

THE WORKING POOR: THE FORGOTTEN MARKET SEGMENT

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Abstract

The objective of this paper is to present and discuss the methods to be used during a low-income residential market assessment conducted in mid 1997 (June - September) in the Detroit Edison Company's service territory. The purpose of the study is to identify customer segments, to identify segment members who are and who are not taking advantage of currently available low-income products and services and to identify additional products and services that may be appropriate for these customers.

A primary goal of this study is to better understand a sub-segment of the residential population which we refer to as the "working poor". The hypothesis of the Company is that the needs of the working poor, in particular, are not being addressed by the current utility, state and federal service offerings. A central objective of the study is to identify these customers in order to assess and address their energy-related needs. The study also focuses on identifying and quantifying the low-income market, and developing more detailed segment descriptions. In particular, the study examines the market share represented by the working poor, the current services delivered to this market, and the needs of this market. The segmentation aspects of the research will focus on identifying low-income customers and describing and quantifying segments relative to their needs and uses of energy or energy related products and services.

The results of this study provide a starting point to develop new products and services aimed at meeting the needs of the low-income market, and the working poor in particular. The project uses standard demographic segmentation techniques in addition to psychographic and lifestyle/behavior/attitudinal segmentation schemes to help DECo identify, locate and serve their low-income customers.

The implementors of this study realize the low-income population often has less monetary resources than other customers and therefore may need a different type of service or service mix than other customers and may also be receptive to a different configuration or mix of promotional messages and message delivery systems once their energy related product and service needs are more fully understood. The research is being conducted in conjunction with an energy impact and operational process evaluation of DECo's Low-Income Energy Management Program. This program is offered to income-eligible customers and provides energy efficient technologies to cus-

tomers in addition to assistance with bill payments, including fixed monthly payment agreements, reduced consumption agreements and on-site educational training.

Introduction

Detroit Edison is currently conducting a study to identify and understand the needs of their low-income customers. Of primary interest is an assessment of the "working poor", a sub-segment within the low-income market. The key researchable issues are:

- What are the best means to identify low-income customers and segments?
- How many such customers are there in the Detroit Edison service territory?
- What share of this market is being addressed by existing Detroit Edison programs?
- What factors affect participation in existing programs?
- Are the existing programs reaching or transforming the remainder of the market?
- What potential products and services will fulfill the wants and needs of the low-income market segments?
- How are these potential products and services best promoted and delivered to the various segments?

The study endeavors to assess the extent to which the needs of the working poor, in particular, are being addressed by current program offerings. A central objective is to identify these customers in order to assess and address their energy-related needs, and to discern means to address these needs.

Methods

To accomplish these goals, the Company is conducting a market research study to investigate the energy-related attitudes and behaviors of the low-income market segment. The study involves identifying a small customer group for on-site interviews and a larger group for a telephone survey. The results from these efforts will be matched to consumption and billing history information, analyzed and reported.

Identifying Customer Sampling Frames

The study will involve 60 on-site interviews and 550 low-income telephone surveys of the targeted population, defined as customers with household income below 150% of the county poverty level. The sample will be distributed as follows:

- 40 on-site interviews with participants of the Low-Income Energy Management Program,
- 20 on-site interviews with program non-participants,
- 100 telephone surveys with participants from the 1995-97 program population,
- 200 telephone surveys with non-participants that have been self-identified as low-income customers (through communication with DECo), and
- 250 telephone surveys with non-participants that have not been self-identified as “low-income” customers.

The sample selection for the 40 on-site interviews is being drawn at random from the lists of program participants such that their selection is weighted to match the geographic distribution of the program participants. The sample for the 20 non-participants for the on-site interviews and the 200 self-identified non-participants are being drawn from Detroit Edison’s electronic data set of identified low-income non-participants. This sample is being selected at random from low-income customer lists. There are about 125,000 customers in this data set and consists of customers who have self-identified themselves as low-income households, but who do not have program participation codes in their electronic customer records.

A challenging step in the study is to determine a means to identify potential members of the unidentified non-participant group. That is, the customers that are not identified as low-income in Detroit Edison’s in-house database, but who qualify for low-income status as a result of their household income levels. Information sources considered for this effort included the 1990 federal census data, the 1993-95 state economic development and county income data, the use of neighborhood organizations and community action groups, state and federal agencies, and Detroit Edison MicroVision database. The determination was made to utilize Equifax’s MicroVision customer segments, in conjunction with customer contact information and consumption data from the Company’s billing system. The MicroVision coded customers will be drawn at random consistent with their distribution within the customer population and selected using a per-group selection method weighted by their estimated percentage of low-income customers within the population. This means that we will select the MicroVision group codes with low-income customers, identify the estimated percent of the

group that are low-income customers from the MicroVision income identifiers, estimate the extent of each group in the low-income population consistent with MicroVision’s population estimates, and conduct screener calls to sample a population of customers from each group consistent with the sampling goal and the percent of low-income group members in the groups.

The MicroVision group codes are identified through survey research conducted in DECo’s service territory by MicroVision. The segments are established and identified by MicroVision and are neighborhood, block and address specific. That is, the MicroVision group identifiers apply to a specific address and are assigned in accordance with the probability that the segment identifier applies to a home located in an area displaying a high probability for each group. This method, while not 100% accurate in identifying groups at the individual household level, provides a system of identifying homes that have a high probability of being associated with a MicroVision group code. Because one of the elements in the MicroVision code is household income levels, this method provides a method of identifying individual homes that have a high probability of being income-eligible within the probability of the income levels for each group. Unfortunately, to obtain a representative sample of income eligible households it is necessary to conduct screener calls to each home selected to be included in the market assessment survey. This means that about 2 to 6 screener calls are expected to be made to achieve a completed survey from an income eligible household, depending on the MicroVision group. The use of screener calls allows us to identify eligible households prior to the initiation of the market assessment survey. To expedite the survey process the screener call will be made to the customer as a filter question. Once the filter question has identified a low-income home the remaining survey will be conducted. The one major concern of this identification process is the tendency of some low-income households to not want to report income levels during a telephone screener call. This aspect of the survey will be carefully monitored to assess the extent to which this self-selection activity is being addressed. If necessary we will examine alternative methods to identify estimated income levels if this appears to be a significant problem for the assessment.

Table 1 describes the eleven segments to be considered in the survey including MicroVision’s segment group number and abbreviated group description, the percent of the group that is below the medium income, and a description field that provides some estimation of the extent of the low-income population within each MicroVision group.

Data Collection

The next step in this active evaluation will be to conduct the on-site and telephone interviews with Detroit Edison’s program participants and non-participants. The interviews and surveys will collect information to classify

Table 1
Customer Segmentation

MicroVision Segment Names	Median In- come, % Be- low Avg.	Other Description
24 City Ties	3%	15% below poverty level
26 The Mature Years	14%	50% below \$25,000 income
33 Living off the Land	20%	15% below poverty level
36 Metro Mix	15%	Above avg. % of families w/ no workers
41 Close-Knit Families	34%	31% below poverty level
42 Trying Rural Times	38%	28% below poverty level
43 Manufacturing USA	44%	30% below poverty level
44 Hard Years	34%	20% below poverty level
45 Struggling Metro Mix	26%	23% below poverty level
46 Difficult Times	51%	40% below poverty level
48 Urban Singles	44%	50% below \$15,000 income

customers as low-income and to develop more detailed segmentation systems reflecting demographics and energy-related behaviors within the low income market. The non-participant interviews and surveys, as well as interviews with agency managers and implementors being conducted as part of an on-going process evaluation will further address the transformative effects of the existing Detroit Edison programs.

One of the key tasks of the market assessment will be the implementation of the Low-Income Market Survey. This survey will gather the demographic, attitudinal, and behavioral characteristics of DECo's low-income market. Specifically, the data collection effort will focus on the following:

- Identify and quantify the basic demographics of the low-income market, including data such as age, family size, number and age of children in the home, marital status, job status income sources, general household income level, location, and others,
- Identify specific geographic locations of the low-income markets to allow a more focused product and services targeting effort for future programs and identify low-income, behaviors and social interactions that can assist program marketing efforts in locating and reaching these customers,
- Identify and quantify energy consuming appliances and related appliance operational behaviors and responsibilities including responsibilities for bill payments, appliance operation and maintenance and replacement procedures and responsibili-

ties that will help understand how low-income populations view and use their energy consuming appliances and identify market or program impact opportunities with in these conditions,

- Identify and quantify barriers and barrier behaviors that relate to energy efficiency,
- Identify and quantify the attitudes of this group of customers about energy use, DECo's programs and services , and other relevant issues, and
- Identify energy-related opinions, behaviors and concerns pertaining to or relating to energy use and management, including safety and security concerns and behaviors.

These data will be analyzed together with consumption data and the personal interview results to assess the low-income market, determine the market share addressed by current programs, and identify means to deliver services to the remaining market.

Analysis

The analysis will focus on *market segmentation* to describe the target market, *discrete choice analysis* to assess drivers of participation, and *market transformation analysis* to address program influence on non-participating customers in the target market.

Segmentation of the Low-Income Market. The Company desires a market segmentation that will enhance its understanding of its low-income customers and its ability to locate eligible customers that are difficult to identify, e.g., the working poor. In addition, the segmentation will allow for the development of new product and service opportunities. In this light, the study will investigate the

demographics, attitudes, and behaviors of this customer group and create segments based on these data.

This market segmentation task will consist of two key tasks:

1. Cluster and factor analysis to create segments, and
2. Evaluation of the segments with respect to participation and other factors discovered in the study.

A k-means cluster analysis will be performed to generate market segments based on survey data. This analysis will be performed multiple times to identify the optimal number of clusters and to verify the stability of the clustering. A factor analysis will be performed on the data prior to the cluster analysis to identify the degree to which the various characteristics drive the formation of the segments and the degree to which the variance between segments can be explained by the measured characteristics.

A key element of the cluster analysis is the interpretation of cluster results. It will be important to examine the cluster outputs to ensure that the resulting clusters are relevant and useful to support program decision making. The goal will be well-defined market segments defined by demographic, attitudinal, and behavioral characteristics. The segmentation will also consider program participation levels.

For any market segmentation to be truly useful, there must be a mechanism by which other customers can be mapped into the segments. To accomplish this, the study will construct a participation model that will identify the variables best able to predict segment membership. This model will be used in the future to identify low-income customers not identified in this study.

Discrete Choice Model. Participation models will be developed using discrete choice estimation techniques. The participation models will quantify factors that influence the choice of customers to participate in DECo's Low-Income Program. The discrete choice model is built off of the pooled group of participant and non-participant surveys.

Discrete choice estimation techniques have been applied within the utility industry to determine what influences consumer participation decisions for both residential and commercial programs. Participation is typically modeled as a binary function, where the dependent variable takes on a value of one for participants and zero for non-participants. The participation models are constructed using a *probability model*. Probability models are used because the use of ordinary least squares (OLS) to estimate participation can lead to a violation of basic regression assumptions. For example, using OLS in this type of analysis can yield non-constant error terms or estimation of a participation result that does not lie between 0 and 1.

To perform the analysis for this project, participation will be modeled using a logistic function and estimated using Maximum Likelihood Estimation (MLE). This function is expressed as:

$$P(y_i = 1) = \frac{e^{b'x}}{1 + e^{b'x}}$$

Where:

$P(y_i = 1)$ is the probability of the i th customer participating,

x is the vector of independent variables

β is the vector of coefficients.

Using the results of the participant and non-participant surveys, relevant variables will be considered within the model.

Using the results of the participation model, a "Base Case" and an appropriate Alternative Case" will be developed and presented. From this presentation, participation influences can be examined and ranked. Ultimately, the participation analysis provide empirical evidence to recommendations of how to change the implementation to optimize participation, or to target market customers most likely to participate.

Market Transformation. The attitudes, activities and behaviors of participants and non-participants will be compared using regression techniques to identify differences in energy-related behavior and product purchase and use decisions that can reasonably be attributed to DECo's low-income programs. These models, along with qualitative ethnographic observations, will be used to estimate the transformative effects of DECo's programs.

Results

Preliminary study results will be available in August of 1997 and presented at the conference. Final results will be available in September 1997. All results are the property of Detroit Edison Company.

The key results of the study will be estimates of the low-income population of customers in each Equifax segment with emphasis on descriptions and analysis of a sub-segment to be known as "the working poor". In addition we expect to identify new low-income segments consistent with customer opinions, attitudes, behaviors and needs. Information on the new segments will include estimates of the low-income population in each of the new segments resulting from the study, the percentage of these customers that fall into the target market, and the percentage of these populations that have participated in existing Detroit Edison Programs. The analysis will further identify drivers to participation and estimate market transformation for the different market segments. The end result will be recom-

mendations on products, services and delivery mechanisms tailored to the various customer types.

Conclusion

The methods presented will enlighten means of determining the low-income market share, and developing more detailed segments within this market. In particular, the study will assess the market share represented by the working poor, the current services delivered to this market, and the needs of this market. The results of this study will provide a starting point for utilities to develop new products and services aimed at meeting the needs of the full low-income market, and the working poor in particular.