PARTICIPATION OF THE ELDERLY IN UTILITY-SPONSORED RESIDENTIAL CONSERVATION PROGRAMS

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ABSTRACT

Although greater-than-average opportunities for residential energy-efficiency improvements exist among the elderly, most utility-operated conservation programs are not successful in reaching this subgroup. This paper reviews research on elderly participation in utility programs. It contains a literature review, descriptions of program participation levels among the elderly, and a discussion of discrete choice model results which show that the association between age and nonparticipation persists even after the effects of other predictors such as income, education, dwelling age and need for retrofit are removed.

In general, utilities include efforts to reach the elderly as one component of their programs for the poor. Since 85% of the elderly are not poor, most will not qualify for these programs. Few utilities reach a large fraction of their low-income households either, regardless of the household's age. Thus, a majority of the elderly, whatever their income level, do not receive conservation services from utilities.

Although the elderly with adequate incomes may not need free services, they do require special incentive, marketing, and/or information delivery systems if their high potential for energy efficiency improvements is to be realized. Several diverse approaches are effective in stimulating conservation program participation by the elderly. Door-to-door canvassing with free installation of measures, recruitment and verification of eligibility through existing community groups, peer services and counseling by other senior citizens, shared savings programs offered in retirement villages, and rebate programs that offer highly visible, easily understood measures with short paybacks have all attracted the elderly. Utilities that wish to increase participation among their elderly customers should consider using some of these approaches.

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INTRODUCTION

Overall, the elderly use residential energy less efficiently than the nonelderly population (Brown and Rollinson, 1985). As a result, significant opportunities for energy efficiency improvements exist among older age groups. In general, however, utility-operated conservation programs have not been successful in reaching older customers. Residential Conservation Service (RCS) audit programs, for example, attract little participation from the elderly. Most utility-sponsored postaudit loan and rebate programs also have low levels of elderly participation.

This paper begins by describing the importance of the elderly as a market segment for conservation programs. The distinctiveness of the elderly in factors related to energy demand, the growing size of this age group, and the inefficiency of their energy use all suggest that more attention to their needs is warranted. The typically low participation rates of the elderly in conservation programs, which are discussed in the second major section of the paper, also suggest the need for marketing strategies specifically designed to reach this group. The features of several programs designed to attract the elderly are described in the third section. The final section summarizes the marketing approaches that have attracted the elderly and offers policy recommendations.

IMPORTANCE OF THE ELDERLY AS A MARKET SEGMENT

Success in marketing a product or service often depends upon identification of appropriate market segments and use of promotional activities tailored to the unique needs and requirements of these segments. To be most successful, the segments chosen should have the following characteristics: (1) they should be distinct in terms of differences related to market demand--that is, the segments should exhibit homogeneity within and heterogeneity between groups; and (2) the segments should be large enough to be worth the effort of differentiating the market (Hutton and McNeil, 1984). In the following sections we assess the extent to which the elderly meet these criteria. Subsegments of the elderly population are also considered.

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Distinct Market Demand

The elderly are distinct in many ways which relate to demand for residential conservation measures and programs. The housing of older Americans is generally older and less adequate than the balance of the nation's housing. About 40% of homes owned by older persons in 1980 were built prior to 1940 (22% for younger owners), and 9% were classified as inadequate in 1981 (compared with 6% for younger owners) (American Association of Retired Persons, 1984). Homes occupied by older households have less insulation, fewer storm windows, and older heating and cooling equipment, indicating a greater than average need for energy efficiency improvements (Smiley, 1979; Jackson, 1980; Brown and Rollinson, 1984).

The elderly also engage in fewer conservation behaviors (Brown and Rollinson, 1984; Hutton and McNeil, 1984). At the same time, they require higher temperatures for comfort and health (Minnesota Department of Energy and Economic Development, 1983).

The "effort" barrier to conservation is particularly significant for the elderly--both because of their diminished physical ability and their lack of energy know-how. The elderly have fewer years of formal education than younger age cohorts and are less aware of effective energy saving actions (Brown and Rollinson, 1984; Minnesota Department of Energy and Economic Development, 1983).

Another barrier to investments in conservation technologies is the savings mentality of older persons. Although seniors are frugal, they don't relate well to conservation's spend-to-save philosophy (Brown and Rollinson, 1984; Minnesota Department of Energy and Economic Development, 1983). The elderly also are uncertain about financial solvency and the length of time they will be able to live independently, which contributes to a shorter than average planning horizon for the amortization of investments. Thus, the potential demand for energy efficiency measures on the part of elderly households is great, but so are the barriers to implementation.

Significance of the Elderly Segment

In terms of sheer size, the older population is significant and will become even more so. The elderly (i.e. those 65 years of age and older) numbered 27.4 million in 1983 at which time they represented 11.7% of the U.S. population. By the year 2000 they will represent 13.0% of the population, and by 2030 this percentage may climb to 21.2% (American Association of Retired Persons, 1984). Because the elderly tend to have fewer members in each household, they form a greater proportion (20.8%) of the total households in the United States. These households consume about 21% of the total residential energy used annually. They consume less than 20% of the residential electricity, however, because fewer heat with electricity and those with electric heat consume fewer kWh per household (Energy Information

Administration, 1982). The fact that three-fourths of the elderly are homeowners means that most of this group has considerable control over its in-home energy use and therefore can potentially change it. In addition, because elderly households spend a higher proportion of their income on residential energy than the average household (8.1% vs. 5.3%), they have at least one factor motivating them to improve their household energy efficiency.

In summary, although the elderly consume less total energy per household than the nonelderly, they form more households. In addition, measures of inefficiency in energy usage such as energy consumption per capita and per square foot of occupied space show that seniors have greater than average potential for energy efficiency improvements (Brown and Rollinson, 1984; Warriner, 1981). As noted earlier, this greater potential occurs because homes occupied by older households have fewer conservation measures in place and because the elderly engage in fewer conservation behaviors.

Further Segmentation of the Elderly Population is Necessary

The market demand of the elderly for improved residential energy efficiency is both distinct and significant enough to merit the development of specialized programs by utilities. There is a tradeoff in market segmentation efforts, however, between large segments where potential impacts justify the development of custom-made marketing strategies, and small segments which may be easier to reach because of their homogeneity but which have less significant potential impacts. One of the key outcomes of a 1986 Symposium on Energy and the Aging sponsored by the U.S. Departments of Energy and of Health and Human Services was the conclusion that the elderly are a heterogeneous group and that its essence can only be captured by further differentiation. Some of the potentially important subgroups of the elderly include:

- Low-income elderly. Approximately 12.4% of all persons 65 years of age or older have incomes below the poverty level (compared with the 14.4% national average in 1984). Because poor seniors typically live on fixed incomes, their financial barriers to investments in retrofit activities are greater than those of many other poor households. At the same time, their need for such investments is great because low-income seniors spend a higher percentage of their total expenditures on energy than do other elderly households (Clark and Erickson, 1985).

- Younger seniors. One market research study found that younger seniors (ages 60-70) are more aware of conservation and more receptive to conservation messages--suggesting that they would be a more fruitful segment than older seniors (Minnesota Department of Energy and Economic Development, 1983).

- Women living alone or with nonrelatives. This segment represents 41% of older women, who themselves are a majority of the elderly. These women are forced to deal with problems that were

traditionally handled by men, including major home repairs such as the installation of insulation.

- o Older renters. A disproportionate number of the elderly who rent live in publicly owned or subsidized housing--22% versus 9% of younger renters.

As we shall document, utility conservation programs have been designed to meet the unique needs of low income elderly households, but to our knowledge, none of the other subsegments mentioned above have been specifically targeted.

ELDERLY PARTICIPATION IN CONSERVATION PROGRAMS

Even though the homes of the elderly have a greater than average potential for energy efficiency improvements, the elderly are less likely to participate in conservation programs. In general, age has a curvilinear relationship with conservation behavior, as young and elderly households take fewer actions than those in their middle years (Frey and LaBay, 1983; Hirst and Goeltz, 1982). This same curvilinear association can be seen in patterns of participation in conservation programs (Tables I, II, III, and IV).

As Table I shows, 23% of the participants in the Bonneville Power Administration's weatherization program were over age 60, while over 30% of the eligible households were elderly. In the Pacific Gas and Electric (PG&E) program 27% of the participants and 37% of the eligibles were over 54 years of age (Table II). In the FPL program 28% of the audit participants and 44% of the eligibles were over age 60 (Table III). The underrepresentation of the elderly among conservation program participants shown in our examples, is typical of programs that have not developed delivery mechanisms specifically designed to reach this group (Wirtshafter, 1985)

The Residential Energy Conservation Action Program (RECAP), developed by the General Public Utilities Corporation (GPU), has been implemented in five communities in New Jersey and Pennsylvania by three contractors in conjunction with two of GPU's electric utility operating companies (Jersey Central Power and Light Company and Metropolitan Edison). RECAP is a shared savings conservation program which offers residential customers free weatherization services. All risks of obtaining less than anticipated fuel savings are assumed by energy-services companies (ESCOs) that are under contract with the utility to install conservation measures. The utility reimburses the ESCOs for the value of the marginal avoided cost for each kWh saved due to the improvements. In the communities served by Metropolitan Edison, RECAP drew disproportionately from middle-aged cohorts, reflecting the typical under-representation of the elderly (Table IV). Jersey Central Power and Light, however, implemented RECAP in several retirement villages which, as will be discussed later, was an effective way to reach the elderly.

Table I. Age distributions of participants in Bonneville Power Administration's Interim Weatherization Program vs all residential customers

	Program participants (%)	All residential customers (%)
Under 18	1.3	0.47
19 - 29	9.1	18.7
30 - 39	38.8	20.7
40 - 49	15.4	15.6
50 - 59	12.2	13.7
Over 60	23.2	30.8

Source: Oak Ridge National Laboratory's data base on BPA's Interim Weatherization Program and Pacific Northwest Residential Survey, 1983.

Table II. Age distributions of participants in Pacific Gas Electric's Zero Interest Loan Program (ZIP) vs all eligible households

Head of household's age	ZIP participants (%)	All eligible customers (%)
Under 35	21	18
35 - 54	52	45
Over 54	27	37

Source: Barnes, Richard S., 1985.

Table III. Age distribution of participants in Florida Power and Light's Home Energy Survey vs all residential customers

	Home energy participants (%)	All residential customers (%)
Under 21	0.5	0.3
21 - 50	52.0	39.1
51 - 60	19.1	15.9
Over 60	28.4	44.7

Source: Brown, M. A., L. G. Berry, D. L. White, and P. Zeidler, 1986.

Table IV. Age distribution of participants in the Metropolitan Edison Company's RECAP program vs all eligible households

	RECAP participants (%)	All eligible households (%)
Under 30	3.9	12.2
31 - 40	32.3	28.1
41 - 60	52.0	40.2
Over 54	11.7	29.4

Source: Brown, M. A. and G. Reeves 1985.

Age Effects in Discrete Choice Models

Although the information on participation levels by age reviewed above shows that the elderly are less likely to participate in conservation programs, it does not tell us how important age is as compared to related predictors of participation. It may be that the elderly are less likely to participate mainly because of their lower educational levels, or because of the type of housing that they occupy. Discrete choice regression models allow one to account for the correlations between various predictors of participation and to determine which predictors are most important. These models also can be used to predict the probability of participation for various types of households.

Several discrete choice models that predict participation in conservation programs have been developed recently (Barnes, 1985; Doane and Hartman, 1984; Hartman and Doane, 1984; Hirst, Bronfman, Goeltz, Trimble and Lerman, 1983; Tonn and Berry, 1986). Most of these models use age of household head as a predictor. When age is included in the models, it always has a negative sign and is generally a highly significant predictor of participation.

In the model developed by Tonn and Berry (1986), age is a significant predictor of participation even after the effects of income, education, dwelling age, costs of retrofit, and several attitudinal variables are controlled. Discrete choice models developed by Hartman and Doane (1984) for Portland General Electric programs and by Doane and Hartman (1984) for General Public Utilities programs also found that age of household head had a negative relation to participation. Other variables in the Doane and Hartman models included: occupancy status (owner/renter), education, income, length of residence in the house (in years), and awareness of electric power company advertising (yes/no). Another model that found age to be a significant negative correlate of participation was developed by Barnes (1985) with data for the PG&E Company's zero-interest loan program. In addition to the age variable, Barnes' model included the independent variables of dwelling type, income, type of heating and cooling system, and gas and electricity use variables.

PROGRAMS DESIGNED TO REACH THE ELDERLY

The low levels of elderly participation and the model results reviewed above, show that programs designed for a general market are unlikely to attract the elderly. Because many utilities recognize that different marketing strategies are needed for the elderly, a number of programs have been developed for this target group.

To obtain an understanding of the range of program types used to reach the elderly, we asked experts for their nominations of successful programs. Researchers known for their work on conservation issues were contacted at Oak Ridge National Laboratory, Lawrence Berkeley Laboratory, the American Council for an Energy-Efficient Economy, the National Research Council and the

Alliance to Save Energy and asked to name successful programs. Representatives of trade associations such as the Electric Power Research Institute, Edison Electric Institute, the American Gas Association, and the American Public Power Association also were asked to list the programs that they believed were especially successful in reaching the elderly. Representatives of the National Association of Regulatory Utility Commissioners and of the California Energy Commission were asked to give their recommendations too. In addition, a recent survey of state Public Utility Commissions (PUC's), identifies fourteen states that require utilities to provide special conservation services for the elderly (Markowitz, 1985). To obtain an overview of programs in these states, we contacted the PUC's with such mandates. After identifying utilities with programs for the elderly, we contacted utility staff to obtain information about program history, design and operations. Detailed descriptions of most of these programs can be found in Berry, Hubbard and White, 1986.

Most of the programs we reviewed focus on the needs of the low-income elderly and include efforts to reach the elderly as one component of a program for the poor (Berry, Hubbard and White, 1986). All of the major California utilities and several Pacific Northwest utilities including the Bonneville Power Administration, for example, offer free weatherization to the low-income elderly. Since over 85% of the elderly are not poor, most will not qualify for these programs. In addition, the record of utilities in the delivery of programs to low-income households is a case of a few preliminary successes (Wirtshafter, 1985). In other words, most low-income households, regardless of their age, do not receive utility conservation services.

Although most of the utilities offer special incentive programs only to the low-income elderly, there are exceptions. The Georgia Power Company, for example, provides free weatherization services to all elderly households through their award-winning Seniors Lending a Helping Hand program. Some utilities, such as Central Illinois Light and New York State Electric and Gas, offer all elderly households the same program services that are offered to younger low-income households. Other utilities such as those in California and Maryland use more liberal low-income program eligibility requirements for the elderly; for example, the elderly customers of the Southern California Gas Company are eligible at 200% of federal guidelines instead of the 150% required for the nonelderly.

In addition to the weatherization programs described in this paper, there are other utility efforts to meet the information and communication needs of the elderly. A four hour training program designed to sensitize utility staff to the needs of the elderly, to develop staff skills for communicating with them more effectively, and to provide resources for helping older customers has been developed jointly by the Edison Electric Institute, the American Association of Retired Persons, and the Center for the Study of Aging at North Texas State University. By January of 1986 over 90 utilities had purchased this training program for their employees. Several utilities also offer information workshops for seniors. A particularly successful effort is the Wise Informed Seniors on Energy (WISE) program offered by the

Columbia Gas Company. These workshops include audience participation, role-playing, games, hands-on demonstrations and refreshments. They are often conducted at senior citizen centers and have been very well attended and received.

Utility offerings to the elderly are not always motivated by PUC mandates. The Georgia Power program, for example, was motivated by a recognition that existing conservation programs were not reaching senior citizens particularly those living in rural areas or small towns. Providing relief from rate increases to customers living on fixed incomes was another consideration. In this case, the decision to develop a program for the elderly was made at the Chief Executive Officer level because of a sense of social responsibility toward the elderly and handicapped. The Senior Citizen's Peer Counseling Program offered by the Nashville Electric Service, which is a Tennessee Valley Authority distributor, the Housewarming Program offered by Puget Sound Power and the Seniors Weatherization Program offered by Southwest Gas Company are further examples of programs developed without PUC mandates (Berry, Hubbard and White, 1986).

Nearly all of the successful elderly programs we have information about offer free direct installation of weatherization measures and all of them work closely with existing community groups and/or social service agencies (Table V). In most instances, these groups and agencies verify the eligibility of the households, thus relieving the utilities of the burden of such verification. One utility, which did not use community groups in this capacity, reported that the costs and difficulties of validating eligibility was a major cause of the program's demise (Cutting, 1986).

Door-to-door canvassing with offers of immediate, free installations was used in several of the elderly programs. This type of marketing also has been used in programs for all age groups such as Operation Assist sponsored by Alabama Gas and the Energy Fitness Program operated by the City of Santa Monica. When the elderly are included in whole neighborhood outreach efforts such as these, they participate at rates proportional to their representation in the general population (Egel, 1985). An alternative personalized outreach approach used successfully by several utilities involves elderly employees or volunteers who visit elderly households, install measures during the visit, and offer information and counseling services (e.g., Georgia Power, Nashville Electric, Puget Power, and Southwest Gas).

Florida Power and Light's Residential Window Treatment Program (RWTP) is an example of a program with high rates of elderly participation that was not designed to achieve that purpose (Table VI). Florida's Public Service Commission has a policy of not offering special conservation services or incentives to any particular market segments. Their position is that income redistribution activities are not among their appropriate roles. Nevertheless, the window treatment program did attract the elderly at levels substantially above their representation in the population of households requesting a home energy survey (Table VI).

Table V. Characteristics of weatherization programs for the elderly

Utility	PUC mandate	Community group involvement	Income eligibility requirement	Free instal-lation	Special features
Bonneville Power	No	Yes	Yes	Yes	part of low-income program
Central Illinois	Yes	Yes	No	Yes	services of low-income program are offered to all elderly households
Georgia Power	No	Yes	No	Yes	hires elderly to deliver services, recruitment through community groups
Nashville Electric	No	Yes	Yes	Yes	young summer employees and senior volunteers deliver services
National Fuel Gas	Yes	Yes	Yes	Yes	combines funding sources; part of low-income program
New York State Electric & Gas	Yes	Yes	No	No	services of low-income program are offered to all elderly households
Pacific Gas and Electric	Yes	Yes	Yes	Yes	part of low-income program; contracts with community groups to deliver services
Puget Sound	No	Yes	Yes	Yes	hires seniors to install measures
Southern California Edison	Yes	Yes	Yes	Yes	part of low-income program
Southern California Gas	Yes	Yes	Yes	Yes	part of low-income program; contracts with community groups to deliver services
Southwest Gas	No	Yes	Yes	Yes	senior volunteers install measures

Table VI. Percentage of program participants by age group in Florida Power and Light incentive programs*

Age group	All audit customers	CWHP	RCIP	RWTP	HELP
Under 21	0.5	0.6	0.6	0.3	0.1
21 - 30	8.1	9.6	8.1	5.1	6.6
31 - 40	24.2	36.2	23.0	16.8	22.0
41 - 50	19.8	27.2	21.4	14.6	19.5
51 - 60	18.9	16.5	20.9	21.9	19.6
61 - 70	22.6	8.4	20.3	21.9	19.6
Over 70	5.9	1.5	5.6	7.5	6.5

*CWHP - Conservation Water Heating Program
RCIP - Residental Ceiling Insulation Program
RWTP - Residential Window Treatment Program
HELP - Home Energy Loss Prevention Program

Source: Brown, M. A., L. G. Berry, D. L. White, and P. Zeidler 1986.

Florida Power and Light's residential conservation effort includes a walk-through audit and five incentive programs which offer utility cost-sharing for household investments in energy efficiency. In the five incentive programs FPL covers part of the cost of installations of efficient whole house cooling and heating equipment, solar film window treatments, water heaters, ceiling insulation and low-cost infiltration measures such as caulking and weatherstripping. Elderly customers were less likely than the nonelderly to request a walk-through audit and less likely to participate in any incentive program except RWTP. The elderly were more likely than the nonelderly to participate in the RWTP. The solar film window treatment option probably attracted the elderly because of its high visibility, easily understood benefits, and short payback. The high acceptance of this conservation measure by FPL's elderly customers suggests that other programs for the elderly could increase response by offering measures with similar characteristics.

The shared savings program, RECAP, operated by GPU is an example of a program that has been successfully implemented in several retirement communities. In the Jersey Central Power and Light service area RECAP contractors focused most of their efforts on retirement villages because there were: (1) good opportunities for achieving reductions in energy use in these locations, (2) economies of scale associated with the weatherization of a large number of fairly uniform dwellings, and (3) advantages in working with condominium associations to market the program (Brown and Reeves, 1985). Response in the targeted retirement villages was high. In one retirement community of 3000 households, there were more than 2500 participants. Recall

that customer response to the same program in the more heterogeneous communities served by Metropolitan Edison in the Reading, Pennsylvania area, however, was less among the elderly than would be expected from their representation in the general population (Table IV).

SUMMARY AND CONCLUSIONS

Several diverse approaches are effective in stimulating conservation program participation by the elderly. Door-to-door canvassing with free installation of measures, recruitment and verification of eligibility through existing community groups, peer services and counseling by other senior citizens, shared savings programs offered in retirement villages, and rebate programs that offer highly visible, easily understood measures with short paybacks have all attracted the elderly.

In general, utility programs for the elderly focus on the needs of the low-income elderly and include efforts to reach the elderly as one component of their program for the poor. Since over 85% of the elderly are not poor, most will not qualify for these programs. Few utilities reach a large fraction of their low-income households either, regardless of the household's age. Thus, a majority of the elderly, whatever their income level, do not receive conservation services from utilities. Federal and state programs provide some weatherization services to low-income elderly households; but, again, coverage is limited and the majority of the elderly receive no assistance. In the Department of Energy's low-income weatherization program, for example, only about ten percent of the eligible households received services during the first ten years (1975-1985) of program operation (U.S. General Accounting Office, 1985).

How much conservation assistance should the elderly receive? Many analysts are now questioning policies that provide guaranteed income, medical coverage, free services, and discount fares or prices to all of the elderly regardless of financial need. The elderly are no longer the poorest segment of our society. In fact, recent evidence suggests that the elderly are better off than other age groups. The average over 65 household has, for example, one-third more after-tax income per member than baby-boom households and three times the financial wealth (Robbins and Roberts, 1985). This does not mean, of course, that there are no elderly poor; but, recall that a smaller percentage of persons 65 years of age and older are poor than is the case for younger persons.

The evidence on the income status of the elderly suggests that the typical utility policy of offering free weatherization services to the low-income elderly and not to wealthier seniors is a reasonable one. Income restrictions also are typical of subsidized federal and state weatherization programs. The elderly with adequate incomes may not need free services, but, because of their low rates of participation in general market programs, they do require special incentive, marketing, and/or information delivery systems if their high potential for energy efficiency improvements is to be realized. The elderly at all income levels share certain significant barriers to

conservation investments and activities such as shorter planning horizons and diminished physical abilities.

Although a number of current program offerings developed specifically for the elderly seem to be adequate in design, they do not begin to reach all of the elderly who need special services. Most of the programs we reviewed serve only the low-income elderly. In addition, it seems that a very small percentage of utilities offer any special services to the elderly. We devoted considerable effort to locating utilities with elderly programs and found a limited number of examples. There are very few efforts to design programs for the specific needs of seniors with adequate incomes. Other subsegments of the elderly market such as younger seniors, women living alone or with nonrelatives, and older renters seem to have received no attention. The potential for energy efficiency improvements and the increasing size of these market segments suggest that more attention to their needs is warranted.

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