority of the Program participants were recruited through the HEAT program. However, it was subsequently brought to our attention that this is likely due to

the fact that electric bills tend to be lower than gas bills, hence the HELP credit, alone, was sufficient for some customers to pay their electric bills.

We then examined the non-participants and found that nearly 13% had received HEAT dollars, but were not recruited into HELP. One possible explanation was that seasonal workers and other temporarily unemployed customers found the HEAT credit to be sufficient for paying their electric bills.

Impact Findings

The following highlight the findings of the impact portion of the evaluation:

- ***Participation levels***. The goal of the Program was to enroll approximately 19,000 clients. Our review of utility data showed that the participation rates ranged from a low of 10,692 (September '04) to a high of 22,183 (May '04).
- ***Length of stay on the Program***. The average length of Program participation is 13 months.
- ***HEAT assistance***. In addition to the rate discount, the majority of participants received energy assistance through HEAT. The average assistance amount received was $142.40.
- ***Energy consumption impact***. The bills for the participants and the comparison group increased by an average of 6% and 8%, respectively. This was almost entirely due to rate changes and not to actual increases in consumption. In fact, kWh usage increased by only 2% by both groups despite the reduction in cost.
- ***Improved payment patterns***. The combined assistance of HELP and HEAT has reduced arrears by approximately $100. The impact of HELP alone was estimated at approximately $77.
- ***Decreased shutoffs***. We compared the change in shutoffs between the participant and comparison groups and found no statistically significant differences. Both groups had a slight decrease in shutoffs (0.3%).
- ***Decreased mobility***. We examined the number of times a household moved and compared the frequencies between the two groups. Both groups experienced an increase in mobility. However, the participants' rate of increase was significantly lower than the comparison group's. The net difference was a reduction of 0.03 moves per participant. Over the three-year evaluation period, this translates to nearly 1,500 avoided moves.
- ***Decreased collections***. Participants witnessed a slight decrease in collection activities (0.03 fewer notices per participant). At the same

time, the comparison group witnessed an increase of 1.16 notices on average per customer. Therefore, we conclude that, had the Program not existed, the participants' collections would have been 1.19 notices per participant higher than observed annually.

Cost-Effectiveness Analysis

Cost-effectiveness analyses are customarily summarized using benefit-cost (B/C) ratios. A B/C ratio of 1.0 is the "breakeven point" where benefits are just equal to the investment. Values above 1 indicate a profitable investment.

We present the analysis for the combined HELP/HEAT as well as the HELP program only. Furthermore, the analysis is presented from the Ratepayers and Societal/Total Resource Cost perspectives. The benefits included under the Societal/TRC perspective are only a fraction of those likely to have resulted from the Program. For example, health and safety, reduced stress, increased ability to afford other necessities, and potentially some economic benefits resulting from the increased spending are not included. Very little data are available to support direct quantification of these benefits. In conducting our surveys with Program participants, we repeatedly heard that, while $8 may not be a lot of money to many people, to them it meant a meal, a prescription, or diapers.

Combined, HEAT/HELP passes the ratepayers and the societal (Total Resource Cost) test with B/C ratios of 1.05 and 1.49, respectively. HELP passes the Societal/TRC test creating a net benefit to society of at least $1.28 million over the three-year evaluation period. HELP, however, does not pass the ratepayers test (B/C ratio of 0.82; net value of -$860,934). This test is applied to investigate the Commission stated goal of providing a bill discount *without being burdensome to non-recipient customers*. The strictest interpretation of this statement is that the Program has to provide a benefit in decreased utility cost that is equal to the surcharge. As such, the Program does not pass the test.

This outcome is primarily due to the modest decline in arrears relative to the amount of the credit. The net value of the HELP only program is -$860,934 over the evaluation period of three years (i.e., representing the total net cost to ratepayers over the three year period). This translates to approximately $287,000 annual net cost to ratepayers (about 1.86 cents per ratepayer monthly). This is the estimate of the "non-recipient burden." Whether the 1.86 cents monthly net cost per ratepayers is burdensome or not, is a call that the Commission needs to make. However, we propose that the Commission consider the benefit accruing to the participants above and beyond those related to the electric bills. Our model estimated there may have been 1,500 avoided moves over the three-year period due to the Program. This benefit alone we conservatively valued at over $2 million dollars.

Table ES.1: Program Cost Effectiveness

	Ratepayers		Societal/TRC	
	HELP Only	HEAT & HELP	HELP Only	HEAT & HELP
Benefits				
Reduction in Arrears	$3,877,884	$4,987,986	$3,877,884	$4,987,986
Reduction in Notices	$44,538	$44,538	$44,538	$44,538
Reduction in Mobility	$44,912	$44,912	$2,185,708	$2,185,708
Total Benefits	$3,967,334	$5,077,435	$6,108,130	$7,218,231
Costs				
Administration	$37,676	$37,676	$37,676	$37,676
Surcharge	$4,790,592	$4,790,592	$4,790,592	$4,790,592
Total Costs	$4,828,268	$4,828,268	$4,828,268	$4,828,268
B/C Ratios	0.82	1.05	1.27	1.49
Net Value	$(860,934)	$249,167	$1,279,862	$2,389,963

Overall Findings/Recommendations

1. The Program is offering a critical service to a significant number of Utah families in need (nearly 20,000 at any one time, and more than 50,000 since inception). The Program has reduced the average participant's energy burden by approximately 17%. During the interviews we conducted with recipients, we were told repeatedly that, while $8 is not a significant amount of money for most people, it can mean a meal or prescription to them. Most of recipient of the credit make less than $8,500 annually. We recommend that the Program continues until the Commission confirms its cost effectiveness criteria and whether the Program requires to be redesigned.
2. The Program passes the Societal test creating a net benefit of at least $1.28 million. Numerous societal benefits were not included in our calculations for lack of quantitative data.
3. The Program does not pass the Ratepayers' test producing a net monthly cost per ratepayer of 1.86 cents.
4. Cross class subsidies occur on regular basis in the utility business. For example, when a utility adds capacity to accommodate a new industrial customer, all ratepayers pay the bill.
5. The Commission needs to clarify the goal of the Program. If the Commission determines that it is critical that the Program passes the cost effectiveness test, then, the Program needs to be redesigned to better achieve any revised goals. Available Program design options include integrated services, coupled with better targeting. If, on the other hand, simplicity of delivery is the most important criterion, then current design with minor changes is adequate. Without a clear

definition of goals, however, it is difficult for us to recommend specific design changes.

6. Regardless of final delivery decision, SLCAP and DCED need to implement quality control procedures to ensure accurate and effective intake implementation. This is probably best accomplished through a periodic, thorough review of a random sampling of customer files.
7. Consider conducting simple review of other state commission orders regarding low-income program goals. Commissions around the country have had varying opinions regarding the importance of cost effectiveness in low-income program design and delivery. Those that favor cost-effectiveness screens, tend to use the Total Resource Cost perspective.
8. If a Program redesign is deemed desirable, we recommend that it be conducted by an outside independent entity. We do not believe that the current members of the Low-Income Task Force are capable of reaching consensus based on different views of the purpose of the Program. An independent third party can make design recommendations to the Commission, and the various stakeholders may file opinions if they so desire. This entity would need to keep in mind DCED and SLCAP resource/staffing restrictions regarding administrative requirements.

I. Introduction

Background

Salt Lake Community Action and Crossroads Urban Center (SLCAP/CUC) proposed a lifeline rate for low-income customers. The Public Service Commission (Commission) approved the implementation of the program in Docket 99-035-10 (5/24/00). The Commission order declared that they had the "authority to implement a lifeline rate" and ordered the implementation to take place within 90 days. The details of the implementation were to be negotiated between the Utah Commission of Consumer Services (CCS), the Utah Division of Public Utilities (Division), SLCAP, large user groups, and other interested parties.

In Docket no. 00-035-T07 (8/30/00), the Commission ordered capping annual program costs at or near $1,850,000 and ordered Utah Power (the Company) to monitor collection and disbursement amounts periodically.

The 2003 General Rate Case called for no changes to the HELP rate structure. Mr. Paul Mecham presented opposing testimony of the Stipulation (Appendix II: Revenue and Spread Design Stipulation, Docket no. 03-2035-02).

Program Description

The Program was designed to provide a fixed discount to Utah Power's low-income customers without being burdensome to non-recipient customers. The Program offered a fixed credit ($8/month) toward enrolled participants' bills. (Customers that are use life support equipment are provided with an additional $10 discount.) To be eligible for the Program, a residential customer must be qualified for the Home Energy Assistance Target (HEAT) Program or earn no more than 125% of the federal poverty level.

The Program is funded through a surcharge on other ratepayers (schedule 91). This charge was estimated at $0.12 per month for a residential ratepayer (approximately 0.3% of total bill) and approximately $6.25 monthly (not to exceed $75 annually) for large customers. The collections by the Company are capped at around $1.85 million. The program administration was capped at $37,000.

The Utah Department of Community and Economic Development (DCED) administer the Program and developed an application process through which applicants are screened and forwarded to the Company. The Company applies the credit to the account and maintains a database of Program participants.

Evaluation

The Division was designated to evaluate the effectiveness of the Program. The Division, with the assistance of the Company, SLCAP, CUC, DCED, and CCS, developed the standards against which the Program's success was to be judged.

This evaluation is part of the "major review" that was to be "undertaken no later than three years after implementation." (Docket 00-035-T07).

Overall Approach

Our approach consists of two components: a process and an impact evaluation.

Process Evaluation

Process evaluation data collection consisted of the following activities. Interviews were used to assess Program design and delivery. We interviewed a cross section of advocates, regulators, and other interested parties.

- In-depth interviews with the following:
  1. Jeff Fox (Crossroads Urban Center)
  2. Kelly Francone (Committee for Consumer Services)
  3. Artie Powell (Division of Public Utilities)
  4. Sherm Roquiero (Department of Community and Economic Development)
  5. Alyce Miller (Salt Lake Community Action Program)
  6. Paul Mecham (Light and Truth)
  7. Betsy Wolf (Salt Lake Community Action Program)
  8. Abdinasir Abdulle (Division of Public Utilities)
- Participant interviews (phone and in-person)
- Collecting census data

Impact Evaluation

The objective of this component was to measure the Program's impact on participants' arrears, shutoffs, disconnections, and energy burden. Our team collected the data shown in Table I.1.

Table I.1: Impact Evaluation Data

Participant Information	Basic information on participants, including address and dwelling type
Account(s) and Rate Classification	Each customer may have multiple accounts or changes in account numbers.
Billing/Meter Reading Records	Historical billing information, including bill read date, read type, and amount (kWh and $).
Payment Records	Every payment received and date received, including non-bill payments (e.g., Program credits). If the client received any form of energy assistance, the type and amount was included.
Collection Activity Logs	Log recording of each collection-related activity, including termination notices, actual shutoffs, write-offs, and other collection activities.
Payment Adjustments	Adjustments for NSF checks, rebilled accounts, and other adjustments, as well as codes for these adjustments.

Using the participant data collected above, Quantec merged all the information to create a complete participant database. The first step was to assess the quality and quantity of the data and to create a comparison group with which we would assess attribution.

In conducting assessments of conservation programs' impacts, evaluators have traditionally used "quasi-experimental design," where the behavior of the participants is compared to that of a similar group of non-participants (comparison group). The purpose is to estimate "what would have happened in the absence of the program." In low-income evaluations, however, rarely is an appropriate comparison group readily available; utilities almost never have access to income data on their customers. Lacking a true comparison group, evaluators are often constrained to 1) using data on participants, but from time periods prior to their actual program participation, 2) using customers waiting to receive the service, 3) using customers from known low-income geographic concentration, 4) using other low-income programs such as food stamp participants, or 5) other means.

For this evaluation, we elected to use option 1. The following steps were taken:

1) For clients that participated in Sept '01, we used Sept '00 to Sept '01 as the pre-Program period, and Sept '01 to Sept '02 as the post-Program period. We then computed the changes in the key indicators (e.g., amount recovered, amount in arrears, termination, write offs, etc.). These changes represented the *gross* Program impacts. It should be noted that two criteria needed to be satisfied in order for a customer to be included as a participant. For each possible entry point, a customer was included in the participant group if their historical data included invoice and/or payment data from the preceding 12 months (pre-Program period), and they received no HELP credits during that time frame. To be included in the participant group, that same individual must have had 12 months of invoice and/or payment data

following the entry point (post-Program period), during which time they would receive an $8/month HELP credit.

2) For these clients, we selected a matched group of customers (by pre-Program Period amount in arrears) that did not receive their HELP discount until Sept '02 or after. We examined the changes in the key indicators for this group using the same pre- and post-Program time periods used for the participants in (1) above. It should be noted that, once again, two criteria needed to be satisfied for a customer to be included in the group of non-participants. For each possible entry point, a customer was included as a non-participant if their historical data included invoice and/or payment data from the 12 months during the pre period and they received no HELP credits during that time. That same individual must have had 12 months of invoice and/or payment data during the post period, at which time they would receive no HELP credits

3) The difference between the changes in the key indicators in (1) and those observed in (2) produces the *net* Program impacts (i.e., establishes attribution).

Table I.2 provides further illustration of the process

Table I.2: Example of Treatment and Comparison Group Matching (Sept '01 Participants)

Group	Participation Date	Pre Period	Post Period
Participant	Sept '01	Sept '00 to Sept '01	Sept '01 to Sept '02
Comparison	Matched sample from participants after Sept '01		

4) We repeat the same process for October '01 participants as illustrated in Table I.3

Table I.3: Example of Treatment and Comparison Group Matching (October '01 Participants)

Group	Participation Date	Pre Period	Post Period
Participant	Oct '01	Oct '00 to Oct '01	Oct '01 to Oct '02
Comparison	Matched sample from participants after Oct '02		

5) This "rolling" time period selection process continues until we get to participants in Sept '02. For those, we resorted to participants in the program since Sept '03 onward.

Balance in Arrears was analyzed to examine the effects of the Program on payments made by participants. Any change in participants' payment behavior was then compared to the comparison group to establish the *net* effects.

An annualized value for the "average annual arrearage" was calculated for each sample obtained through the rolling time period selection process. To calculate the annualized average annual arrearage, the monthly arrears were summed within each of the two Program Periods (pre and post). Once the sum of monthly arrearages was calculated, it was divided by the number of days in that period and multiplied by 365. The number of days in the pre- and post-Program periods was determined by counting the number of days between invoice dates within that period. A weighted average of the annualized average annual arrearages was then calculated across all samples obtained through the "rolling" time period selection process. The weights were based on the sample sizes of each of the months in the analysis. The difference in accrual of arrears between the comparison group and the participants is the change in arrearage balance due to the Program.

Notices. To study the impacts of Program participation on the number of collection notices received by customers the same samples of participants and non-participants from the arrearage analyses were used. For both the participants and non-participants, the change in the average number of collection notices received from pre- to post-Program period was calculated.

Terminations and Moves. In order to evaluate the impacts of HELP on the annual number of disconnects and moves, it was first necessary to redefine the participant and non-participant samples since the previous definition required that the customer remain in the same residence for two consecutive years.

Once again the rolling time period selection process was used; however, new criteria for inclusion were adopted. Now a customer would be required to have a credit during the entry month of the post-Program period and in any of the subsequent 11 months, but there would no longer be a requirement for how many months that customer participated. This same individual would have to have, at a minimum, one month of invoice and/or payment data from the pre-Program period in order to be included in the sample of participants. Based on the availability of disconnection data dating from 2001 though 2004, only 12 rolling time periods were used (from January 2002 through December 2002).

Having generated acceptable samples of participants and non-participants to evaluate, the average number of disconnections and moves were calculated, on an annual level, in the pre and post periods. These values were then examined during the cost-effectiveness analyses.

Cost-Effectiveness Analysis

After collecting Program cost data and assessing attributable benefits, Quantec conducted a cost-effectiveness analysis for the Program overall. Costs include credits paid, administrative costs, and evaluation costs. Financial benefits include reduction in arrears, reduction in collection costs, and reduction in disconnection and moving costs. The entire analysis was conducted for the entire program period as a snap shot in time. No discounting over time was employed.

II. Poverty in Utah

According to data collected during the 2000 United States Census, the State of Utah ranked 39th with regard to the percentage of its citizens living in poverty. While Utah's relatively low level of poverty compared to the national level (11.9% versus 15.0%) might make some believe households in Utah are less in need of assistance, it is important to remember that the oppressive burden of poverty is not any lighter for those Utahan's struggling than it is for others in the country. In addition, Utah is one of only 12 states to exhibit an increase in the level of poverty since the 1990 Census.

Most importantly, it is critical to realize that this lower level of poverty still equates to approximately 75,000 households within Utah Power's service territory currently living at or below 125% of the Federal Poverty Guidelines (FPG).

Utah received $14 million in Low-Income Home Energy Assistance Program (LIHEAP) funding in 2004. This represents a decline of about 3.5% from the previous year. At the same time, the number of households receiving energy assistance (35,362 in 2004) increased by about 4%. Of those, only 2% received weatherization services. The following statistics also help describe Utah's low-income households:

- 65% of LIHEAP recipients in Utah made less than $8,500 annually (75% of the FPG)
- 60% are on a fixed income
- 40% have a disabled person
- 23% are elderly
- 22% have preschool children
- 49% received food stamps

The following tables and figures briefly describe the poverty status of Utahan's within the service territory, with particular attention to the electrical burden faced by lower-income households.

As evident in Figure II.1, a higher percentage of Utah children live in poverty than adults or seniors. The more detailed look at these children provided in Figure II.2 further demonstrates this pattern, as the highest percentage of these children are under the age of five.

Figure II.1: Proportion of People Living at or below 125% of FPG

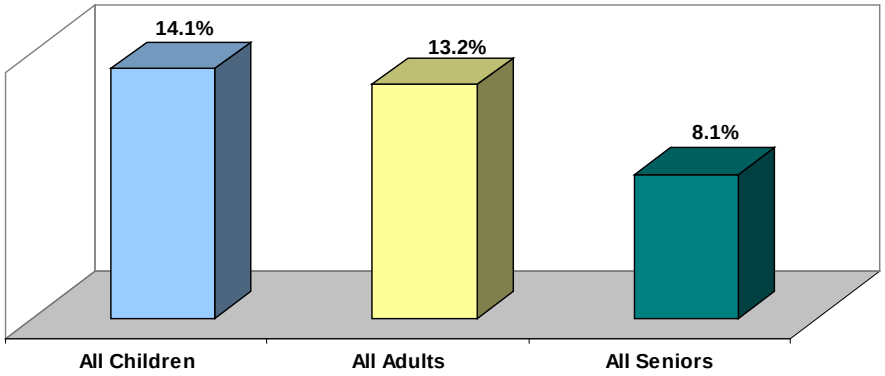
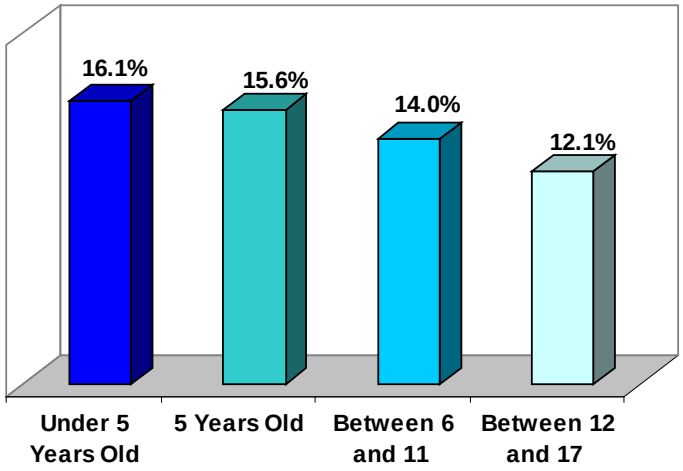


Figure II.2: Breakdown of Children Living at or below 125% of FPG



As evident in Table II.1, the overall level of poverty varies dramatically by county within Utah Power's service territory. The highest and lowest levels of overall poverty are in San Juan and Summit County, respectively.

Table II.1: Overall Poverty by County

County	At or below 125% FPG	County	At or below 125% FPG
San Juan County	37%	Sevier County	14%
Iron County	26%	Juab County	14%
Piute County	21%	Weber County	13%
Grand County	21%	Garfield County	11%
Sanpete County	21%	Beaver County	11%
Uintah County	19%	Salt Lake County	11%
Cache County	18%	Box Elder County	10%
Millard County	18%	Tooele County	9%
Carbon County	18%	Morgan County	8%
Utah County	17%	Davis County	7%
Washington County	16%	Wasatch County	7%
Emery County	15%	Summit County	7%
Rich County	15%	*Utah Power Service Territory*	*13%*

Electricity Burden

While basic poverty statistics, such as those provided above, offer insight into the size of the population needing assistance within a service territory, the monetary impact of a utility's assistance can be better understood by examining the financial situation of median- and low-income customers. In the case of Utah Power, a customer's *electricity burden* – the share of household resources needed to cover electric expenses – can be calculated by dividing a household's annual electric bill by their annual post-tax household income. This metric provides for a direct understanding of how the cost of electricity affects customers of varying income levels. The following illustrates the basic electricity burden formula and the following sections detail the inputs for the calculation.

$$\frac{ElectricCost}{Post-Tax\ Income}$$

Electric Costs. Based on the data we received from Utah Power, the average low-income customer spent approximately $613 annually on electricity.

Post-Tax Income. Post-tax income was computed as approximately 75% of the county's median household income for the average customer. When calculating the burden for Utah Power's low-income customers, the average electric expenditure was divided by the midpoint between the annual income of households solely receiving social security insurance and 125% of the FPG, which varies according to the county's average household size. The assumption was that the incomes of low-income customers are normally

distributed between these two points. Furthermore, at these income levels, little to no taxes are levied.

Table II.2 shows the electricity burden for each county in the service territory and for Utah Power overall. Low-income household electricity burden is more than two and a half times that of a median household for the entire Utah Power service territory.

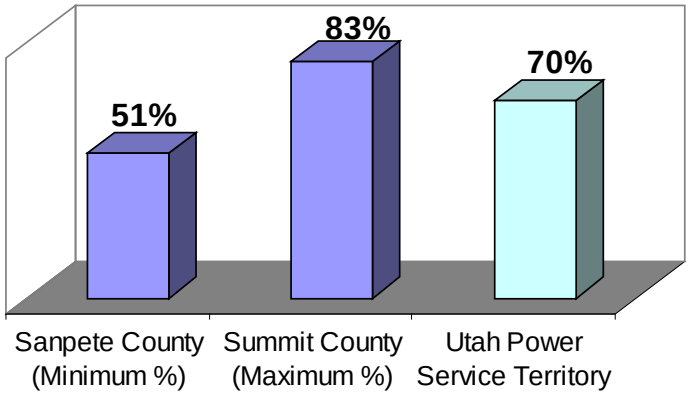
Table II.2: Electricity Burden

	Median Household	Low-Income Household	Difference
Summit County	1.3%	4.8%	381%
Davis County	1.5%	4.5%	295%
Salt Lake County	1.7%	4.7%	278%
Wasatch County	1.6%	4.6%	278%
Morgan County	1.6%	4.4%	269%
Tooele County	1.8%	4.6%	259%
Weber County	1.9%	4.7%	255%
Box Elder County	1.8%	4.5%	248%
Utah County	1.8%	4.3%	242%
Piute County	2.1%	4.9%	235%
Rich County	2.1%	4.7%	228%
Emery County	2.1%	4.6%	226%
Cache County	2.1%	4.5%	220%
Washington County	2.2%	4.7%	215%
Juab County	2.1%	4.5%	209%
Carbon County	2.4%	4.9%	206%
Sevier County	2.3%	4.7%	205%
Garfield County	2.3%	4.8%	205%
Grand County	2.5%	5.1%	204%
Millard County	2.3%	4.6%	202%
San Juan County	2.2%	4.4%	202%
Beaver County	2.4%	4.8%	201%
Uintah County	2.4%	4.7%	197%
Iron County	2.5%	4.6%	187%
Sanpete County	2.5%	4.5%	182%
Utah Power Service Territory	*1.8%*	*4.6%*	*261%*

In addition, we also calculated for each county the amount of bill assistance required by low-income customers to decrease their electricity burden to the same level as the average household. This may come from any source (i.e., bill discount, energy cash assistance, reduced consumption through weatherization, etc.). The percentage of the overall annual bill that the assistance would constitute was also calculated. Figure II.3 shows the observed outliers and the overall figure for Utah Power. The dollar value of annual electricity assistance presented in the figure for Sanpete County,

Summitt County, and the service territory overall are $277, $452 and $378, respectively. Also, ten of the 25 counties within Utah Power's service territory would require electricity assistance of at least $350 a year.

Figure II.3: Minimum, Maximum and Overall Assistance Required to Balance Electricity Burdens



III. Program Design & Delivery

Our assessment of Program design and delivery is based primarily on review of Program documents and interviews with various stakeholders. The following sections highlight our findings.

Goals of the Program

The primary goal of the Program is to decrease participants' electric energy burden. Decreasing arrears, shutoffs, and overall collection activities are also among the Program goals. Some interviewees mentioned health and safety benefits as being another set of Program goals. Overall, we found no consensus among the stakeholders as to the goals of the Program. Stakeholders need to understand the Program goal as it significantly impacts how the Program is evaluated, implemented, and funded.

The simplest approach for programs that are designed to reduce energy burden is to provide a straight discount or give cash assistance. If the goal is to make permanent changes in energy burden and payment behavior, the design is more complicated.

Our interviews also revealed a range of opinions regarding the cost effectiveness goal of the Program. It was not clear to us from discussions with stakeholders or review of documents whether cost effectiveness is a clear goal. Furthermore, it was not clear to us exactly whose perspective should be considered in assessing cost effectiveness.

If cost effectiveness to the utility and ratepayers is an important goal, then the Program will need to be revised to target those most likely to improve payment behavior. Targeting people with history of arrears, for example, is more likely to produce benefits to other ratepayers. At the same time, offering assistance to clients that pay their bills on time simply provides subsidy to them with no benefit to other ratepayers. Furthermore, providing straight assistance in the form of discount or cash assistance is less likely to produce change in behavior in the long run. Program design options that include arrearage forgiveness for improved payment patterns or matching of contribution to debt are more likely to produce cost-effective results.

If the goal is equity and serving those in need, then the Program needs to continue to be available to all who need it. Revisions are likely still needed to target those most in need and vary the assistance amount accordingly.

Amount and Nature of Credit

In order to achieve is goals, the Program offers participants a fixed $8/month ($96 annually) credit on their Utah Power bill. During Program planning, this amount was considered sufficient to reduce the electric burden by approximately 20%. Most interviewees, however, thought that the amount was rather arbitrary and the result of negotiations among the Low Income Task Force members.[1] The average annual Utah Power electric bill currently is approximately $600 annually. On average, the credit actually reduces the electric energy burden by nearly 17%.

The credit is offered as a straight $8/month discount against the bill. There are a variety of rate discount designs in place throughout the United States. Some discounts are in the form of a percent reduction or targeted rate discount allowing higher levels of savings for lower income groups. Many programs also combine the discount with other mechanisms to encourage improved payment behavior. The advantage the flat discount offers is the ease of delivery and clarity to the recipients.

The credit amount appears as a line item (discount for participants and a charge for other ratepayers) on the Utah Power bill. This offers an advantage of informing the participants that they are receiving the credit. When they move, it also serves as a reminder that they are no longer on it.

We interviewed one participant that thought she was receiving the credit. Upon examination of her bill, however, it turned that she had been (for over a year) actually paying into it. She confused the line item with a surcharge of $0.12 with the line item showing a discount. It turned out that a data entry error at SLCAP may have caused an unknown number of customers to be dropped off the Program.

Funding

Funding for the Program is provided through a surcharge on ratepayers' bills. Non-participating residential customers pay $0.12/month. Non-residential customer contributions are capped at $75 annually. The charge appears as a line item on customers' bills.

The collections are tracked in an account by the Company, who pays interest to the account equivalent to their cost of capital.

---

[1] The Task Force was formed by the Public Service Commission to study the proposed rate discount program. It was composed of members from the DPU, SLCAP, Industrial Customers, the League of Women Voters, Utah Power, and other interested parties.

The surcharge is the most contested component of the Program by various members of the Low-Income Task Force. The Commission-formed task force was unable to reach an agreement regarding the collection and source of the surcharge. Some felt that funds should be collected from all customer classes; some felt that it should be limited to residential customers, while others felt that no funds should be collected at all. The industrial customers felt that they did not need to subsidize the Program as they did not see benefits accruing to them. Light and Truth did not think the Commission had the authority to impose a "tax" against customers. Finally, the surcharge was collected from residential and nonresidential customers (with a cap). The appearance of the line item on the bill was also contested, as the low-income advocates felt that the subsidies across customer classes occur on regular basis and there is no need to highlight this particular one.

The Commission declared that it did indeed have the authority to levy the charge and further asserted that, as it was not a "third party," it was able to alter rates. The various parties have decided that they are unable to reach common grounds and that a compromise is not possible. From Light and Truth's perspective, there are only two solutions: eliminate the subsidy altogether or require funds be only collected through customers that volunteer to opt in, which, in essence, will terminate the Program.

Quantec was not charged with determining the constitutionality of the surcharge. We certainly do not have the experience or the skill to resolve this issue. We understand that the Commission may have decided that the issue does not need further discussion, as they feel that they have the authority to levy charges against customers' bills. Other stakeholders have indicated that, since the Commission has issued a ruling on this matter, the issue is resolved. Light and Truth does not agree and may seek further intervention.

Eligibility/Enrollment

Utah Power customers at 125% of the Federal Poverty Guideline (FPG) or less are eligible for the Program. Customers that receive HEAT assistance are automatically eligible to receive the HELP credit.

Once enrolled in the Program, customers continue to receive the credit as long as they reapply for HEAT annually and continue to live at the same location. If, for some reason, they do not reapply for HEAT, they receive recertification notice from SLCAP. If they move, they are dropped from the Program. But they can reapply at the new address.

Quality Control

Currently there are minimal quality control procedures in place by the agencies and DCED, the implementation agencies. We did not conduct a full-

scale investigation of the issue and any impacts it may have had. However, in conducting our data collection and data analysis, we encountered few inconsistencies that brought up the issue.

During an interview with a participant, we realized she actually was not. She was confused by the line item titled “Home Electric Lifeline Program” on her monthly bill. She assumed that meant she was receiving the credit when, in fact, she was paying into it. A data entry error by SLCAP may have caused a few clients to be dropped off the Program accidentally. Our concern is the lack of checks to ensure through random sampling the correct processing of clients.

We requested that SLCAP pull 35 participant records randomly and check their status. Of the 35, ten had moved or were disconnected; one was not on the Program.

In conducting data analysis for estimating Program impacts on arrears, we found nearly 15% of the HELP recipients did not receive HEAT dollars. Initially, this was surprising given our understanding that that the majority of the Program participants were recruited through the HEAT program. However, it was subsequently brought to our attention that this is likely due to the fact that electric bills tend to be lower than gas bills, hence the HELP Credit, alone, was sufficient for some customers to pay their electric bills.

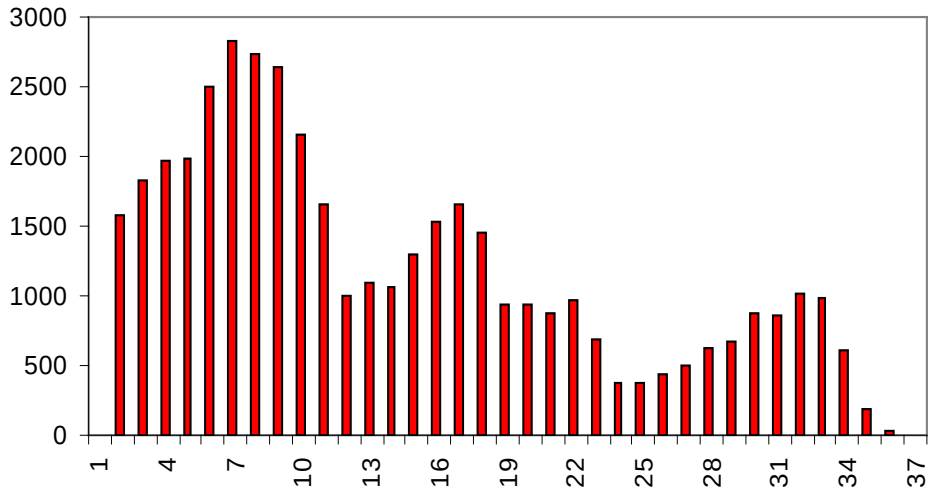
We then examined the non-participants and found that nearly 13% had received HEAT dollars, but were not recruited into HELP. One possible explanation was that seasonal workers and other temporarily unemployed customers found the HEAT Credit to be sufficient for paying their electric bills.

At the very least, SLCAP needs to cross check HEAT recipients against their records of HELP clients.

IV. Impact Findings

The Program's enrollment goal was approximately 19,000 clients. Quantec's review of utility data showed that participation rates ranged from a low of 10,692 (September '04) to a high of 22,183 (May '04). Figure IV.1 shows the number of participants (vertical axis) since Program inception by number months a household continues on the program (horizontal axis). The average length a participant was on the Program during the evaluation period was 13 months.

Figure IV.1: Number of Participants by Months Enrolled



In addition to the rate discount, the participants received energy assistance through HEAT. The average assistance amount was $142.40.

Impact Assessment

Energy Consumption Impact. Participant and comparison group bills increased by an average of 6% and 8%, respectively. This difference was not statistically significant. Most of the change in billed amounts in both groups was due to increases in rates rather than in consumption (estimated at 2% for

both groups). In other words, we found no evidence that the discount has caused participants to consume more energy.[2]

Improved payment patterns. This analysis was conducted to examine the effects of the Program on payments made by participants. Any change in participants' payment behavior was then compared to the change in non-participants' to establish the *net* effects.

In the year prior to receiving the reduced rate, participants had an arrearage level of $78.65 on average. During the post period, the participants' accumulation of debt was $45.06 on average. This represents a $33.59 decrease in arrears.[3] The comparison group accumulated $80.94 during the pre period,[4] while increasing their accumulation to $147.17 in the post (for a $66.23 average increase in arrears). The evaluation question is: "what would have happened in the absence of the Program?" The behavior of the comparison group is supposed to resemble the participants' in the absence of the Program; therefore, we estimated net Program impacts to be the difference between the two groups – $99.82. Tables IV.2 and IV.3 show the calculation of arrears and changes in arrears for the participant and comparison groups on a monthly basis.

Table IV.1: Arrears Impact

	Participants	Comparison
Pre Invoice	$504.82	$585.24
Pre Payment	$426.17	$504.30
Pre Arrears	$78.65	$80.94
Post Invoice	$440.58	$631.28
Post Payment	$474.17	$565.05
Post Arrears	$45.06	$147.17
Change in Arrears	$33.59	$(66.23)
Net Impact	$99.82	

---

2 One of the key tenets of economics is the Law of Demand which states that, all other things being equal, an increase in price will lead to a decrease in demand and *vice versa*. Given a wealth of economic analysis that puts the short-run price elasticity of demand for electricity at 0.1 to 0.3 (see for example Houthakker and Taylor (1970), who report a short-run estimate of 0.13) and an average rate decline for participants of nearly 17%, one would expect that the increase in demand would have been larger (2% to 5%).

3 We set arrears at zero at the beginning of the pre period. During the pre period, arrears were computed as simply *amount invoiced – amount paid*. In the post period, arrears were computed as a*mount invoiced + arrears from the pre period – amount paid* to account for the fact that some of the payment in the post period was applied to arrears from the pre period. Why not include arrears still owing from time prior to pre-period?

4 The two groups have the same level of arrears in the pre period by design. We selected the comparison group to match the participants by level of arrears.

Table IV.2: Participant Arrearage by Month Results

Participants

Date	N	Pre Due	Pre Pay	Pre Arrears	Post Due	Post Pay	Post Arrears	Delta Due	Delta Pay	Delta Arrears
9/1/2000	18	759.84	402.32	357.52	677.78	816.26	219.03	82.06	(413.95)	138.49
10/1/2000	511	527.81	245.47	282.34	503.21	580.84	204.71	24.60	(335.38)	77.64
11/1/2000	964	408.19	258.99	149.20	356.86	426.74	79.32	51.34	(167.75)	69.88
12/1/2000	2,019	428.46	332.02	96.45	372.48	425.00	43.93	55.98	(92.98)	52.52
1/1/2001	2,788	447.34	386.62	60.71	387.90	413.77	34.85	59.43	(27.15)	25.87
2/1/2001	1,753	487.21	421.76	65.45	428.19	463.06	30.58	59.02	(41.29)	34.87
3/1/2001	1,321	496.07	428.11	67.96	437.48	479.36	26.08	58.59	(51.25)	41.88
4/1/2001	506	516.13	452.53	63.61	450.71	488.57	25.74	65.42	(36.05)	37.86
5/1/2001	88	524.00	446.43	77.57	464.10	497.83	43.84	59.90	(51.40)	33.73
6/1/2001	4	724.08	685.81	38.27	665.19	667.62	35.84	58.89	18.19	2.43
7/1/2001	7	711.99	632.93	79.07	512.07	536.51	54.63	199.92	96.42	24.44
8/1/2001	17	694.46	598.08	96.38	634.92	720.58	10.71	59.54	(122.50)	85.67
9/1/2001	20	538.50	412.87	125.63	467.14	494.08	98.69	71.36	(81.21)	26.94
10/1/2001	107	588.89	462.98	125.91	535.54	574.79	86.66	53.35	(111.81)	39.25
11/1/2001	536	522.39	444.99	77.41	461.92	494.15	45.18	60.47	(49.17)	32.23
12/1/2001	1,029	519.75	458.18	61.57	446.45	473.24	34.79	73.30	(15.05)	26.79
1/1/2002	1,101	527.10	471.96	55.14	450.78	473.06	32.87	76.32	(1.10)	22.27
2/1/2002	761	557.59	479.84	77.75	463.35	506.98	34.12	94.24	(27.15)	43.64
3/1/2002	599	620.40	550.21	70.20	536.55	577.13	29.61	83.86	(26.92)	40.58
4/1/2002	34	584.93	525.42	59.52	450.37	483.52	26.37	134.56	41.90	33.15
5/1/2002	262	605.06	553.29	51.76	652.26	604.02	100.00	(47.20)	(50.73)	(48.24)
6/1/2002	3	415.83	387.72	28.11	403.31	349.07	82.35	12.52	38.66	(54.25)
7/1/2002	5	455.99	402.47	53.52	379.81	385.12	48.22	76.18	17.35	5.31
8/1/2002	6	589.34	448.21	141.12	498.97	565.70	74.39	90.37	(117.49)	66.73
9/1/2002	12	564.34	437.90	126.44	571.50	631.79	66.16	(7.16)	(193.89)	60.29
10/1/2002	71	651.18	518.47	132.71	611.99	640.35	104.36	39.19	(121.88)	28.36
11/1/2002	461	568.21	496.42	71.79	488.69	512.79	47.69	79.52	(16.37)	24.10
12/1/2002	629	561.67	503.16	58.51	484.51	499.41	43.62	77.16	3.76	14.89
1/1/2003	620	586.68	537.41	49.27	496.24	513.42	32.09	90.44	23.99	17.18
2/1/2003	538	569.97	520.63	49.34	483.42	490.30	42.46	86.55	30.34	6.88
3/1/2003	374	555.89	501.90	53.99	477.13	491.95	39.17	78.76	9.96	14.81
4/1/2003	136	581.14	531.12	50.01	488.79	495.31	43.49	92.35	35.82	6.52
5/1/2003	212	597.27	550.53	46.73	540.08	531.11	55.70	57.19	19.42	(8.97)
6/1/2003	5	599.39	543.01	56.38	560.32	528.40	88.30	39.07	14.61	(31.92)
7/1/2003	5	683.62	543.95	139.67	615.27	686.68	68.27	68.35	(142.73)	71.41
8/1/2003	8	621.20	513.42	107.79	546.59	556.02	98.36	74.61	(42.60)	9.43
9/1/2003	10	529.67	340.79	188.88	646.30	622.78	212.40	(116.63)	(281.99)	(23.52)
10/1/2003	51	600.72	511.35	89.38	508.11	560.95	36.54	92.61	(49.60)	52.83
11/1/2003	193	529.78	468.78	61.00	450.22	473.83	37.39	79.56	(5.05)	23.61
12/1/2003	2	587.18	553.21	33.97	730.44	640.81	123.61	(143.27)	(87.60)	(89.64)
	17,786	504.82	426.17	78.65	440.58	474.17	45.06	64.25	(48.00)	33.59

Table IV.3: Non-Participant Arrearage by Month Results

Comparison

Date	N	Pre Due	Pre Pay No Ag	Pre Arrears	Post Due	Post Pay	Post Arrears	Delta Due	Delta Pay	Delta Arrears
9/1/2000	18	811.66	451.57	360.09	810.36	558.17	612.29	1.30	(393.46)	(252.20)
10/1/2000	511	772.94	489.80	283.14	844.21	623.67	503.68	(71.27)	(402.42)	(220.54)
11/1/2000	964	582.97	433.06	149.91	644.80	529.08	265.62	(61.83)	(231.67)	(115.71)
12/1/2000	2,019	557.30	458.69	98.61	613.60	544.83	167.39	(56.30)	(165.80)	(68.78)
1/1/2001	2,788	538.60	475.01	63.60	596.73	538.57	121.75	(58.12)	(119.34)	(58.15)
2/1/2001	1,753	556.51	487.54	68.97	616.32	556.70	128.60	(59.81)	(130.49)	(59.63)
3/1/2001	1,321	569.79	499.63	70.16	619.70	567.46	122.40	(49.91)	(124.33)	(52.24)
4/1/2001	506	524.12	455.58	68.54	568.12	507.52	129.14	(44.00)	(101.59)	(60.60)
5/1/2001	88	518.09	437.41	80.68	544.63	482.65	142.67	(26.54)	(103.69)	(61.98)
6/1/2001	4	589.71	552.27	37.44	610.08	621.76	25.75	(20.38)	(86.38)	11.68
7/1/2001	7	784.96	704.31	80.65	825.34	774.94	131.05	(40.38)	(73.59)	(50.40)
8/1/2001	17	643.09	546.89	96.20	676.34	585.87	186.66	(33.25)	(141.61)	(90.46)
9/1/2001	20	660.52	533.96	126.55	809.08	649.69	285.94	(148.56)	(319.70)	(159.39)
10/1/2001	107	624.34	494.15	130.19	646.83	569.78	207.23	(22.49)	(177.67)	(77.05)
11/1/2001	536	604.74	524.73	80.02	648.42	580.34	148.10	(43.68)	(125.36)	(68.09)
12/1/2001	1,029	602.59	539.33	63.26	647.82	589.26	121.83	(45.23)	(99.98)	(58.57)
1/1/2002	1,101	599.76	543.29	56.47	646.05	592.85	109.67	(46.29)	(96.56)	(53.20)
2/1/2002	761	596.11	516.95	79.16	622.09	569.16	132.10	(25.98)	(108.38)	(52.93)
3/1/2002	599	614.83	543.22	71.61	638.20	587.14	122.68	(23.38)	(91.15)	(51.07)
4/1/2002	34	525.55	465.25	60.30	556.44	498.86	117.87	(30.89)	(70.08)	(57.57)
5/1/2002	262	581.63	529.06	52.58	611.28	562.35	101.51	(29.65)	(63.19)	(48.94)
6/1/2002	3	482.67	455.71	26.96	574.69	518.03	83.62	(92.03)	(102.23)	(56.66)
7/1/2002	5	742.59	687.90	54.69	775.77	710.64	119.82	(33.18)	(85.69)	(65.13)
8/1/2002	6	550.68	410.79	139.89	525.25	486.57	178.57	25.43	(128.43)	(38.68)
9/1/2002	12	758.34	632.75	125.60	794.86	732.98	187.48	(36.52)	(205.76)	(61.88)
10/1/2002	71	719.32	587.33	131.99	775.18	692.03	215.14	(55.85)	(233.67)	(83.15)
11/1/2002	461	630.08	554.46	75.62	645.45	590.07	131.00	(15.37)	(86.12)	(55.38)
12/1/2002	629	604.71	543.67	61.04	623.05	567.32	116.77	(18.34)	(52.59)	(55.73)
1/1/2003	620	617.25	566.83	50.42	642.97	593.34	100.05	(25.71)	(49.82)	(49.63)
2/1/2003	538	608.33	557.15	51.19	634.58	579.13	106.64	(26.25)	(39.81)	(55.45)
3/1/2003	374	618.48	562.16	56.32	656.02	580.52	131.83	(37.54)	(35.25)	(75.51)
4/1/2003	136	644.40	586.52	57.88	679.06	585.96	150.99	(34.66)	(15.44)	(93.11)
5/1/2003	212	618.98	568.23	50.75	642.82	599.73	93.84	(23.84)	(60.78)	(43.10)
6/1/2003	5	739.98	684.13	55.84	775.31	721.55	109.60	(35.34)	(94.01)	(53.76)
7/1/2003	5	607.40	469.41	137.99	635.95	557.75	216.18	(28.56)	(166.03)	(78.20)
8/1/2003	8	697.73	590.04	107.69	797.30	702.16	202.82	(99.56)	(267.42)	(95.13)
9/1/2003	10	940.24	753.22	187.02	906.14	892.39	200.78	34.10	(293.98)	(13.76)
10/1/2003	51	631.22	538.13	93.09	665.01	628.25	129.85	(33.79)	(197.11)	(36.76)
11/1/2003	193	631.55	570.21	61.34	642.22	630.39	73.17	(10.66)	(105.49)	(11.83)
12/1/2003	2	364.56	331.42	33.14	432.07	430.85	34.36	(67.51)	(133.78)	(1.22)
	17,786	585.24	504.30	80.94	631.28	565.05	147.17	(46.03)	(125.32)	(66.23)

We further analyzed the impacts of the Program using the following regression model:[5]

Post Arrears = f (Pre Arrears, Change in HELP Credit Amount, Change in HEAT Energy Assistance, Participation Dummy interacted with Change in HEAT Energy Assistance)

In this model, we assume that the amount in arrears in the post period is a function of (i.e., determined by) amount in arrears in the pre period, amount of credit received through HELP, energy assistance received through HEAT, and an interaction between participation (binary variable set to 1 for participants and 0 for the comparison group) and level of energy assistance. The purpose of this model is to isolate the impact of HEAT from HELP.

5 SeeTechnical Appendix for more details of the Regression Model

The results are displayed in Table IV.4.

Table IV.4: Regression Model Results

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	571,557,907	142,889,477	11,279	<.0001
Error	35,567	450,586,773	12,669		
Corrected Total	35,571	1,022,144,681			

Root MSE	113	R-Square	0.5592
Dependent Mean	96	Adj R-Sq	0.5591
Coeff Var	117		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	54.68	0.97	56.2	<.0001
PreArrears	1	1.11	0.01	193.78	<.0001
Delta-HELP	1	0.80	0.01	55.05	<.0001
Delta-HEAT	1	(0.20)	0.01	-19.43	<.0001
Interaction(Delta-HEAT*Participation)	1	0.37	0.01	31.51	<.0001

Using this regression model to estimate the post-Program arrears produces results almost identical to the simple averages estimated above (i.e., post arrears of $46 and $146 for the participant and comparison groups, respectively). The net Program impact is then estimated at approximately $100 (versus $99.82 using the simple averages in Table IV.1 above).

Again, using this model, if the amount of HEAT assistance is set to 0 (i.e., had the participants not received HEAT assistance), the net impact of HELP is estimated at approximately $78. When the HELP credit is set to 0, the net impact of HEAT is estimated at approximately $22. In other words, of the $100 combined impact of HEAT/HELP, HELP is responsible for 78% of the observed impact.

Decreased shutoffs. We compared the decreased shutoffs between the two groups and found no statistically significant differences. Both groups had a slight decrease in shutoffs (0.3%).

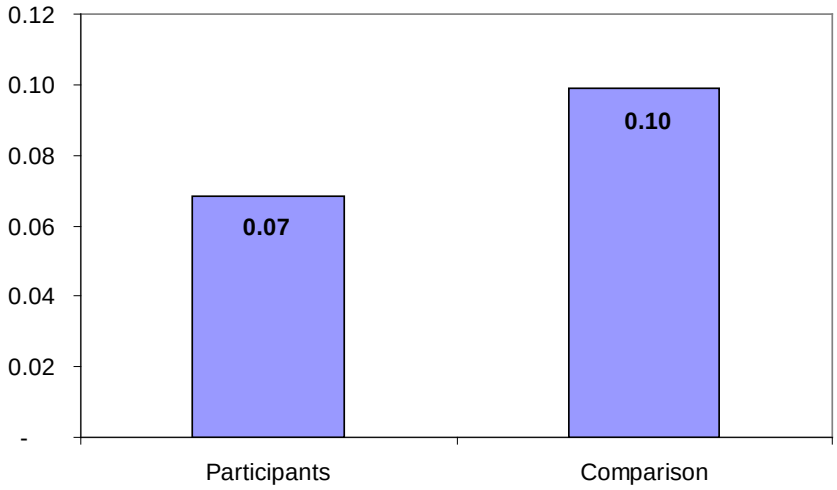
Decreased Mobility. The United States is a mobile society. Residential mobility is often thought to be both voluntary and opportunity-related. That is, people choose to move in order to start a new job, live in a better neighborhood, attend a better school system, or in some other way improve their quality of life.

Some groups are far more likely to make residential changes than others, including renters and people living below the poverty line. During 2002 to

2003, the mobility of people in poverty was estimated at 24% while people above poverty had a mobility rate of 13%.

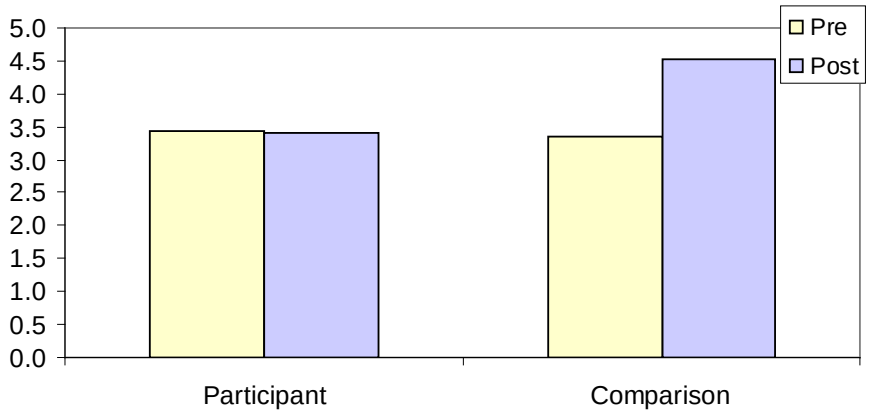
We examined the number of times Utah HELP participants' and nonparticipants' households moved and compared the frequencies between the two groups. Both groups witnessed an increase in mobility. However, the participants' rate of increase was significantly lower than the comparison group. The net difference was a reduction of 0.03 moves per participant.

Figure IV.2: Change in Mobility



Decreased Collections. Participants experienced a slight decrease in collection activities (0.03 fewer notices per participant). At the same time, the comparison group witnessed an increase of 1.16 notices on average per customer. Therefore, we conclude that, had the Program not existed, the participants' collections would have been 1.19 notices per participant higher than observed.

Figure IV.3: Changes in Collection Activities



Cost-Effectiveness Analysis

Reduction in Arrears

Unpaid balances are usually written off and added to the utility's expenses. If paid on time, these balances represent a benefit to the utility and its ratepayers. As mentioned above, we estimated the reduction in arrears for the combined HEAT/HELP programs at approximately $100, of which $78 is directly attributable to the HELP Program.

This per-participant estimate was extrapolated to the Program's participant population. This was more complicated than simple multiplication. Our estimate of arrearage reduction was based on people who had been on the Program for 12 months, not on a random sample of participants. We estimated the "effective" number of participants by counting the number of "months of participation" then dividing by 12. This in essence counts a participant who receives discounts for 24 months as two "effective" participants. Similarly, someone who receives discounts for only six months is considered a 0.5 effective participant.

Reduction in Collections Costs

Utilities often incur significant costs attempting to collect debt from customers. These collection activities include phone calls, letters, customer visits, and collections agencies' costs.

Based on a billing analysis of participants with adequate billing data, changes in several collection procedures were analyzed. In total, there was a decrease of 1.19 collection activities per participant. We assigned a national average cost per collection of $0.75.

Reduced Mobility. When energy costs are high, household funds are diverted from other uses, including food, medical care, and rent. In some cases, high energy bills may force occupants to move either to lower energy costs or to avoid paying an energy bill. In other cases, they may be evicted for inability to pay their rent or for having services disconnected. Not only are frequent moves expensive and inconvenient, they have other extremely serious effects, including increased school dropout and inability to hold a job. Energy assistance programs lower the energy vulnerability of the participating low-income families and their forced mobility.[6] Mobility can be especially hard for the elderly and families with children. The value of reduced mobility can be as high as $1,460 per household.[7] In another national study, the cost of moving for low-income families was found to be between 10% and 20% of annual income.[8] These costs include moving expenses, rental deposits, bank fees, telephone connections, etc.[9]

As shown above, we estimated that the Program caused a reduction of about 0.03 moves per participant on average.

According to Utah Power's Web site (Docket 03-2035-02), the cost of residential reconnection is $30. This figure is used as a proxy for the cost saving to the Company of reduced mobility. Often when a customer moves, the utility has to read the meter prior to assigning a new account.

Other Benefits

Other benefits of low-income energy assistance programs include reduced levels of economic stress on the participating customers, reduced homelessness, and increased health and comfort.

Reduced Homelessness. Clearly a strong link exists between the inability to pay bills and homelessness. In a study of homelessness in Philadelphia, 7.9% of persons living in emergency shelters indicated that utility termination was

---

6 Khawaja (2001). In Indiana, as a result of participating in the REACH program, the participants received energy education that lowered their energy consumption by 12.5%, reduced their mobility by 52%, and reduced school absences by 18%.

7 Oak Ridge (2002).

8 Howat and Oppenhiem (1999).

9 The Oakridge study found a range of estimates from $0 to $1,460. We opted for the high end for the societal test because we believe that even the $1,460 is conservative if one could account for the impact of school changes on children and their future earning potential. If we had used the mid range of the Oakridge study (i.e., approximately $700, then the B/C for HELP would have been 1.03). Had we used the average of the point estimates (i.e., $278), the B/C ratio for HELP would have been 0.90. No specifics were provided on what the extreme point estimates included. We judged that the $278 could not possibly include all the monetary cost of the move (e.g., deposit, truck rental, time off work, etc). In our opinion, the $1,460 estimate came closer to the actual cost of the move.

the reason for their homelessness. Respondents to a homelessness study in Northern Kentucky indicated that utility shutoff was among the primary causes of homelessness.[10] No further information was available on attempts to quantify this impact.

Improved Health. Avoidance of shutoff clearly has some serious health implications. High energy burden can force low-income customers into making difficult decisions regarding their very limited funds. No information is available on the monetary impact of this undoubtedly important benefit.

Decreased Stress. Life for low-income families can be overwhelming. On a day-to-day basis, critical needs compete over finite resources, and tradeoffs have to be made. Programs like this one are invaluable to people in need.

During our interviews with participants, we heard frequently that, while $8 may not be a significant amount to most people, to them it meant an additional meal, a prescription they could not afford, or meeting other critical needs.

Program Costs

The major cost component is the credit given to Program participants. For the period covered by the evaluation (Sept '00 to Sept '03), the total amount of credit given was $4,790,592. Other cost categories included the agencies' and Company administration of $37,000.

Results

Cost effectiveness analysis is customarily summarized using benefit-cost (B/C) ratios. A B/C ratio of 1.0 is the "breakeven point" where benefits are just equal to the investment. Values above 1 indicate a profitable investment (the larger the values the more profitable the investment). As stated earlier, the Cost-Effectiveness Analyses were conducted at a snap-shot in time (program period of three years). No discounting was utilized in computing the net values or the B/C ratios.

Cost effectiveness tests for traditional demand-side management programs are fairly well defined (California Standard Manual). These tests apply properly to programs that are aimed at reducing energy consumption. They are not intended for programs that offer assistance to low-income customers through straight cash donations or rate discounts. To our knowledge, no such tests exist. The Program is certainly cost effective from the participants' perspective as they get all the benefits and none of the costs. The Company perspective is also straightforward. Ratepayers incur all Program costs, and

[10] Howat and Oppendhiem (1999).

the Company gets the benefits associated with reduction in arrears and collections and their associated costs. Therefore, we present the cost effectiveness results only from the ratepayers' and societal/Total Resource Cost perspectives in Table IV.5. The main difference in the table between the two perspectives is the computation of the benefit of reduced mobility. For the ratepayers test we apply the $30 benefit to the Company of one reduced move; for the societal test, we use the $1,460 per move figure mentioned above.

We present the analysis for the combined HELP/HEAT as well as HELP only. The benefits included under the Societal/TRC perspective are only a fraction of those likely to have resulted from the Program. For example, health and safety, reduced stress, increased ability to afford other necessities, and potentially some economic benefits resulting from the increased spending are not included. Very little data are available to support quantification of these benefits. In conducting our surveys with Program participants, we repeatedly heard that, while $8 may not be a lot of money to many people, to them it meant a meal, a prescription, or diapers.

The combined HEAT/HELP passes the ratepayers as well as the societal (Total Resource Cost) tests with B/C ratios of 1.05 and 1.49, respectively. HELP passes the Societal/TRC test (B/C ratio of 1.27), but not the ratepayers test (B/C ratio of 0.82 and net value of -$860,934). This test is applied to investigate the Program goal of providing a bill discount *without being burdensome to non-recipient customers*. The strictest interpretation of this statement is that the Program has to provide a benefit in decreased utility cost that is equal to the cost in surcharge. As such, the Program does not pass the test.

This outcome is primarily due to the modest decline in arrears relative to the amount of the credit. The net value of HELP only is -$860,934 over the evaluation period of three years (i.e., this represents the total net cost to ratepayers over the three year period). This translates to approximately $287,000 annually or about 1.86 cents per ratepayer monthly (non-recipient burden).

Table IV.5: Program Cost Effectiveness

	Ratepayers		Societal/TRC	
	HELP Only	HEAT & HELP	HELP Only	HEAT & HELP
Benefits				
Reduction in Arrears	$3,877,884	$4,987,986	$3,877,884	$4,987,986
Reduction in Notices	$44,538	$44,538	$44,538	$44,538
Reduction in Mobility	$44,912	$44,912	$2,185,708	$2,185,708
Total Benefits	$3,967,334	$5,077,435	$6,108,130	$7,218,231
Costs				
Administration	$37,676	$37,676	$37,676	$37,676
Surcharge	$4,790,592	$4,790,592	$4,790,592	$4,790,592
Total Costs	$4,828,268	$4,828,268	$4,828,268	$4,828,268
B/C Ratios	0.82	1.05	1.27	1.49
Net Value	$(860,934)	$249,167	$1,279,862	$2,389,963

Appendix A. References

Colton, R. (1994) "Identifying Savings Arising from Low-Income Programs."

Howat, J. & Oppenheim, J. (1999). Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs. http:www.consumerlaw.or/Energy/Energy&Utility/non_energy_benefits.htm

Houthakker, H. and L. Taylor (1970) *Consumer Demand in the United States: Analysis and Projections*. Cambridge, MA: Harvard University Press.

Khawaja, M. (2001). Indiana REACH Evaluation. Quantec, LLC.

Monte de Ramos, K. (2002). Lessons Learned from Columbia Gas of Ohio's WarmChoice Program. KMDR Research.

Oak Ridge National Laboratory. (2002). Nonenergy Benefits from The Weatherization Assistance Program: A Summary of Findings from the Recent literature. Skumatz, L. and C. Dickerson (1998) "Extra! Extra! Non-Energy Benefits Swamp Load Impacts for PG&E Program!" 1998 Summer Study on Energy Efficiency in Buildings Proceeding, p. 8.307 (American Council for and Energy Efficient Economy).

Appendix B. Technical Appendix

Arrears Regression Model: The general formula for the regression model is defined below:

$$\text{Post Period Arrears} = \alpha + \beta_1 * \text{Pre Period Arrears} + \beta_2 * \Delta HELP + \beta_3 * \Delta HEAT + \beta_4 * \Delta HEAT * \text{Participation}$$

The independent variables are defined as follows:

$\Delta HELP$ = Pre Period HELP Credit – Post Period HELP Credit

$\Delta HEAT$ = Pre Period HEAT Credit – Post Period HEAT Credit

$\Delta HEAT * \text{Participation}$ = 1 * $\Delta HEAT$ for Participants

= 0 * $\Delta HEAT$ for Non Participants

The output from the actual regression model is listed below:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	571,557,907	142,889,477	11,279	<.0001
Error	35,567	450,586,773	12,669		
Corrected Total	35,571	1,022,144,681			

Root MSE	113	R-Square	0.5592
Dependent Mean	96	Adj R-Sq	0.5591
Coeff Var	117		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	54.68	0.97	56.2	<.0001
PreArrears	1	1.11	0.01	193.78	<.0001
Delta-HELP	1	0.80	0.01	55.05	<.0001
Delta-HEAT	1	(0.20)	0.01	-19.43	<.0001
Interaction(Delta-HEAT*Participation)	1	0.37	0.01	31.51	<.0001

This regression model allows for the isolation of the impact due to the HELP funds, alone, by effectively partitioning the two samples (participants and non participants) into four distinct groups:

1) Participants who received HELP and HEAT assistance

2) Participants who received HELP only

3) Nonparticipants who received HEAT

4) Nonparticipants who received neither HEAT nor HELP

When substituting the mean values of all of the independent variables into the equation as appropriate for the four groups, the Post Period Arrears for participants is estimated at $46. Similarly, the Post Period Arrears for the Non Participants is estimated at $146. The difference in these two values ($100) yields the net impact in arrears due to both HELP and HEAT.

When substituting the mean values of the other independent variables into the equation, and 0's for the **ΔHEAT** and the **Interaction** term, the Post Period Arrears for participants is approximately $66, whereas the Post Period Arrears for the Non Participants is approximately $144, yielding a net impact in arrears of approximately $78 due to HELP alone.

Participants	
Variable	**Mean**
Delta-HELP	-93.647
Delta-HEAT	-121.49
PreArrears	78.6515
PostArrears	45.0598
Interaction (Delta-Heat Participation)	-121.49

Non Participants	
Variable	**Mean**
Delta-HELP	0
Delta-HEAT	-8.7031
PreArrears	80.9382
PostArrears	147.169
Interaction (Delta-Heat Participation)	0

Statistical Test of Differences between Proportions for Shut-Offs:

The Null hypothesis (**$H_0: \pi_1 - \pi_2 = 0$**) was not rejected with a t value of 0.07 concluding that there was no statistically significant difference between the Percentage of Shut-Offs for Participants and Non Participants.

Statistical Test of Differences Between Number of Moves:

The Null Hypothesis (**$H_0: \mu_1 - \mu_2 = 0$**) was rejected with a t of –17.53.