# EVALUATION OF SHAWNEE COUNTY LOW/FIXED INCOME CONSULTATION PROGRAM

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## ABSTRACT

The Kansas Corporation Commission during Fiscal Years 84 and 85 contracted with community action agencies to present energy conservation consultations in the homes of low/fixed income families. This paper presents the results of an evaluation conducted for FY 1984 to measure program impacts. The FY 84 evaluation lacked sufficient data to be statistically reliable. In FY 85 an attempt was made to develop a statistically sound evaluation, however the results are not available at press time. The results generated by the FY 85 study will be the focus of the presentation at the Chicago conference for program evaluators.

It is encouraging that preliminary indications from the FY 85 report show a program impact comparable to the FY 84 study. The change in natural gas consumption among households selected for evaluation in the FY 85 study was a consumption reduction of 10.9 percent from the two most recent heating seasons. In the FY 84 report a consumption reduction of 10.5 percent was reported. Additionally, a control of non-program-participants was identified for the FY 85 study and this group's consumption increased by 0.8 percent.

## SECTION I--INTRODUCTION

In Fiscal Year 1984, the Kansas Corporation Commission (KCC) contracted with Shawnee County Community Assistance and Action, Inc. (SCCAA) to provide consultations identifying no-cost/low-cost energy conservation measures in low/fixed income households. The program had two purposes:

1) reduce energy consumption, thereby lowering a household's energy expenses;

2) educate the target group in ways to use energy more efficiently.

SCCAA is well suited for directing these education efforts. Along with contracting Shawnee County's weatherization program, SCCAA administers a wide variety of energy and other assistance programs for low income families.

This paper presents the results of an analysis conducted at the end of FY 84 to estimate the impact of the consultations on the target group. A preliminary attempt is made in this paper to assign natural gas consumption reductions to the program as well as project the financial savings accruing to program participants.

This introduction is followed by a description of the program and the accomplishments of FY 84. The evaluation project is described in Section III. The results of the study follows, including a review of natural gas consumption, energy conservation measures implemented, and dollar saving estimates. Recommendations for future program direction conclude the paper.

## SECTION II--PROGRAM DESCRIPTION

The low/fixed income consultation program involves three steps that occur after families have requested energy assistance from SCCAA. To receive aid or be eligible for weatherization or both, all applicants attend an energy education workshop which presents no-cost/low-cost options that can reduce energy consumption. The workshops offer an explanation of how and why the measures work and presents guidelines for installation.

After attending the workshop, an in-house consultation is scheduled. This first visit lasts up to 1 1/2 hours with a paid representative of SCCAA conducting an energy audit of the home and discussing no-cost/low-cost measures relevant to the specific structure. The consultation includes hands-on demonstrations of the energy reduction techniques mentioned in the workshop. Also, a limited amount of energy conservation supplies are either installed or left in the house (materials are purchased with other SCCAA funds).

A second visit occurs a week later. This visit is used to assess the implementation of recommended measures, answer additional questions, and provide more material if needed. Emphasis during this visit is placed on the financial benefits resulting from efficient energy use.

### Program Accomplishments

The low/fixed income consultation program in Shawnee County was developed in FY 84 as a pilot project. Initial reactions to the program was positive and plans were made to expand the program in FY 85. The KCC initiated consultation projects in one other primarily urban county (Sedgwick) and created a pilot program in a rural region to test the program's adaptability in less populated areas.

The project in FY 84 operated for six months and a total of 607 low/fixed income households received the two consultations following the SCCAA workshop.

Project cost for the six-month contract was $24,531. Cost per recipient household was just over $40.

## SECTION III--EVALUATION PROJECT

An evaluation of the SCCAA program was conducted as FY 1984 ended. The purpose of the evaluation was to develop an estimate of the program's impact on target households and to establish the basis for a more detailed evaluation in FY 1985. Reasons limiting KCC staff from conducting a more thorough evaluation study include:

The program's late start necessitated its development on an on-going basis. Program planning was limited to identifying and addressing problems as the project operated.

Because consultations did not begin until February, the earliest heating data available were for the billing period of mid-February to mid-March.

There was no breakout of households by family size, square footage of living space, type of heating, etc.

The sample size was reduced due to the mobility of the target group, the need to have data from a heating period, and the exclusion of houses that were weatherized after the consultations (in an effort to attribute savings to consultation not weatherization).

At the time this evaluation report was prepared, 117 households had completed the program. For reasons noted previously, the total number of households examined was 27. At the same time 27 households representing families that had attended only the workshop were selected. Each of the 27 households in one group was matched with a household in the other group by billing cycle.

The 27 households represented 22 percent of total program participants at the time of the evaluation. This total is not enough to be statistically significant, but a comparison of gross consumption data reveals that for the households analyzed the program had an impact.

The evaluation compared gas consumption in each house over a one month period in 1984, to consumption over the same billing cycle in 1983. The formula below was used to normalize for weather between the two years to enable comparison of consumption. The formula generates the percentage change in consumption between the two cycles.

$$1 - \left[ \frac{\text{current MCF consumption}}{\frac{\text{current Degree Days}}{\text{old Degree Days}} \times \text{old MCF consumption}} \right] = \text{Percentage}$$

A major shortcoming of this analysis is the lack of a control group. It is possible that all consumption reduction is the result of the SCCAA program; however, without the benefit of a control group, attributing all savings to the program cannot be done. However, a preliminary assessment of the impact of the in-home visit is possible because of the two groups. Besides the workshop, Group I benefited from two consultations that were specific to their homes. Group II, during the time period reviewed, only attended the workshop. A greater reduction in gas consumption in Group I would indicate the two in-home consultations have resulted in a savings impact beyond the workshop-only group.

SECTION IV--EVALUATION RESULTS

For ease of reporting the evaluation information, Group I is made up of the 27 households that attended the workshop and received the two on-site consultations. Group II comprises the 27 homes that attended the workshop only.

## Change in Consumption

Group I experienced an average reduction in gas consumption of 10.5 percent during the month following the two consultations (Table 1). For Group II households, an average 6.0 percent reduction in gas usage occurred (Table 2).

Group I had 20 households with a percentage decrease in gas consumption, while gas consumption at 7 houses increased (one household's reduction in consumption was 67% while one household increased consumption by 33%.)

SCCAA has developed a key that identifies 27 low-cost/no-cost tasks that are presented in the workshops and initial consultation. This key is used at the second consultation to review the household's implementation of measures. A list of the measures is provided below.

Table 3 - In-House No Cost/Low Cost Recommendations

| X - Educational/Lifestyle | Y - Technical |
|---|---|
| 1. Lowered thermostat | 1. Lowered hot water heater setting. |
| 2. Effective use of window shades/drapes | 2. Cleaned/replaced furnace filter |
| 3. Vents are unobstructed | 3. Hot water heater pipes wrapped |
| 4. Unused space closed off | 4. Plastic sheeting on windows |
| 5. Location of furniture effective | 5. Rope caulk installed on window cracks |
| 6. Appropriate clothing is worn | 6. Caulk on window/door casings |
| 7. Closed storm windows | 7. Installed outlet insulators |
| 8. Organize refrigerator | 8. Weatherstripped doors |
| 9. Use draft dodger | 9. Installed vent deflectors |
| | 10. Installed shower restrictor |
| | 11. Installed water heater blanket |
| | 12. Installed dryer vent |
| | 13. Drain water from water heater |
| | 14. Install door sweep |
| | 15. Tape ductwork on furnace |
| | 16. Wrap air conditioner |

The measures are separated into two groups, with the "X" variables representing educational/lifestyle changes and the "Y" variables representing technical measures. The "Y" category would require some monetary and time investment for implementation.

There were 14 households in Group I that had percent savings in gas consumption greater than the 10.5 percent average for all 27. The conservation efforts noted in the second visit at these 14 households can be compared to efforts by the other 13 houses to determine in Group I which tasks were more effective. The other 13 houses include 6 that had consumption savings, but whose savings were below Group I's average of 10.5 percent.

Table 1
SCCAA-Low/Fixed Income Consultation Program
Group I - Workshop and Two In-home Consultation Participants
Percent Change in Natural Gas Consumption
One Billing Cycle, 1982-83 and 1983-84

| | Heating Degree Days | | Natural Gas Consumption | | Percent Change |
|---|---|---|---|---|---|
| | 1982-83 | 1983-84 | 1982-83 (MCF) | 1983-84 (MCF) | in Consumption (%) |
| 1 | 447 | 442 | 10 | 3 | -67.6 |
| 2 | 394 | 441 | 4 | 2 | -55.3 |
| 3 | 388 | 441 | 12 | 10 | -26.7 |
| 4 | 651 | 799 | 23 | 21 | -25.6 |
| 5 | 388 | 441 | 13 | 11 | -25.6 |
| 6 | 350 | 379 | 11 | 9 | -24.4 |
| 7 | 690 | 738 | 16 | 14 | -18.2 |
| 8 | 394 | 441 | 13 | 12 | -17.5 |
| 9 | 464 | 459 | 11 | 9 | -17.3 |
| 10 | 350 | 379 | 12 | 11 | -15.3 |
| 11 | 477 | 460 | 17 | 14 | -14.6 |
| 12 | 690 | 738 | 12 | 11 | -14.3 |
| 13 | 327 | 380 | 11 | 11 | -13.9 |
| 14 | 464 | 441 | 12 | 10 | -12.3 |
| 15 | 464 | 441 | 7 | 6 | - 9.8 |
| 16 | 489 | 442 | 11 | 9 | - 9.5 |
| 17 | 477 | 460 | 9 | 8 | - 7.8 |
| 18 | 477 | 460 | 22 | 20 | - 5.7 |
| 19 | 327 | 380 | 10 | 11 | - 5.3 |
| 20 | 350 | 359 | 8 | 8 | - 2.5 |
| 21 | 478 | 376 | 5 | 4 | 1.7 |
| 22 | 701 | 546 | 20 | 16 | 2.7 |
| 23 | 687 | 616 | 19 | 18 | 5.7 |
| 24 | 327 | 380 | 6 | 8 | 14.7 |
| 25 | 668 | 669 | 11 | 13 | 18.0 |
| 26 | 732 | 720 | 8 | 10 | 27.1 |
| 27 | 350 | 379 | 9 | 13 | 33.4 |
| Total | 13,031 | 13,207 | 322 | 292 | -10.5 |
| Average | 482.6 | 489.1 | 11.9 | 10.8 | -10.5 |

Table 2
SCCAA-Low/Fixed Income Consultation Program
Group II - Workshop Only Participants
Percent Change in Natural Gas Consumption
One Billing Cycle, 1982-83 and 1983-84

| | Heating Degree Days | | Natural Gas Consumption | | Percent Change |
|---|---|---|---|---|---|
| | 1982-83 | 1983-84 | 1982-83 (MCF) | 1983-84 (MCF) | in Consumption (%) |
| 1 | 388 | 451 | 4 | 2 | -57.0 |
| 2 | 604 | 804 | 18 | 16 | -33.2 |
| 3 | 327 | 380 | 9 | 7 | -33.1 |
| 4 | 350 | 379 | 8 | 6 | -30.7 |
| 5 | 686 | 609 | 11 | 7 | -28.3 |
| 6 | 477 | 460 | 11 | 8 | -24.6 |
| 7 | 350 | 379 | 14 | 12 | -20.8 |
| 8 | 703 | 756 | 16 | 14 | -18.6 |
| 9 | 464 | 441 | 14 | 11 | -17.3 |
| 10 | 725 | 745 | 14 | 12 | -16.6 |
| 11 | 327 | 380 | 8 | 8 | -13.9 |
| 12 | 686 | 594 | 8 | 6 | -13.4 |
| 13 | 686 | 731 | 22 | 21 | -10.4 |
| 14 | 666 | 616 | 13 | 11 | -8.5 |
| 15 | 477 | 460 | 17 | 15 | -8.5 |
| 16 | 477 | 467 | 10 | 9 | -8.1 |
| 17 | 690 | 738 | 16 | 16 | -6.5 |
| 18 | 477 | 460 | 11 | 10 | -5.7 |
| 19 | 327 | 363 | 9 | 10 | 0.1 |
| 20 | 388 | 376 | 9 | 9 | 3.2 |
| 21 | 467 | 442 | 14 | 14 | 5.7 |
| 22 | 375 | 386 | 6 | 7 | 13.3 |
| 23 | 388 | 376 | 6 | 7 | 20.4 |
| 24 | 368 | 386 | 11 | 14 | 21.3 |
| 25 | 388 | 376 | 9 | 12 | 37.6 |
| 26 | 368 | 386 | 11 | 17 | 47.3 |
| 27 | 467 | 482 | 5 | 12 | 132.5 |
| Total | 13,096 | 13,423 | 304 | 293 | -6.0 |
| Average | 485.0 | 497.1 | 11.3 | 10.9 | -6.0 |

The 14 above-average households implemented a total of 95 measures; 24 measures were in the lifestyle/educational category, 71 were technical measures. The average number of measures in this group was 6.8 per house (1.7 lifestyle measures and 5.1 technical measures).

In the 13 houses below Group I's average, 71 total measures were implemented; 23 measures were Lifestyle/Educational efforts and 48 measures were in the Technical catetory. The average for this group was 5.5 total measures per house (1.8 educational/lifestyle efforts and 3.7 technical measures per house).

The major difference between the above and below average consumers is the number of technical measures installed. As pointed out earlier, the technical measures would most likely require some monetary investment as well as a greater time commitment. The above-average group implemented 23 more technical measures than the below-average group. The 3 households with the greatest gas reduction (savings of 68%, 55% and 27%) implemented only 2 educational/lifestyle changes while installing 14 technical measures.

Table 4 displays the individual measures that were most frequently implemented. The table compares the measures between the above average households (savings greater than 10.5%) and below-average households. The variance could reveal measures that accounted for the difference between the two groups.

Table 4 - Most Often Implemented
No Cost/Low Cost Energy Measures

| | $X_1$ | $X_4$ | $Y_3$ | $Y_4$ | $Y_5$ | $Y_7$ | $Y_8$ | $Y_{13}$ |
|---|---|---|---|---|---|---|---|---|
| 14 Households Above 10.5% Savings | 5 | 7 | 10 | 12 | 8 | 9 | 9 | 8 |
| 13 Households Below 10.5% Savings | 4 | 3 | 9 | 6 | 3 | 9 | 5 | 4 |
| (Above-Below) | 1 | 4 | 1 | 6 | 5 | 0 | 4 | 4 |

In five of the most frequently recorded measures, the above average savers had at least 4 more houses implementing them than did the below average households. These measures were:

X4 - Shutting off unused space
Y4 - Plastic sheeting on windows
Y5 - Rope caulk installed on window cracks
Y8 - Weatherstripped the doors
Y13 - Drain water from water heater

Due to the small sample size, no strong inference can be made concerning this information, but the data suggest the 5 measures present significant promise for saving energy. From a program development standpoint, emphasis should be placed on these measures during the consultations.

## Dollar Savings

For the 27 households in Group I, consumption during the November through March 1983-84 heating season was 92.4 MCF and the average heating bill was $456.12. If this evaluation's average per-month gas consumption reduction of 10.5 percent is applied to the pre-SCCAA participation consumption, gas usage would have been 82.7 MCF during the past heating season. At a per-MCF-average cost of $4.94, the total average heating bill per household would have been $408.59, a savings of $47.59 per house during the heating season (slightly more than $7 per household earnings in one heating season). The dollar savings could be more when consideration is given to the fact that some no cost/low cost measures presented in the consultations apply to non-heating periods (eg. raise thermostat in summer).

While the problems expressed with this evaluation prevent strong inference based on the current data, it is encouraging that the preliminary indication is the program appears to work.

# SECTION V--RECOMMENDATIONS

With this report as a guide, recommendations for improving the SCCAA low/fixed income consultation program are presented below:

- Statistically sound evaluation be conducted during the 1984-85 heating season of the SCCAA program;
- Develop a means of purchasing conservation materials and installing the technical measure which this report shows had the greatest impact on consumption reduction;
- Determine whether there are any options for SCCAA to provide an incentive to households in order to increase conservation measures implementation;
- Concentrate on-site efforts in households that have, in the past, been large consumers of gas;
- Determine impact on electricity consumption resulting from changes in gas consumption. For example, whether increased use of space heating has a net negative result on a household's budget;
- Contact other similar programs nationwide to assess changes that can be made to improve the existing program.
- Measure savings over two heating season to determine whether a follow-up contact is required to maintain savings, or whether the lifestyle changes will be retained during the second heating period.