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Title: Attitudes and Behavior toward Energy Consumption among Oregon Residents and their Sociodemographic Correlates

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The relationship between attitudes toward energy and conservation behavior was studied in the context of sociodemographic and housing characteristics. Data were obtained by mail survey from a random sample of 1,503 Oregon households (Western Regional Agricultural Experiment Station Project, W-159). The return rate was 55 percent (834).

Attitudes toward energy consumption were obtained by factor analyzing twelve Likert-type opinion statements toward energy sources. Three factors accounted for 50 percent of the variance. They were: favor reducing energy consumption, favor conventional energy sources, and favor renewable energy sources.

Eight behavioral measures were based on basic structural conservation features, such as wall insulation and double glazed windows, and on additional structural features, like wood stoves, solar heating, etc. Basic and additional features were further divided into features that already existed when respondents moved into their homes ($\bar{x}$ = 2.3), features added by respondents themselves ($\bar{x}$ = 2.1), and features respondents planned to add ($\bar{x}$ = 1.1). In addition, two measures based on no-cost

conservation practices were constructed ($\bar{x}$ = 3.2).

The analysis of attitudinal and behavioral measures proceeded in three steps, using a multiple regression stepwise procedure. First a favorable attitude toward energy conservation and a favorable attitude towards renewable energy sources were found to be related to independent variables, i.e. perceived seriousness of the energy problem, age, income, and location in the same way. A favorable attitude towards conventional energy sources, however, generally related to the demographic variables in an opposite manner.

In the analysis of behavioral measures, attitudes had only a moderate effect on behavior. Basic structural measures were more common in newer homes than in older ones. Respondents who favored renewable energy sources reported more additional energy saving features than those who were less favorable. The adoption of no-cost conservation practices was higher among respondents who favored energy conservation.

In the third step actual energy expenditures were used to determine the impact of energy related attitudes and conservation behavior on actual energy expenditures. Attitudes and behavior, although not the most important determinants of energy consumption, had a significant impact on the amount of energy consumed in a household.

Attitudes and Behavior toward Energy Consumption Among Oregon Residents and their Sociodemographic Correlates

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I. INTRODUCTION

> The future energy and fuel requirements
> of the United States and the world
> present society with a complex of
> challenges unprecedented in history
> (Ashley, Rudman, Whipple 1976, p. vii).

The Energy Controversy

In 1973 when the Arab oil embargo suddenly cut off the supply of cheap energy, the Western world grew painfully aware that the age of abundant energy had come to an end. Long waiting lines in front of gas stations in the summer of 1979 and disruptions in the supply of heating oil in the following winter served to convince more people that the problem was real and not just contrived by OPEC countries or major oil companies. Politicians and scientists, as well as the general public, directed their attention to what amounted to an energy crisis.

As public interest turned to energy issues, a vast amount of literature dealing with energy problems emerged almost over night. A large number of publications were rather technical. Proposed solutions to the problem were ranging from gigantic solar satellites to 'cow magnets' which supposedly reduce automobile fuel consumption.

In addition a body of literature developed which focused on our inherently wasteful way of life. A more frugal life-style was advocated; one which had less conveniences but would allow a happier and healthier life, less threatened by large technologies. Something that might be called a 'conservation ethic' was beginning to take shape. At the same time, other groups focused on reduced energy consumption not through voluntary simplicity, but through better technologies and higher efficiency of appliances.

From all this literature it appears that two basic strategies to resolve our energy problem have emerged.

The first strategy aims at increasing the efforts to exploit conventional energy sources. This would mean drilling for off-shore oil, strip mining for coal, and constructing large scale nuclear power plants. Lovins (1977) refers to these technologies as 'hard' technologies. There are several shortcomings to this type of solution to the energy problem.

The depletion of these non-renewable energy sources would require ever higher capital investments, and the energy would be available only at ever higher prices, with the consequences of capital shortages and high inflation (Lovins 1977; Nash 1979). And eventually, when all resources would have been depleted, the energy problem would return with even more dire consequences (see also Bartlett 1978).

Further more, increased production of conventional energy has major impacts on the environment. The technologies which move us into a 'plutonium society' not only impose threats on our safety, but also bear the risk of destroying and polluting the environment (Ashley, Rudman, Whipple 1976; Griffin & Steele 1980).

Another point of critizism is concerned with over dependence on foreign energy which may be cut-off at any time and forces additional military effort to secure shipments of middle east oil.

These disadvantages, besides others, have lead people to think of alternative ways to provide the energy we need. Lovins (1977) has created the term 'soft energy paths' for those alternative strategies. The core concept is energy conservation. This may be achieved through less use of energy consuming appliances, but it may also be achieved by using more efficient appliances and cars, by insulating walls and roofs, etc., at no expense of convenience and individual well being. In fact, many scientists believe that energy conservation is <u>the</u> best source of energy, posing no burdens on the environment. Many energy saving measures are readily available and have proved to be cost effective, while saving large amounts of energy.

Yet another way to conserve precious fossil fuels is to substitute renewable energy sources. Active and passive solar systems may replace other sources for home heating and cooling. Wind energy can generate electrical power and pump water. Biofuels can be used for space heating, or can be converted to alcohol, which in turn can be used to run cars. Geothermal energy, the most important source for space heating in Iceland, is also feasible in parts of the United States, Oregon being one of them (Oregon Alternate Energy Development Commission 1980).

Both strategies, reduced energy consumption through more efficiency and changes in life styles, as well as development of alternative energy resources, can and should be pursued simultaneously (Oregon Alternate Energy Development Commission 1980). However, it is questionable if soft and hard technologies can be pursued at the same time. Lovins (1977) believes that both strategies are mutually exclusive, since both compete for the same scarce capital resources, and since the underlying values are incompatible. This notion, however, is not shared by public agencies (see Blackman 1979 for the Energy Research and Development Administration) and the general public.

Statement of Purpose

Public policies which aimed at the private consumer of energy, mainly focused on energy conservation as the solution to the energy problem. Programs that were designed to elicit conservation behavior followed two different strategies.

The first strategy was to influence behavior directly, by providing tax credits for conservation measures, imposing higher gasoline taxes, raising minimum building standards for insulation, providing car-pool lanes, and the like.

The second strategy was more indirect through information about the seriousness of the energy problem, about energy saving measures that are available, ways to do things without using as much energy, or by providing energy audits at no cost to the consumer. The reasoning behind this approach was that by changing attitudes toward energy consumption, behavior would change in its wake with positive long-term effects.

However, there were hardly any studies on the relationship between attitudes and behavior in the field of energy conservation, that policy makers could have drawn upon. The present study is an attempt to close this gap by providing information on the relationship between energy related attitudes and behavior in the context of sociodemographic characteristics. The knowledge of these relationships would allow government to make more informed choices about what policies would be most effective, for which group of the population, under what conditions.

Major Objectives

In order to accomplish its purpose the study will address the following three problems:

1. An attempt is made to identify energy related attitudes.
2. Once these attitudes have been specified, their impact on energy conservation behavior in the context of personal and housing characteristics will be investigated.
3. Energy related attitudes and conservation behavior, as well as personal and housing characteristics will be used to assess actual expenditures for energy in the household.

Assumptions

This study makes the following assumptions:

1. The sample is representative of the state of Oregon.
2. No systematic biases exist in the way respondents answered the questionnaire.

Limitations

The following are limitations to the present study:

1. The study is limited to the investigation of residential energy consumption. The industrial, commercial, and transportation sector were not considered in the data collection.
2. The present analysis was based only on responses from an Oregon sample. Therefore findings may only be generalized to residents of Oregon.
3. Since residential energy price differences are relatively small within Oregon, the price of energy, which is considered an important factor in determining energy consumption, was not included in the list of independent variables.
4. The questionnaire from which data for this analysis were taken was not developed specifically for the purpose of this study. Attitudinal and behavioral measures therefore had to be a compromise between what was thought ideal and what was available from the survey instrument.

Definition of Terms

Attitudes are predispositions about particular social objects, types of people, particular persons, social institutions, government policies, etc. They are directed toward a specific object (Nunnally 1978, p. 580).

Conventional energy sources are interchangeably used with traditional or non-renewable energy sources. They are oil, coal, natural gas, nuclear fission, and electricity generated with these resources.

Renewable energy sources are those resources which may be consumed at a sustainable level; in particular these are solar, wind, geothermal, hydroelectric, and organic energy. The term is used interchangeably with alternate or alternative energy sources (Oregon Alternate Energy Development Commission 1980).

Energy conservation refers to reduced consumption of energy compared to a previous level of consumption.

Rural/urban was defined according to the 1980 census. Only SMSA census areas were designated as urban. By this definition the following counties in Oregon were considered urban: Clackamas, Lane, Marion, Multnomah, Polk, and Washington (Paulus 1981).

Residential energy consumption refers to energy that is directly consumed in households i.e. for space and water heating, refrigeration, lighting, etc. It does not, however, include energy used for private transportation.

Structural conservation measures are all those energy saving features that involve changes in the structural environment, like wall and ceiling insulation, double glazed windows, wood burning stoves, solar water heaters, and the like.

No-cost conservation practices involve some changes in living patterns, like turning down thermostats, switching the use of rooms, opening and closing windows for natural convection, etc. They do not, however, cost any money.

CHAPTER II

REVIEW OF LITERATURE

The energy problem can ultimately be solved only when supply and demand for energy are at the same level, no matter whether it is achieved by boosting current energy output, or by curtailing energy consumption. The first part of the review of literature contains figures for energy consumption in the residential sector, the potential for energy conservation, and new energy sources. Following this rather technical section is a review of recent research findings on energy conservation behavior. After that, the nature of attitudes and how they relate to behavior is discussed, before some empirical evidence for the relationship between energy related attitudes and conservation behavior is presented.

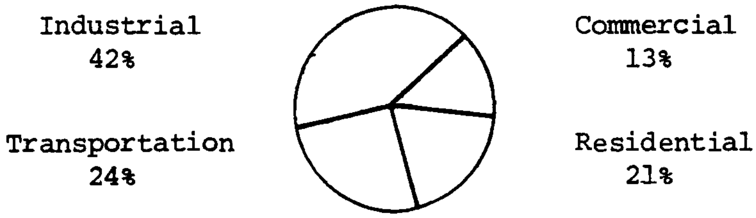
Out of this evidence a model is developed to guide the analysis of energy related attitudes and conservation behavior in the context of sociodemographic characteristics.

Residential Energy Consumption

Figure 1 presents the percentage of consumed energy in the industrial, commercial, residential, and transportation sectors.

Figure 1

Estimated Energy Consumption in Different Sectors (1974)

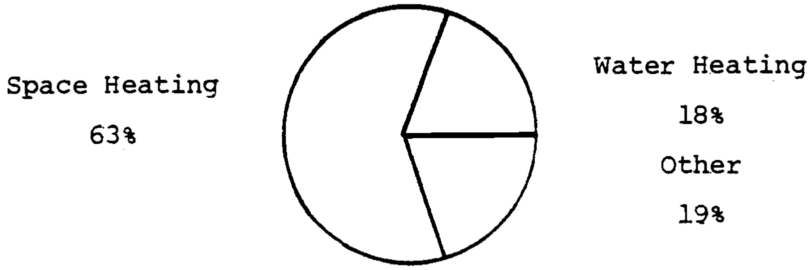


(Estimated from the U.S. Department of Energy Data Base 1978)

As shown in Figure 1 over one fifth of all energy is consumed in the residential sector. This energy mainly goes into space and water heating which accounts for some 80 percent of the total residential energy requirements, as can be seen from Figure 2.

Figure 2

Oregon Residential Energy Consumption by End Use



Source: U.S. Department of Energy. End Use Energy Consumption Data Base (1974) 1978

Estimates on the further growth of energy consumption are rather tentative and depend largely on the assumptions on makes about the successfulness of energy conservation and the development of related technologies which enable consumers to use less energy. Demand is projected to range somewhere between 75 QUADS (Quadrillion British Thermal Units or BTU) which assumes large conservation efforts (e.g. Lovins 1977) and more than 150 QUADS which assumes growth rates similar to those in the past (e.g. the historical growth scenario of the Ford Foundation 1974) until the year 2000.

For Oregon, estimates of residential energy consumption in the year 2000 have been published by the Oregon Department of Energy, ODOE (1980). The demand for different energy forms in 1980 and 2000 are presented in Table 1.

Table 1

Projected Change of Energy Consumption in Oregon Through the Year 2000 in the Residential Sector

Type of Energy	1980	2000	Change	Change
	(Trillion BTU per Year)			(%)
Electricity	52.9	76.0	+ 23.1	+ 44
Natural Gas	22.6	27.3	+ 4.7	+ 21
Petroleum	21.1	17.5	- 3.6	- 17
Coal and Other Fuels	9.4	10.8	+ 1.4	+ 15
Total	106.0	131.6	+ 25.6	+ 24

Source: Oregon's Energy Future: Fourth Annual Report, Oregon Department of Energy, January 1980

The 24 percent increase in total residential energy demand translates to a moderate annual growth rate of 1.1 percent over the next twenty years. This compares to about 5 to 6 percent annual growth between the years 1960 and 1975 (U.S. Department of Energy 1978). It reflects confidence in the efforts the Oregonian legislature has taken to foster energy conservation and the development of alternate energy sources (Oregon Department of Energy 1980).

Energy Conservation

Projections of energy use in the year 2000 may prove grossly exaggerated if efforts to conserve energy are implemented fast and on a large scale. A major shift toward renewable energy sources as well could take some of the strain off our supply of fossil fuels. The Oregon Department of energy writes under the headline "Entering A New Energy Era":

> If for no other reason, ever-dwindling reserves of finite energy sources eventually would compel the harnessing of 'new' energy forms: power from the sun and the wind, from falling water and water heated in the earth, and from wood and plant fibers and organic wastes (Oregon Department of Energy 1980, p. 20)

Let us first consider the potential of energy conservation. The advantages of energy conservation are widely recognized. A study by the Ford Foundation (1974) concludes that conservation is both cost-effective and the only major new source of energy which is readily available. Stobaugh and Yergin (1979) write about conservation:

> There is a source of energy that produces no radioactive waste, nothing in the way of petro-dollars, and very little pollution. Moreover, the source can provide the energy that conventional sources may not be able to furnish (Stobough & Yergin 1979, p. 136)

Increasing the efficiency of automobiles and appliances, insulating homes and installing efficient heating systems, utilizing waste heat, and much more could be done to achieve zero growth in energy consumption.

The "Oregon Residential Energy Conservation Survey" was conducted in 1979. About 1200 Oregon households were interviewed. Some of the findings are reported in the ODOE's Fourth Annual Report (1980). According to the survey, 75 percent of Oregon homes have at least some attic insulation, and 52 percent have wall insulation. Yet 34 percent are not fully weatherstripped and 58 percent not caulked, measures which are highly cost-effective. 89 percent reported they turned down thermostats upon retiring and 75 percent shut off areas they did not use.

In their 1980 Final Report, the Oregon Alternate Energy Development Commission estimates that by the year 2000 the equivalent to 41 trillion BTU could be saved annually through conservation efforts in the residential sector alone. These savings are equivalent to the projected growth in the energy demand for this sector and thus would allow residential energy consumption to remain at its current level.

It can be concluded that Oregonians, although they engage in some types of conservation behavior, are yet far away from exploiting the whole potential of energy conservation.

Alternate Energy Sources

Let us now examine the potential of alternate energy sources. The term alternate energy sources needs some clarification. It is used here interchangeably with the terms renewable energy sources and soft energy technologies. Lovins (1977) defines soft technologies by the following five criteria:

1. They rely on renewable energy flows that are always there whether we use them or not.
2. They are diverse, so that our national energy supply is based on many individually modest contributions, each designed for maximum effectiveness in particular circumstances.
3. They are flexible and relatively easy to understand.
4. They are matched in scale and geographic distribution to end use needs, in order to minimize transportation losses.
5. And they are matched in energy quality to end use needs in order to minimize conversion losses.

The Oregon Alternate Energy Development Commission (1980) made an attempt to estimate the potential of alternate energy sources in Oregon in the year 2000. Their focus was on solar, wind, geothermal, hydro, biomass, and fuel alcohols. The Commission estimated that by the year 2000, these alternate sources could produce the electrical power equal to ten large coal fired power plants. In addition, thermal energy of about 200 trillion BTU per year could be produced. This is about twice the amount of energy currently used in the residential sector in Oregon (see table 1, p. 9). On top of that, 70 million gallons of alcohol fuels could be provided per year. This amounts to approximately six percent of the gasoline consumed in Oregon in 1975.

The largest potential for development is seen from three sources; solar energy, geothermal, and wind energy (Oregon Alternate Energy Development Commission 1980).

Determinants of Residential Energy Conservation and Acceptance of Alternate Energy Sources

Following the 1973 oil embargo there has been a substantial amount of research on the determinants of energy conservation. The price of energy, as suggested by economic theory, was linked to conservation behavior in several studies.

Price of Energy

Peck and Doering (1976) found in a study of 453 households in rural Indiana that people who used liquid petroleum gas (LPG), which underwent drastic price increases during 1973/74, increased their fuel efficiency considerably ($t = 4.73$; $N = 279$). At the same time natural gas users, who faced only moderate price increases, did not change their energy consumption patterns to any notable extend ($t = 1.35$; $N = 174$). Both groups, however, had been exposed to the same amount of energy conservation appeals following the 1973 oil embargo.

Morrison, Keith, and Zuiches (1978) found in a study of 216 Michigan households that changes in energy consumtion between 1974 and 1976 for different energy sources varied inversely with the amount of price increase for these different fuels. The larger the relative price increase the smaller the growth of fuel consumption, including the possibility of reduced fuel consumption.

Voluntary Energy Conservation

There is evidence that energy consumption has been reduced over what would be expected just from price increases. Thus factors other than the price of energy may determine conservation behavior.

Mayer (1977) examined the demand for home heating gas and electricity in a sample of households in Twin Rivers, New Jersey. He concluded that the nearly ten percent reduction of natural gas consumption was not due primarily to price changes, but to conservation appeals and changing social norms.

Taylor and Blattenberger (1979) investigated the residential demand for electricity, natural gas, and fuel oil. The authors conclude that the difference in electricity consumption in 1974 relative to 1973 and 1975 was clearly a response to the energy crisis and cannot be accounted for by changes in income or price of electricity. A conservation effect was also found for natural gas and fuel oil, although it was somewhat weaker. It may be noted, however, that the effect of the oil crisis did not have a lasting effect, since it only accounted for voluntary reductions in the year following the oil embargo.

Incentives Other than Price

There have been studies attempting to assess the effect of various incentives on energy conservation efforts.

Winett, Kagel, Battalio, and Winkler (1978) conducted an experimental study of household electricity demand with 129 Texan households. An additional 179 households served as a control group.

Regression analysis suggested that approximately four percent of the reduction in electricity use could be attributed to voluntary response greater than that warranted by price and income changes.

Hayes and Cone (1976) conducted an experiment in an 80-unit housing complex in spring 1975. They offered cash payments, information, and feedback as incentives for people to cut down on their electricity use. Cash payments effected the largest reduction in energy consumption (-29%) whereas information (-16%) and feedback (-18%) were only half as effective. In conjunction with monetary incentives, neither information, nor feedback increased the effectiveness of cash payments alone.

Direct payments were also found to be most effective in reducing energy consumption in a study by Nietzel and Winett (1977).

From the reported studies it can be summarized that the price of energy had a dominant effect on energy conservation as would be expected from the economic theory. However, price was apparently not the only determinant for the demand of energy. Some studies provided evidence that conservation appeals and positive incentives were effective in further reducing energy consumption.

In the following sections studies are reported which tried to identify sociodemographic variables which are related to conservation behavior.

Sociodemographic Characteristics Related to Energy Conservation Behavior

The relationship between energy conservation behavior and various sociodemographic variables has been investigated in a number of studies. Results of these studies will be briefly presented by these variables.

Residential Location

Mc Kenna and Nixon (1979) in their study of 199 rural and urban households in Larimer County, Colorado, found more willingness to spend money for energy conserving measures among rural residents than among urban residents. No-cost measures, however, were found to be equally adopted in both groups.

Thompson (1980) reports as a result from the 1978 National Interim Energy Consumption Survey that rural households actually consumed less energy (128 million BTU) than urban households (141 million BTU).

Morrison, Keith, and Zuiches (1978), in a study of 235 Michigan families, did not find a significant impact of the residential location on conservation efforts.

Income

Donnermeyer (1977) concluded from the study of 104 Kentucky households that income was the single best predictor of energy consumption, with high income respondents using the most energy.

This was confirmed by the previously cited Morrison, Keith, and Zuiches (1978) study.

Cunningham and Lopreato (1977) summarized their findings as follows: "It shows that in most cases those individuals who were classified as more energy-conserving were lower-income subjects." (Cunningham & Lopreato 1977, p. 75)

Tienda (1980) conducted a telephone survey with 297 Wisconsin households. She found no significant differences between income groups with regards to adding conservation measures or adopting conservation practices.

Jackson (1980) in a study of 455 Canadian households did not find a significant difference in the amount of conservation practices adopted by different income groups.

Education

Jackson (1980) found a significant relationship between level of education and number of conservation practices adopted. Less educated respondents engaged in fewer conservation behaviors than the better educated.

Morrison, Keith, and Zuiches (1978) found that energy conservation was highest in the middle education group, while poorly educated and well educated respondents alike were less inclined to reduce their energy consumption.

Age

Jackson (1980) found that people under 25 years of age and over 65 were less likely to adopt conservation practices than were those in the middle age brackets.

Conversely, Morrison, Keith, and Zuiches (1978), who looked at the stage in the family life cycle rather than the respondent's age, found that people in the middle stages of the life cycle used significantly more energy than younger and older families. This, however, may have been due to the fact that in the middle stage of the family life cycle families tend to be larger.

Occupational Status

Occupation was not significantly related to energy conservation behavior in any of the above mentioned studies.

Type of Housing

Jackson (1980) reported that apartment dwellers were less likely to adopt conservation measures than respondents who lived in houses. This may reflect the fact that a higher percentage of apartments are rented than are houses.

Summary

Research findings on the relationship between energy conservation behavior and sociodemographic characterisitics do not yield a clear picture. Sociodemographic variables, however, appear to be useful in explaining conservation behavior to some extend. Existing contradictions between studies need to be explained by further research. The analysis of energy related attitudes and motives behind conservation behavior may help to resolve apparent contradictions and provide a better understanding of determinants of energy conservation.

The Relationship between Attitudes and Behavior

Allport (1935) defined an attitude as a learned predisposition to respond to an object or class of objects in a consistently favorable or unfavorable way. According to Fishbein (1966) an attitude is an organized set of beliefs with respect to a stimulus object. Stimulus objects may be physical objects, types of people, particular persons, social institutions, government policies, etc. (Nunnally 1978).

Although the concept of attitudes is regarded as one of the central concepts in social psychology there is substantial disagreement on the usefulness of attitudes in social research (Kelman 1974). Studies which tried to establish a linkage between attitudes and related behavior oftentimes result in little or no correlation between the two measures. Fishbein (1967) gives a pointed description of this failure in writing:

> It is my contention that we psychologists have been rather naive in our attempts to understand and to investigate the relationships between attitude and behavior. More often than not, we have attempted to predict some behavior from some measure of attitude and found little or no relationship between these variables. Yet, rather than questioning our basic assumption that there is a strong relationship between attitude and behavior, we have tended to blame our failures on our measuring instruments, on our definition of attitude, or on both (Fishbein 1967, p. 477).

He points out that at times behavior toward a given object may be completely determined by situational or individual difference variables. He therefore concludes that "behavior toward a given object is a function of many variables, of which attitude toward the object is only one" (Fishbein 1967, p. 491).

Many studies on attitude-action inconsistency have dealt with racial prejudices. La Piere's (1934) now classic study of the discrepancy between attitude versus actual behavior with respect to hotel and restaurant managers' treatment of Chinese is the first in a long row of studies which aimed at debunking the widely held notion that attitude and behavior must always be consistent.

Wicker (1969) concluded from his thorough review of studies on attitude-action relationship that "taken as a whole, these studies suggest that it is considerably more likely that attitudes will be unrelated or only slightly related to overt behaviors than that attitudes will be closely related to actions" (Wicker 1969, p. 65).

According to Kelman (1974), however, much of the blame for weak attitude-action relationship goes to poor research design. He notes that oftentimes attitude measures were obtained from large surveys whereas actual behavior then was assessed in a small experimental setting.

The unidimensional view of attitudes as being either positive or negative, favorable or unfavorable, does not do justice to more elaborate attitude theories. Rokeach (1969) has argued that prediction of behavior toward an object requires a systematic analysis of the situation in which the object is encountered.

A second line of empirical research that has raised questions about the attitude concept is research on the effects of counterattitudinal action. The theory of cognitive dissonance (Festinger 1957) has triggered many experiments which suggest that attitude follows action rather than precede it. However, dissonance theorists have reasoned that one way of reducing dissonance is to change attitudes. Attitude change then reduces dissonance because it provides the person with an attitude from which his/her earlier behavior follows retroactively. Kelman (1974) argues that the new attitude can fulfill that function only insofar as it is 'real', and, if it is real, it should have a directive effect on subsequent behavior.

From both areas of criticism of the attitude concept it follows that attitudes are more complex than the socio-psychological research design using them. Attitudes are determinant, component, and consequence of action all at the same time, or as Kelman (1974) says:

> Attitude and action are linked in a continuing reciprocal process, each generating the other in an endless chain. Action is the ground on which attitudes are formed, tested, modified, and abandoned (Kelman 1974, p. 316).

Research Findings of Attitude-Behavior Relationships in the Field of Energy Conservation

A growing number of studies have investigated the relationship between energy related attitudes and behavior. Most often this attitude was the 'perceived severeness of the energy problem' or the 'belief in an energy problem'.

Perception of the Energy Problem

The most thorough analysis of the perception of the energy problem was done in a study by Cunningham and Lopreato (1977) in three Southwestern States of the U.S. Their mail survey yielded 2,403 usable questionnaires. They found that the belief in an energy problem was greater among women, among younger respondents, among better educated persons with higher incomes, and finally among Whites as opposed to Blacks and Mexican. They note, however, that part of these relationships may be due to high intercorrelations between these variables.

Cunningham and Lopreato, however, did not relate the perceived seriousness of the energy problem to any behavioral measure.

Jackson (1980) collected data from 455 residents of Edmonton and Calgary, Canada, on their perception of the seriousness of the energy problem and a number of energy saving behaviors they were engaging in. He concluded that "these data provide evidence for a consistent association between perceptions of energy problems and the range of energy conservation practices perceived and adopted" (Jackson 1980, p. 126).

He found that the respondent's age was the best predictor of perceived seriousness of the energy problem, with younger people most frequently describing energy problems as very serious. Also related to perceived seriousness, although somewhat weaker, were income, with low-income respondents being more concerned about the energy problem; living in an appartment as opposed to a house; and sex, with women taking the energy problem more serious than men.

In a review of literature by the Solar Energy Research Institute (SERI 1979) it was concluded that those people who believed there was an energy problem were younger, better educated, had a higher income, had higher status occupations, and were white.

All these findings are consistent in that they establish a relationship between perceived seriousness of the energy problem and higher socio-economic status. The relationship between perceived seriousness and actual energy conservation behavior, however, is less certain.

Morrison, Keith, and Zuiches (1978) in their study of 235 Michigan families, for example, found that belief in the energy problem did not have a measurable impact on the level of energy consumption.

Attitudes Other than Perceived Seriousness of the Energy Problem

Hogan and Paolucci (1979) investigated the relationship between environmental values and energy conservation practices using a sample of 157 families from the Lansing Standard Metropolitan Area. The value labeled 'eco-consciousness' was found to be a good predictor of energy conservation behavior. Education, occupation, and age of both husband and wife, on the other hand, were not found to be related to energy conservation practices in any systematic way.

Eco-consciousness, in turn, was best predicted by wife's education (R = .47), husband's education (R = .39), and husband's occupation (R = .37).

Donnermeyer (1977) investigated the relationship between conservation attitude, social status, and actual energy consumption. Conservation attitude was a measure derived from four opinions pertaining to energy saving practices. He found that "income, assessed valuation (of the home), and occupational status were generally not significantly correlated with opinions toward energy conservation" (Donnermeyer 1977, p. 187).

He also found no significant relationship between opinions toward energy conservation and energy consumption level. This relationship did not even become significant when controlled for attitude salience or attitude priority.

Modelling Energy Conservation Behavior

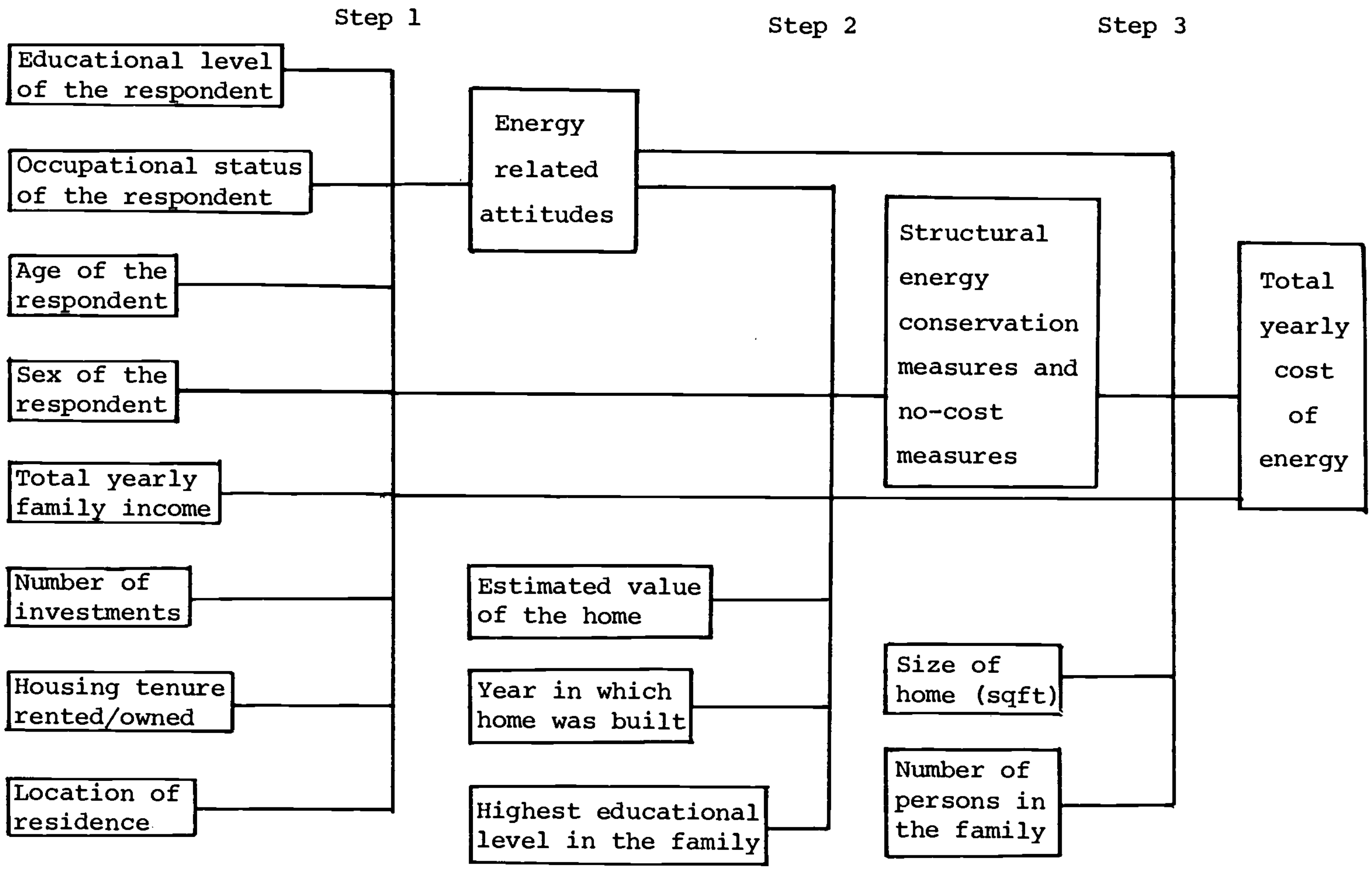
The model developed in this last part of the review of literature serves two purposes. First, it summarizes the findings from previous research in the field of energy conservation behavior as it was presented in the precending sections. Second, it provides a framework to guide the investigation of relationships between sociodemographic characteristics, energy related attitudes, and actual behavior.

According to the review of literature, some of the sociodemographic variables were at the same time related to energy conservation behavior and to energy related attitudes, yet with a different sign. Conservation attitude, for example, was positively related to high social status as expressed by high income, higher education, and higher occupational status. At the same time, energy conservation was inversely related to these same variables.

Relationships between sociodemographic variables, attitudes, and actual behavior therfore should be analyzed step by step. This is expressed by the sequential nature of the proposed model.

The model will contain some housing characteristics which were not discussed in the review of literature, but which were felt to be of importance. It is not a model in a strict scientific sense, neither does it claim to be complete. The price of energy and other conservation incentives, which had been identified as factors determining energy consumption,are not included in the model, since information for these variables was not available. Rather this model should help to conceptualize the flow of research questions in the present study.

Figure 3: A Model for Investigating the Relationship between Energy Related Attitudes, Behaviors, and Selected Sociodemographic Variables



Sociodemographic and Housing Characteristics

CHAPTER III

METHODOLOGY

Research Design

The data for this analysis were obtained from a survey which was conducted as a project by a Western Regional Agricultural Experiment Station Committee (W-159). The project was titled 'Energy Directions: A Western Perspective'. Ten western states and Pennsylvania participated in the project. Regional data, however, were not yet available for analysis, so the present study is confined to Oregon data.

The data were collected with a mailed questionnaire which was developed by the regional research committee and followed the procedure outlined in the Total Design Method by Dillman (1978). The mail survey was chosen for its capability to gather information from large samples, at relatively low cost, and in a standardized procedure in all participating states. The questionnaires were mailed at the same time in all states during spring 1981

Selection of the Sample

A stratified random sample was drawn from each participating state. Telephone directories served as sampling frames, since these listings were readily available in all states. The stratification was for rural and urban population so that an equal number of questionnaires were mailed to rural and urban households. Currently the actual distribution of the Oregon population between rural and urban locations is 40 percent rural and 60 percent urban (Paulus 1981, p. 276).

According to the sampling design half the questionnaires were mailed to the female head of household and the other half was mailed to the male head of household.

For Oregon, an adequate sample size was estimated at approximately 850 respondents (Regional Research Committee, 1980). In order to obtain this number, initially 1503 questionnaires were mailed.

Description of the Instrument

The questionnaire was developed by the regional research committee and again followed the Total Design Method (Dillman 1978). For easier handling the questionnaires were reduced to about half of their original size and put together in the form of a small booklet. An example of the instrument is presented in appendix A.

For the present study only part of the questions were selected from the questionnaire. These were the questions which dealt with attitudes toward the energy problem and various energy sources.

Question 1: Some people feel that energy is a serious national problem, but other people feel it is not. We would like to know your opinion. Do you consider meeting the United States' energy needs during the next ten to twenty years to be: (not a serious problem to a very serious problem).

Question 2: One way to meet our future energy needs is to cut back on energy use. Another way is to increase energy production. Which one of the following choices do you feel our country should make in order to meet our future energy needs: (depend entirely on cut-backs to depend entirely on increased energy production).

Question 3: To what extent do you favor or oppose each of the items listed below as a way of helping to meet our country's future energy needs? (Strongly oppose to strongly favor.)

The next set of selected questions asked for various energy saving measures people had taken.

Question 10: Listed below are certain energy-saving features that might be added to your home (by you or if you rent, your landlord). For each item, please circle the one best answer: (existed, added, plan to add, doesn't exist, don't know, doesn't apply).

Question 14: Here are some other efforts you may or may not be doing to save heating and cooling costs in your home. For each item, tell whether you now do it, or plan to do it in the future. (Done now, plan to do, no plans, doesn't apply.)

In addition to that, a number of questions related to housing characteristics were selected. They contained information on housing tenure (rented versus owned), the size of the home in square feet, the year in which the house was built, the estimated value of the home, and the amount of money it took to supply the home with energy in the past year.

Finally, a number of personal and family characteristics were chosen from the questionnaire. They were age of the respondent and sex of the respondent, number of persons in the household, occupation of the respondent, education of the respondent and his/her spouse, the number of different investments, and the total yearly family income in the past year.

Procedures for the Collection of Data

The Total Design Method calls for a very specific procedure of data collection. The two guiding principles are to personalize the letter of introduction that goes along with the questionnaire, and to follow-up on non-respondents. The letters asking respondents to participate in the study were all individually typed on an APPLE 2 text editing computer. The letter stressed the importance of the respondent's participation and was handsigned by the principal investigator using blue ink. A copy of the introductory letter is included in appendix B. The letters and return envelopes were post-marked with regular stamps to avoid the appearance of business mail. The initial mailing and follow-ups were done according to the schedule described below.

First Mailing on March 9th 1981. In the initial mailing 1503 questionnaires were sent to randomly selected households, 753 to rural residents and 750 to urban residents. Each letter that was mailed contained a questionnaire and an introductory letter. Letters that could not be delivered were checked for possible errors in the address and re-mailed.

One-week Postcard Follow-up. One week after the initial mailing on March 16th 1981 a postcard follow-up was mailed to each participant. The postcard was preprinted and again handsigned by the principal investigator. The postcard contained a thank you for those who had already mailed back their questionnaire and a friendly reminder for others to answer the questionnaire.

Second Follow-up after two weeks (March 30th 1981) a lithographed letter which again was handsigned was mailed. It provided a second questionnaire in case the first one had not arrived or was misplaced. As questionnaires were received they were marked off the mailing list according to their identification number. Thus it was possible to include only those participants in the second follow-up which had not answered by that time. The follow-up letter was slightly more urging than the first letter (see appendix B).

Third Follow-up. The Total Design Method calls for a third follow-up on non-respondents. This is accomplished either by telephone or by certified mail. The third follow-up produces a higher return than the first and second follow-up, according to Dillman (1978). Response rates typically reach between 60 and 75 percent after the third follow-up. However, this procedure is extremely costly. Oregon chose not to do a third follow-up because the response rate was judged to be already sufficient.

Final Distribution of Questionnaires. Of the total 1503 questionnaires which were initially mailed, 834 usable were returned, a 55 percent return rate. 137 questionnaires were undeliverable, 24 had been sent to families which had moved, 101 were returned blank with a refusal to participate, and 407 were not returned for reasons like lack of time or interest to participate, sickness, etc.

Statistical Analysis

The statistical analysis proceeded in three stages.

In the first stage descriptive statistics were run on all sociodemographic variables which were to be included in the analysis. Some of the variables could be taken directly from the questionnaire. These were the variables: respondent's education, occupational status, and age, number of people living in the family, and number of investments the family had made.

Other variables had to be transformed into dummy variables. Those were: Respondent's sex (female = 1; male = 0), housing tenure (own = 1; rent = 0), and location of the residence (rural = 1; urban = 0).

Some variables were categorical rather than continuous. They were recoded by substituting the mean of each category for the category. Those variables were: total yearly family income, estimated value of the home, year in which the home was built, and size of the home.

Finally the highest educational level in each family was computed from the educational level of the respondent and the respondent's spouse.

In the second stage attitudes toward various energy sources were factor analyzed to see which patterns emerge and to reduce the number of variables to a manageable size. From these factors, factor scores were derived which were used in place of the initial attitudes toward energy sources.

The third stage consisted of multiple linear regression analysis. It included the sociodemographic variables described in stage one, the attitude measures derived from factor analysis, and several behavioral measures. Behavioral measures were computed from responses to two questions asking to specify what structural measures had been taken and what energy saving practices respondents had been engaging in. In addition the total amount of money spent for energy was included in the analysis. The regression analysis followed the three steps outlined in the model which was presented in the review of literature.

Descriptive Statistics

Descriptive statistics contained absolute and relative frequencies, as well as relative frequencies adjusted for missing observations. The mean and median were computed as measures of central tendency and the standard deviation as a measure of dispersion.

Factor Analysis

Factor analysis was used to explore variables with the intent to detect underlying patterns and reduce the number of variables. These newly created factors represent the initial set of variables. They may be used as an index or measure in later steps of the analysis (Kim 1975). The following major steps are involved in factor analysis (Comrey 1973, p. 4; Neale & Liebert 1980, p. 99):

1. Selection of variables for the factor analysis.
2. Computation of a correlation matrix between these variables.
3. Extraction of the unrotated factors.
4. Rotation of the factors into a final solution.
5. Interpretation of the final rotated factors.
6. Computation of an index based on the final factor solution.

There are several methods to extract factors from a correlation matrix. The method used in this study was principal factoring. The first factor to be extracted is that which accounts for the largest amount of variation in the variables included in the analysis. Then the second factor is extracted which accounts for the largest amount of remaining variation, and so forth. The process of factor extraction continues until the maximum number of factors have been extracted, which is equal to the number of variables included in the factor analysis, or until some minimum requirement previously set is not satisified. The minimum set in this analysis was a minimum eigenvalue of 1.0.

The initial factor matrix contains factor loadings which are the correlation coefficients of the variables with the factors. The sum of all factor loadings of each variable is called the variable's communality. The communality can be interpreted as the amount of variance in a variable explained by all the extracted factors. Communalities may range from zero, which means that none of the variation in the variable is explained by the factors, to one, which means that all the variation is explained by the extracted factors (Comrey 1973, p. 7 f).

The amount of variance in the set of variables that is accounted for by one factor is referred to as the eigenvalue of that particular factor. Thus, the eigenvalue of a factor indicates the relative value of a given factor in explaining the set of variables.

After the raw-factor matrix has been obtained, the factors are rotated into a terminal solution. There are several methods of factor rotation, but all attempt to facilitate the interpretation of factors. For this study the Varimax rotation method was used. Its advantage is explained by Comrey (1973):

> The Varimax method maximizes the variance of the squared factor loadings by columns (of the factor matrix). Thus, on any given factor, a pattern is desired such that there are some high loadings and lots of low loadings with few intermediate-sized loadings (Comrey 1973, p. 173).

Since factors rotated according to the Varimax method have only few variables which load high, interpretation becomes relatively simple.

The rotated factor matrix may then be used to compute factor scores which, in turn, can serve as variables representing the factors. In the present analysis, factor scores are computed from factor score coefficients. Factor score coefficients are estimated with the least squares regression method from the rotated factor matrix according to the following formula (Kim 1975, p. 488):

$$F = S^T \times R^{-1}$$

with: F = Factor-score matrix

S^T = Transpose of the rotated factor matrix

R^{-1} = Inverse of the correlation matrix

A factor score for each subject may then be computed by multiplying the factor score of each variable with the score each individual had on that particular variable. The scores on the variables are previously standardized by subtracting the mean of that variable and dividing it by the standard deviation. This procedure controls for differences in the standard deviations and means of the variables included in the analysis. Finally the products are summed over all variables that are included in the factor.

An alternative way to arrive at a score for each subject on each factor is, to select only those variables for the computation of the factor score which have a certain minimum factor loading (Kim 1975, p. 487 - 489). This method was chosen in the present analysis for computing factor scores. Only those variables were included in the computation that had a minimum factor loading of +/- .24. Since factor scores were computed from standardized variable scores, they had a mean of zero or at least close to zero.

Multiple Regression Analysis

Multiple regression analysis was chosen for its ability to find the best linear prediction equation for a given variable and control for other confounding factors in order to evaluate the contribution of a specific variable (Kim & Kohout 1975, p. 321). The technique allows to express one dependent variable as a linear function of two or more independent variables. In general, multiple regression requires that variables are measured on interval or ratio scale and the relationships among the variables are linear and additive (Kim & Kohout 1975, p. 320). There are, however, ways to include nominal variables by using dummy variables, and to linearize initially non-linear relationships by specific transformations (Neter & Wasserman 1974, pp. 123 - 130; Kim & Kohout 1975, pp. 373 - 378).

The mathematical procedure to regress a dependent or y variable on one or more independent or x variables is called least squares estimate. This procedure aims at minimizing the squared deviations of actual y's from y's predicted by the following general model:

$$y = b_0 + b_1x_1 + b_2x_2 + \dots\dots\dots\dots + b_nx_n + e$$

with: y = dependent variable

x_1 to x_n = set of n independent variables

b_0 = constant (intercept in simple regression)

b_1 to b_n = regression coefficients associated with independent variables

e = residual, or error term; it is assumed to be normally distributed around zero.

The dependent variable may then be expressed as a function of a set of independent variables and their corresponding regression coefficients.

The analysis of variance table provides the coefficient of multiple determination R associated with the regression model. The squared coefficient of multiple determination R^2 indicates the amount of variance in the dependent variable which is accounted for by the independent variables included in the model.

As a test-statistic for the significance of the whole model as well as for each independent variable included in the model, the F-test was used (Neter & Wasserman 1974, pp. 242; 262 - 265). A regression coefficient was considered significant when it reached a significance level of $p = .05$, and highly significant when it reached at least $p = .01$, as customary in behavioral research (Neale & Liebert 1980, p. 78).

In order to arrive at the best model to explain the dependent variable, the stepwise regression method was applied (Neter & Wasserman 1974, pp. 382 - 386). In the first step, the independent variable which is most highly correlated with the dependent variable enters the model. Then all partial correlation coefficients for the remaining variables are computed and the variable with the highest partial correlation coefficient enters the model. The partial correlation coefficient indicates the correlation between two variables adjusted for one or more other variables. In essence, the second variable to enter the model is that one which explains the greatest amount of the remaining variance in the dependent variable, that is the variance that was not accounted for by the previously entered variable. This procedure continues until all independent variables are in the model or until some previously specified minimum requirement is not satisfied. In this study no such minimum requirements were specified in order to be able to look at all independent variables.

The stepwise regression method is an automatic procedure which may 'overlook' more meaningful variables and thus lead to meaningless models. For this analysis, however, it was judged to yield appropriate models.

Computational Help

All the computations for the analysis were done at the Milne Computer Center at Oregon State University with the help of an unsponsored research grant. The analyses were conducted with the help of the 'Statistical Package for the Social Sciences - SPSS' version 8.0, June 18, 1979.

CHAPTER IV

FINDINGS

Sociodemographic Characteristics

In the first part of the findings, sociodemographic characteristics of the sample are reported. Absolute frequencies, relative frequencies, and relative frequencies adjusted for missing observations are presented for those variables which were selected for the present analysis.

Age of the Respondents

The mean age of the respondents was 47 years and the median age was 45 years. The fact that only household heads were included in the sample explains these relatively high figures. Table 2 shows the age distribution of the sample.

Table 2

Age of the Respondents

Age of Respondents	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
under 25 years	46	5.5	5.9
25 to 34 years	179	21.5	22.9
35 to 44 years	160	19.2	20.5
45 to 54 years	121	14.5	15.5
55 to 64 years	134	16.1	17.2
65 years and over	141	16.9	18.0
No answer	53	6.3	missing
Total	834	100.0	100.0

Sex of the Respondent

Although questionnaires were mailed to an identical number of male and female household heads, the sex distribution in the returned questionnaires is unequal as table 3 shows.

Table 3

Sex of the Respondent

Sex of Respondent	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Female	329	39.4	41.6
Male	462	55.4	58.4
No answer	43	5.2	missing
Total	834	100.0	100.0

Educational Background of the Respondent and Highest Education in the Family

The questionnaire provided information on the educational level of both the respondent and the respondent's spouse. The respondent's education was used in the analysis of attitudes. It was considered inappropriate, however, to use the respondent's education in the analysis of behavior, since large investments like solar water heating, wall and ceiling insulation, etc. can be expected to be a joint decision of both spouses in most cases. Therefore, the highest level of education was computed for each household. As expected, the frequency distribution of the latter variable was shifted toward higher educational levels. Both variables are presented in table 4 and table 5.

Table 4: Educational Background of the Respondents

Level of Education Completed	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
No formal education	2	.2	.3
Grade school	39	4.7	4.9
Some high school	78	9.4	9.8
High school graduate	175	21.0	22.0
Trade school	42	5.0	5.3
Some college	228	27.3	28.6
College graduate	113	13.5	14.2
Some graduate work	50	6.0	6.3
A graduate degree	70	8.4	8.8
No answer	37	4.4	missing
Total	834	100.0	100.0

Table 5: Highest Educational Level in the Family

Level of Education Completed	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
No formal education	1	.1	.1
Grade school	18	2.2	2.3
Some high school	50	6.0	6.4
High school graduate	156	18.7	20.1
Trade school	41	4.9	5.3
Some college	226	27.1	29.1
College graduate	129	15.5	16.6
Some graduate work	57	6.8	7.3
Graduate degree	98	11.8	12.6
No answer	58	7.0	missing
Total	834	100.0	100.0

Occupational Status of the Respondent

Although detailed information on occupation was obtained, for the purpose of this early, rather descriptive study, occupation was dichotomized into blue collar and white collar occupations. Results are shown in table 6.

Table 6

Occupational Status of the Respondent

Type of Occupation	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Blue collar	263	31.6	34.3
White collar	504	60.3	65.7
No answer	67	8.1	missing
Total	834	100.0	100.0

Total Yearly Household Income

Respondents were asked to indicate in which category out of nine their total family income before taxes fell in 1980. Although a frequency distribution of these categories is presented, for the computation of the mean and median income and for further analysis, the mean of each category was substituted for that particular category. According to this, the mean family income in 1980 was $ 23,989 and the median income was $ 21,534. The distribution of the total yearly household income is shown in table 7.

Table 7

Total Annual Household Income

Annual Income Range ($)	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Less than $ 5,000	34	4.1	4.4
$ 5,000 to $ 9,999	92	11.0	11.8
$ 10,000 to $ 14,999	103	12.4	13.3
$ 15,000 to $ 19,999	119	14.3	15.3
$ 20,000 to $ 24,999	132	15.8	17.0
$ 25,000 to $ 29,999	96	11.5	12.4
$ 30,000 to $ 39,999	100	12.0	12.9
$ 40,000 to $ 49,999	45	5.4	5.8
$ 50,000 or more	56	6.7	7.2
No answer	57	6.8	missing
Total	834	100.0	100.0

Number of Investments

Table 8

Number of Different Investments

Number of Investments	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
No investments	30	3.6	3.8
One or two investments	234	28.1	29.6
Three or four investmts.	268	32.1	33.9
Five or six investments	157	18.8	19.9
Seven an more investmts.	101	12.1	12.8
No answer	44	5.3	missing
Total	834	100.0	100.0

The number of investments was derived from a question that asked respondents to identify the types of investments they had made from a list of twelve different investments. The mean number of investments was 3.8 and the median number of investments was 3.5 in the sample.

Number of Persons in the Family

The average family size in the sample was 2.8 persons ranging from one person to eleven persons per household. The frequency distribution of different sized families is shown in table 9.

Table 9

Number of Persons in the Family

Number of Persons in the Family	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
One person	119	14.3	14.6
Two persons	290	34.8	35.6
Three or four persons	307	36.8	37.7
Five and more persons	98	11.7	12.1
No answer	20	2.4	missing
Total	834	100.0	100.0

Residential Location

The sample was stratified for rural and urban population; that is, an equal number of questionnaires was mailed to rural and to urban households. This distribution is well reflected in the returned questionnaires which indicates that there were no differences in the rate of response between rural and urban households. Table 10 shows the distribution.

Table 10

Residential Location

Location of the Home	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Rural	423	50.7	50.8
Urban	410	49.2	49.2
No answer	1	.1	missing
Total	834	100.0	100.0

Selected Housing Characteristics

Besides sociodemographic variables, some housing characteristics were selected for multiple regression analysis at a later stage. Frequencies for these variables are presented in the section below.

Housing Tenure

Respondents were asked to indicate whether they lived in a house they owned or whether they rented the house or apartment they occupied. The findings show that in the present sample only about one out of seven families lived in a rented dwelling, whereas 85 percent owned a house. The exact distribution is presented in table 11.

Table 11

Housing Tenure

Housing Tenure	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Rented	118	14.1	14.4
Owned	689	82.6	84.2
Condominium	5	.6	.6
Other	6	.7	.7
No answer	16	1.9	missing
Total	834	100.0	100.0

Year in which the Home was Built

Table 12

Year in which Home was Built

Year of Construction	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Before 1940	146	17.5	18.0
1940 to 1949	107	12.8	13.2
1950 to 1959	111	13.3	13.7
1960 to 1969	163	19.5	20.1
1970 to 1974	113	13.5	14.0
1975 or after	170	20.4	21.0
No answer	24	2.9	missing
Total	834	100.0	100.0

The mean year in which a house was built, as taken from the present sample, lies close to 1956. This figure was obtained by using the midpoint of each category.

Size of the Home

In order to compute the mean size of the homes from this sample, again midpoints were taken from each category. The average size of homes obtained from this procedure was 1,502 square feet. The frequency distribution for the six categories is presented in table 13.

Table 13

Size of the Home

Size of the Home in Square Feet	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Less than 500 sqft	23	2.8	2.9
501 to 1,000 sqft	165	19.8	20.7
1,001 to 1,500 sqft	267	32.0	33.5
1,501 to 2,000 sqft	189	22.7	23.7
2,001 to 2,500 sqft	75	9.0	9.4
More than 2,500 sqft	78	9.4	9.8
No answer	37	4.4	missing
Total	834	100.0	100.0

Estimated Value of the Home

Finally, respondents were asked to estimate the value of the home they were living in and mark the appropriate category out of eight possible categories. For the computation of an estimated mean value of the homes in this sample, the midpoints of each category were taken as a substitue for each category like in the two previous cases. The mean value according to that computation turned out to be $ 75,555 and the median value $ 66,925 . Table 14 presents the frequencies in each of the categories.

Table 14

Estimated Value of the Home

Value of Home ($)	Absolute Frequency	Relative Frequency %	Adjusted Frequency %
Less than $ 25,000	42	5.0	6.2
$ 25,000 to $ 49,999	143	17.1	21.2
$ 50,000 to $ 74,999	226	27.1	33.4
$ 75,000 to $ 99,999	133	15.9	19.7
$ 100,000 to $ 124,999	57	6.8	8.4
$ 125,000 to $ 174,999	51	6.1	7.5
$ 175,000 to $ 249,999	21	2.5	3.1
More than $ 250,000	3	.4	.4
No answer	158	18.9	missing
Total	834	100.0	100.0

The next section presents those variables that served as a basis for developing attitude measures and the results from the factor analysis.

Energy Related Attitudes

Attitude Measures Obtained by Factor Analysis

Attitudes toward energy consumption were obtained by factor analyzing twelve Likert-type statements which measured opinions about various energy sources. Those statements may be grouped into three categories. The first relates to the degree to which people favor reducing energy consumption;the second to the respondents' attitude toward conventional energy sources, like coal or oil; and the third to attitudes towards renewable energy sources, like solar and wind energy.

In addition to these rather specific opinions about energy sources, a general question asked respondents to indicate whether they preferred reducing energy consumption as a solution to the energy problem, or whether they would rather have increased energy production as a solution to the energy problem.

Responses to eleven statements about different energy sources were tapped with a five step Likert scale that ranged from 'strongly oppose' to 'strongly favor' with the middle position being 'neutral'. For the analysis of these scales a score of one was assigned to the statement 'strongly oppose' and a score of five to the statement 'strongly favor'.

Responses to the twelfth statement, which asked for a general attitude, were treated in the same way, such that one was assigned to the response 'depend entirely on cut-backs' and five was assigned to the statement 'depend entirely on increased energy production'. Thus the higher the score a person has on a particular statement the more favorable that person is toward that particular statement.

Table 15 summarizes the responses to all the twelve statements. The table includes adjusted frequencies in percent for each response category and the mean score for each statement which indicates to what degree the whole sample liked or disliked that particular statement (table 15).

Table 15

Attitudinal Statements toward Various Energy Sources

Statement	Strongly Oppose	Oppose	Neutral	Favor	Strongly Favor	Mean Score
	(percent	of respondents)				
1. More use of solar energy	.2	.4	7.4	39.0	53.0	4.4
2. Reduce energy use in homes	2.8	11.6	17.9	52.3	15.5	3.7
3. More use of nuclear power	19.0	16.3	23.7	28.1	12.9	3.0
4. More use of western coal	1.8	10.0	24.9	50.5	12.8	3.6
5. Reduce energy use in business	4.2	18.9	25.1	40.2	11.7	3.4
6. More use of oil from west. shale	2.2	6.3	27.0	52.9	11.7	3.7
7. Reduce energy use in travel	4.7	20.5	21.7	41.6	11.5	3.3
8. More oil imports	23.9	53.3	17.1	5.0	.6	2.1
9. More exploration for U.S. oil	.4	2.7	8.9	53.9	34.1	4.2
10. Reduce energy use by agriculture	16.1	42.3	24.8	13.7	3.1	2.5
11. More use of wind energy	.4	.7	5.7	51.0	42.3	4.3

Statement	Depend entirely on cuts	Depend mostly on cuts	Cuts and prod.	Depend mostly on prod.	Depend entirely on prod.	Mean Score
12. Would you rather cut back on energy use or increase energy production?	1.0	6.4	69.3	21.0	2.3	3.2

Most favorable attitudes were those toward more use of solar energy with a mean score of 4.4 and more use of wind energy with 4.3, both renewable energy sources. More oil imports, on the other hand, was the statement least favored by the sample. The general statement on energy strategies (statement 12) shows that Oregonians favor a double strategy of increased energy production and reduced energy consumption at the same time. The feasibility to pursue both strategies simultaneously has been doubted by Lovins (1977) as was discussed earlier.

The twelve statements were then factor analyzed. To accomplish this, a principal factoring procedure with iterations and subsequent Varimax rotation were applied. Three factors were extracted from the correlation matrix which satisfied the previously set minimum eigenvalue of 1.0. Combined,those three factors explained 49.3 percent of the variation in the initial set of twelve variables. Factor 1 explained 23.8 percent, factor 2 explained 13.6 percent, and factor 3 explained 12.0 percent of the variance.

The Varimax rotated factor matrix is presented in table 16. It shows the factorloadings of each variable on the final (rotated) factors. Those loadings on any of the factors which were high were marked with an asterisk (*).

The Interpretation of Factors was based on the rotated factor matrix. Each factor was interpreted separately by looking at those variables which loaded high on that particular factor (those which had an asterisk) and determining what those variables had in common.

The interpretation of factor 1 was straight forward. All variables which asked for reducing energy consumption loaded high on factor 1. The general statement loaded negatively on factor 1 which again meant respondents wanted to depend on cut-backs rather than increased energy production. Factor 1 was therfore labeled: 'Favorable attitude toward reducing energy consumption'.

Table 16

Varimax Rotated Factor Matrix

Variables	Factor 1	Factor 2	Factor 3
1. More use of solar energy	.06277	-.11915	.69443 *
2. Reduce energy use in homes	.65580 *	-.05189	.15997
3. More use of nuclear power	-.17113	.38307 *	-.24497 *
4. More use of western coal	-.09165	.60022 *	-.09629
5. Reduce energy use in business	.63152 *	-.15063	.13059
6. More use of oil from west. shale	-.05803	.70224 *	.03000
7. Reduce energy use in travel	.57669 *	-.05591	.11352
8. More oil imports	-.08641	-.01796	-.24625 *
9. More exploration for U.S. oil	-.13578	.49495 *	.11279
10. Reduce energy use by agriculture	.47049 *	-.06854	.01629
11. More use of wind energy	.05914	.02223	.61850 *
12. Cut-backs versus production	-.44202 *	.22521	-.03614

* Indicates high factor loadings

Variables that loaded highly on factor 2 were those associated with conventional energy sources, like coal, oil, and to a lesser degree nuclear power. Factor 2 was therefore interpreted as a measure of attitudes toward conventional or non-renewable energy sources and labeled: 'Favorable attitude toward conventional energy sources'.

The two renewable energy sources, solar and wind energy, loaded high on factor 3. Oil imports and nuclear energy loaded both with a negative sign on factor 3 but they were considerably weaker than solar and wind energy. Factor 3 therefore was interpreted as a measure for attitude toward renewable energy sources and labeled: 'Favorable attitude toward renewable energy sources'.

The Computation of Factor Scores was the final step in the creation of attitude measures. They were computed from factor score coefficients which were part of the computer printout obtained in the factor analysis. The factor score coefficients are shown in table 17.

In a first trial, an index representing each factor was computed based on all variables. This index, however, turned out not to be very precise, since some of the variables went into that index with the opposite sign of what would have been consistent with the rest of the variables. Therefore it appeared more meaningful to select only the variables for the composite factor index that loaded high on a particular factor. As a cut-off point for the factor score coefficients a level of .09 was chosen. The factor score coefficients which met this criterion are marked with an asterisk.

According to this, the factor score for factor 1 was based on responses to the same variables that were already selected for the interpretation of factor 1 (variables 2, 5, 7, 10, and 12). The factor score for factor 2 was based on those variables which had been used to interprete factor 2 (variables 3, 4, 6, and 9). The factor score for the third factor was obtained in the same way from those variables which had already been used to interprete factor 3 (variables 1, 3, 8, and 11).

The factor scores were stored as new variables representing the factors and labeled ATTITUDE 1, ATTITUDE 2, and ATTITUDE 3 (the computations which were necessary to arrive at these new variables are described in the methodology p. 31)

ATTITUDE 1 then stands for the attitude 'favor reducing energy consumption', ATTITUDE 2 represents the attitude 'favor conventional energy sources', and ATTITUDE 3 stands for the attitude 'favor renewable energy sources.

Table 17

Factor Score Coefficients

Variables	Factor 1	Factor 2	Factor 3
1. More use of solar energy	-.07705	-.04101	.49741 *
2. Reduce energy use in homes	.34163 *	.06739	.02279
3. More use of nuclear power	-.01869	.14244 *	-.09445 *
4. More use of western coal	.03102	.30142 *	-.02721
5. Reduce energy use in business	.31024 *	-.00748	.00501
6. More use of oil from west. shale	.06282	.45129 *	.05333
7. Reduce energy use in travel	.24833 *	.03750	.00895
8. More oil imports	-.00861	-.02225	-.09179 *
9. More exploration for U.S. oil	-.02202	.21138 *	.08559
10. Reduce energy use by agriculture	.16994 *	.00997	-.03513
11. More use of wind energy	-.02719	.03082	.36274 *
12. Cut-backs versus production	-.14322 *	.06543	.01628

* Indicates high factor score coefficients

The attitude measures are described in table 18 which presents the mean, the range, and the standard deviation for the three variables. Since the factor scores were based on a standardized score for each variable their mean is zero, or at least close to zero.

Table 18

Description of the Attitude Measures

Attitude Label	Mean	Range Lowest Score	Range Highest Score	Standard Deviation
Favor reducing energy consumption	-.011	-2.875	2.023	.860
Favor conventional energy sources	.010	-3.403	1.637	.800
Favor renewable energy sources	.001	-4.413	1.034	.781

Perceived Severeness of the Energy Problem

Unlike the attitude measures presented above, perceived severeness of the energy problem was obtained directly from the questionnaire and did not involve factor analysis. Respondents were asked to indicate whether they considered meeting the United States' energy needs during the next ten to twenty years not a serious problem, a somewhat serious problem, a serious problem, or a very serious problem.

In the present sample 78.5 percent of the respondents believed that meeting the U.S.' energy needs was at least a serious problem. In a review of literature, compiled by the Solar Energy Research Institute (SERI 1979) comparable figures ranged from 53 percent of the respondents who thought the energy problem was serious in 1975, to 77 percent of the respondents in 1977.

The absolute, relative, and adjusted frequencies for each category are presented in table 19.

Table 19

Perceived Severeness of the Energy Problem

Perceived Severeness of the Energy Problem	Absoulte Frequency	Relative Frequency %	Adjusted Frequency %
Not a serious problem	25	3.0	3.2
A somewhat serious problem	144	17.3	18.3
A serious problem	334	40.0	42.3
A very serious problem	286	34.3	36.2
No answer	45	5.4	missing
Total	834	100.0	100.0

The three attitude measures obtained by factor analysis and the perceived severeness of the energy problem where then related to several behavioral measures which are described in the following section.

Behavioral Measures

Conservation behavior was assessed using two rather detailed questions. The first asked what structural energy saving measures respondents had taken, whereas the second question asked what no-cost measures they were practicing.

Structural Energy Conservation Measures

Eight behavioral measures were based on responses to the question that asked for structural energy saving features. Table 20 shows responses to 14 statements dealing with structural features. Respondents were asked to indicate whether those features existed already when they moved into the house, whether they had added the features themselves, or whether they planned to add them within the next two years. Negative response categories were 'don't plan', don't know', and 'doesn't apply'. They were pooled for presentation in table 20 since they were not analyzed.

Table 20

Structural Energy Conservation Features

Energy Saving Features	Existed	Added (percent of	Planned respondents)	Negative Responses
1. Double pane or storm windows	26.4	29.3	13.9	30.4
2. Caulking and weatherstripping	35.4	32.1	13.2	19.3
3. 4 inch ceiling insulation	42.6	25.6	8.3	12.7
4. Outside wall insulation	49.6	11.8	4.1	34.6
5. Thick floor insulation	25.8	12.1	10.7	51.5
6. Storm doors on all entrances	15.3	21.4	13.3	49.9
7. Clock set-back thermostats	6.0	7.0	3.9	83.1
8. Glass doors on fireplace	10.6	20.3	5.1	64.0
9. Wood-burning stove	12.2	30.0	9.2	48.5
10. Solar water heater	.1	.9	10.6	88.4
11. Solar heating	.8	1.0	7.4	90.9
12. Evaporative cooler	1.9	1.9	1.9	94.3
13. Outdoor window shades	3.9	9.4	4.4	82.3
14. Insulated window coverings	6.3	15.3	7.3	71.1

Table 20 (continued)

Structural Energy Conservation Features

Energy Saving Features	Existed	Added	Planned
	(percent of respondents)		
15. Water heater wrapping	-	1.8	.1
16. Insulated water pipes	-	.4	.1
17. Insulated heating ducts	-	-	-
18. Insulated foundation	-	.2	-
19. Heat pump	.7	.5	.2
20. Wind generator	-	-	.4
21. Geothermal well	.1	-	-
22. Solar greenhouse	-	.2	.5
23. Fireplace insert	-	.7	-
24. Attic ventilation	-	.4	.1
25. Heat exchanger	-	.1	-

Besides these 14 statements, the question provided an open statement that asked respondents to list additional structural measures they had in their homes or they were planning to add. In order to facilitate the coding process, responses to this open statement were treated like the other 14 statements thus extending the list of potential features to 25. Statements 15 through 25, however, had not been included in the questionnaire so that negative responses were technically impossible. The eleven measures and response rates in each category are presented in the second part of table 20. The percentages for these features were considerably lower than for the previously listed ones. It can be attributed to the fact that those statements were free recall as opposed to the previous statements which had been aided recall. Thus, higher percentages would have probably resulted if the latter statements had been included in the questionnaire as well.

Ceiling and wall insulation were the most common features already existing. Forty-three percent and 50 percent respectively of all homes had these features at the time the respondent moved in. Combined with those who added ceiling insulation the number of homes which have some ceiling insulation now is roughly two thirds. For wall insulation the corresponding figure was 60 percent. The Oregon Residential Energy Conservation Survey (Oregon Department of Energy 1980) found that in 1979, 75 percent of Oregon homes had attic insulation and 52 percent had wall insulation which is close to the figures obtained in this survey.

The features that were added most frequently were double pane or storm windows (29%), caulking and wheatherstripping (32%), and wood burning stoves (30%).

The Construction of Behavioral Scores from the list of 25 measures was done in order to reduce the number of variables to a manageable size. Behavior scores were constructed for each respondent. Four different measures relating to the status of various conservation steps were computed. 1) a measure relating to the number of structural conservation features that had already existed; 2) a measure counting the number of structural features that were added; 3) a measure combining those two thus indicating the number of conservation features present, regardless whether they had already existed or whether they were added by the respondent; and 4) a measure relating to the number of conservation steps a respondent planned to take.

A trial regression run with those four behavioral measures and attitudes and sociodemographic characteristics as independent variables indicated that the relationships between independent and dependent variables were too weak to warrant continued analysis. The weak relationship was attributed to the diversity of structural features that were combined in the behavioral measures. In an attempt to create more precise behavioral measures the 25 structural features were divided into two categories; basic structural measures and additional structural measures.

Basic structural measures were those which may be considered part of any well constructed house, like wall and ceiling insulation, double pane windows, and the like. Features one through six and feature eight from table 20 (see page 52) were combined in that category.

Features like solar water heating, clock set-back thermostats, and water heater insulation, on the other hand, where combined in the category additional energy saving measures. An overview of structural conservation measures is presented in figure 4.

Figure 4

Classification of Behaviors Relating to Structural Energy Conservation Measures

<table>
<tr><th>State</th><th colspan="2">Basic Structural Measures</th><th colspan="2">Additional Structural Measures</th></tr>
<tr><td>Existed</td><td>BEHAVIOR 1</td><td rowspan="2">BEHAVIOR 5</td><td>BEHAVIOR 2</td><td rowspan="2">BEHAVIOR 6</td></tr>
<tr><td>Added</td><td>BEHAVIOR 3</td><td>BEHAVIOR 4</td></tr>
<tr><td>Planned</td><td colspan="2">BEHAVIOR 7</td><td colspan="2">BEHAVIOR 8</td></tr>
</table>

A description of the eight behavioral measures is presented in table 21. It provides information on the mean, the range, and the standard deviation for each measure.

It can be seen from table 21 that additional energy saving features were much less frequent than basic features. The average home from this sample had between four and five structural energy saving features, including both, basic and additional measures.

Most common were basic measures when not separated into existing ones and ones that had been added. The mean for that measure was 3.5. Additional measures,on the other hand,regardless of whether they already existed or whether they had been added had a mean of only .99.

Table 21

Behavioral Measures Based on Structural Energy Conservation Features

Status of Structural Features	Mean	Range		Standard Deviation
		Lowest Score	Highest Score	
1. Basic features existed	2.01	0	7	1.921
2. Additional features existed	.31	0	4	.641
3. Basic features added	1.48	0	6	1.725
4. Additional features added	.68	0	5	.864
5. Basic features existed or added	3.50	0	7	1.983
6. Additional features existed or added	.99	0	5	.978
7. Basic features planned	.67	0	6	1.108
8. Additional features planned	.45	0	6	.921

No-cost Energy Conservation Measures

The second question, related to behavior, dealt with no-cost conservation practices. The reason for analyzing them separately was that unlike structural measures, no-cost measures may be employed regardless of income, home ownership, and other factors constraining behavior.

Respondents could respond to each of six measures in one of the following categories: 'done now', 'plan to do', 'don't plan', and 'not applicable'. The percentages in each category are presented in table 22.

Table 22

No-cost Energy Conservation Practices

Energy Conservation Practices	Done Now	Planned	Not Planned	Not Applic.
	(percent of respondents *)			
1. Close off some rooms	70.5	1.5	19.7	8.4
2. Set water heater below 120 ^{o}F	61.3	10.5	25.7	2.5
3. Keep room temperature below 65 ^{o}F in winter	52.6	4.1	31.6	11.7
4. Keep room temperature above 78 ^{o}F in summer	40.5	3.2	17.2	39.2
5. Change the use of rooms	33.4	4.5	37.9	24.1
6. Open and close window coverings	74.5	3.2	12.9	9.4

* relative frequencies adjusted for missing observations

Closing off rooms and taking advantage of natural convection by opening and closing window coverings were the most common practices. Almost three quarters of all households engaged in those. Setting the room thermostat at or below 65 ^{o}F in winter and changing the use of rooms to take advantage of temperature differences were the least favored practices. Roughly one third of the respondents were reluctant to adopt them.

An additional no-cost measure, namely having the house inspected for its energy efficiency (home auditing), was excluded from further analysis since it was not considered to be energy saving per se, but rather helpful in determining potential energy savings.

Behavior Scores were computed for each indiviual for two no-cost conservation measures. Those measures were based on whether or not respondents had 'done now' or had 'no plan' to do each of the six practices listed in table 22. The two measures are presented in table 23.

Table 23

Behavioral Measures Based on No-cost
Energy Conservation Practices

Status of No-cost Practices	Mean	Range		Standard Deviation
		Lowest Score	Highest Score	
9. No-cost practices adopted	3.23	0	6	1.520
10. No-cost practices not adopted	1.41	0	6	1.426

The average household engaged in slightly more than three no-cost energy conservation practices. Compared to structural features it can be noted that no-cost measures were more common than structural measures. If the categories existed and added basic conservation measures were combined (BEHAVIOR 5), however, they were slightly more frequent than no-cost measures (3.50 compared to 3.23).

The two behavioral measures based on no-cost practices together with the eight behavioral measures based on structural features add up to ten different behavioral measures which served as a basis for the multiple regression analysis.

Results of Multiple Regression Analysis of the Three Attitudinal Measures

Multiple regression analysis was used to determine the influence of selected sociodemographic variables on energy related attitudes. All three attitude measures,obtained from factor analysis,were analyzed in a separate model. The list of independent variables contained the following variables:

1. Age of the respondent;
2. Sex of the respondent;
3. Educational background of the respondent;
4. Total yearly household income;
5. Number of different investments;
6. Occupational status of the respondent;
7. Housing tenure, rented versus owned;
8. Residential location, rural versus urban;
9. Perceived severeness of the energy problem.

The stepwise regression method was employed to find the 'best model' for each attitudinal measure. These models contain only those independent variables which have a significant, or at least close to significant, impact on the dependent variable. The minimum p-value of a variable to be considered significant was set at $p = .05$. Variables that reached a significance level of at least $p = .01$ were referred to as highly significant.

The regression models are presented in table form. The tables provide information on 1) the regression coefficient (b) of each variable included in the model; 2) the F-ratio for each variable in the model; 3) the significance level (p-value) of that F-ratio; 4) the squared coefficient of multiple determination (R^2) which indicates the amount of variance in the dependent variable accounted for by all independent variables thus far included in the model; and 5) the change in R-square which indicates the contribution of each individual independent variable to the explanation of the variance in the dependent variable.

In addition to that, the number of cases on which that particular model was based and the F-ratio and p-value for the overall model are presented below each table. The number of cases on which the models are based may vary due to the fact that listwise deletion of missing observations was chosen. With that method, cases are disregarded when any one variable included in the model has a missing observation.

ATTITUDE 1: Favor Reducing Energy Consumption

The best model predicting the attitude 'favor reducing energy use' contained the independent variables which are summarized in table 24.

Table 24

Best Model for the Attitude Measure "Favor Reducing Energy Consumption"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Perceived severeness of energy problem	.242	38.79	.000	.069	.069
2. Age of the respondent	$-.645 \times 10^{-2}$	10.75	.001	.091	.022
3. Occupational status	-.234	11.93	.001	.106	.016
4. Housing tenure	-.255	8.48	.004	.118	.012
5. Residential location	-.125	4.05	.045	.124	.005
6. Constant	-.114	-	-	-	-

N = 690; Overall model: F-Ratio = 19.29, p-value = .000

The model includes five independent variables. Perceived seriousness of the energy problem was found to be positively related to the attitude favoring less energy use, i.e. people who felt that solving the energy problem was serious were more inclined to favor reducing the consumption of energy. Perceived severeness explained approximately seven percent of the variation in the conservation attitude.

The respondents' age was negatively related to favorable attitudes toward less energy use, indicating that younger people were more favorable toward reduced energy use than older people. Age explained slightly over two percent of the variation in the dependent variable. Previous studies on energy related attitudes (e.g. Cunningham & Lopreato 1977; Jackson 1980; SERI 1979) also found that younger people tended to be more concerned about solving the energy problem.

The next independent variable to enter the model was occupational status. The negative sign of the regression coefficient indicates that respondents in blue-collar occupations had less favorable attitudes toward reducing energy consumtion than those in white-collar occupations. Occupational status contributed an additional 1.5 percent to the explained variance. Higher occupational status was also found to be a predictor of eco-consciousness in a study by Hogan and Paolucci (1979).

Homeowners were less likely to favor energy conservation. Housing tenure accounted for 1.2 percent of the variation in the dependent variable. Similarly Jackson (1980) found that people living in apartments were more concerned about the energy problem than those living in houses.

Finally, respondents from rural areas were less inclined to favor energy conservation. Residential location explained .5 percent of the variance in the attitude measure.

The overall model explained approximately 12.5 percent of the variance in the attitude measure 'favor reducing energy consumption'. This relatively low figure indicates that there are factors involved in determining a conservation attitude other than those included in the list of independent variables.

Education did not reach significance in predicting conservation attitude. It was, however, positively related to the dependent variable.

Hogan and Paolucci (1979) had found that education was the best predictor of eco-consciousness. One reason for this lack of significance may be that education is a fairly strong predictor for the perceived seriousness of the energy problem (R = .245) which in turn is the single best predictor for the attitude favoring reduced energy use. Income and number of investments were also found to be unrelated to the conservation attitude.

ATTITUDE 2: Favor Conventional Energy Sources

Attitude 2 might be viewed as the direct opposite of the previously discussed conservation attitude, since it measures favorable opinions about conventional energy sources. Table 25 summarizes the variables which best predict a favorable attitude toward traditional energy sources.

Table 25

Best Model for the Attitude Measure
"Favor Conventional Energy Sources"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Age of the respondent	$.124 \times 10^{-1}$	43.06	.000	.072	.072
2. Perceived severeness of energy problem	-.140	13.01	.000	.097	.025
3. Residential location	.241	15.96	.000	.118	.021
4. Total family income	$.740 \times 10^{-5}$	11.59	.001	.130	.012
5. Education of respondent	$-.336 \times 10^{-1}$	3.71	.054	.135	.005
6. Constant	-.236	-	-	-	-

N = 659; Overall model: F-ratio = 20.38, p-value = .000

The final model again included five independent variables. Together they explained 13.5 percent of the variance in the attitude measure 'favor conventional energy sources'. The single best predictor was found to be the respondent's age which accounted for over seven percent of the variation in the dependent variable. Unlike ATTITUDE 1, a favorable attitude toward conventional energy sources is positively related to age which means that older people were more favorable of traditional energy sources than younger respondents. This would be expected since those are the energy sources that older people had experienced as being so cheap and abundant.

The perceived severeness of the energy problem was found to be inversely related to ATTITUDE 2 indicating that the awareness of a serious energy problem is less prevalent among those who favor non-renewable energy sources. Perceived severeness explained an additional 2.5 percent of the variation in the dependent variable.

Rural residents were more favorable toward traditional energy sources than urban residents. This variable explained two percent of the variance in the attitude favoring non-renewable energy sources.

The total yearly family income was positively related to a favorable attitude toward conventional energy sources, explaining 1.2 percent of the variation in the attitude measure. Cunningham and Lopreato (1977) reported a positive relationship between perceived seriousness of the energy problem and income,and the Solar Energy Research Institute (SERI 1979) confirmed that relationship. Perceived seriousness,however, was found to be negatively related to conventional energy sources, whereas income was found to be positively related to conventional energy sources. This finding provides evidence that high income persons may favor a different strategy for resolving the energy problem than low income persons, namely increased production of conventional energy as opposed to cut-backs in energy use.

The respondent's education failed to be significant by only a small margin and thus was included in the model. It was found to be negatively related to favorable attitudes toward traditional energy sources and accounted for .5 percent in the variance of the dependent variable. Better educated people may be more aware of the problems associated with the dependence on non-renewable energy sources than those who are less well educated.

A comparison of the model describing a favorable attitude toward energy conservation and the model describing a favorable attitude toward non-renewable energy sources reveals that all independent variables that were included in both models have opposite signs. The respondent's age for example was negatively related to'favor reducing energy consumption', but it was positively related to'favor conventional energy sources'. This finding lends support to the notion that both attitudes are mutually exclusive, similar to what Lovins (1977) stated with regards to hard and soft energy technologies.

Housing tenure and number of investments failed to be significant predictors of the attitude toward traditional energy sources. Both variables may be preempted by the variable 'total family income', which was highly significant predicting ATTITUDE 2 since both are correlated with income (R = .238 for housing tenure and .497 for number of investments respectively).

<u>ATTITUDE 3: Favor Renewable Energy Sources</u>

As discussed earlier, there are two ways leading to the conservation of fossil fuels. The first one is to reduce energy consumption. This strategy is reflected in the attitude presented first. The second strategy aims at developing new, renewable energy sources, such as solar and wind energy. It is reflected in the third attitude measure. Since both strategies have the common goal to prevent scarce natural energy resources from being depleted we may expect some parallels in the independent variables explaining both attitudes.

The variables predicting a favorable attitude toward renewable energy sources are summarized in table 26.

Table 26

Best Model for the Attitude Measure "Favor Renewable Energy Sources"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Age of the respondent	$-.129\times10^{-1}$	57.66	.000	.083	.083
2. Perceived severeness of energy problem	.204	35.98	.000	.128	.045
3. Constant	$-.250\times10^{-1}$	-	-	-	-

N = 708; Overall model: F-ratio = 51.63, p-value = .000

Two variables were found to be significantly related to the attitude favoring renewable energy sources. Both variables were highly significant. The best predictor for a favorable attitude toward new energy sources was the respondent's age. Younger persons were more favorable of renewable energy sources than older people. Age explained 8 percent of the variance in the dependent variable.

Perceived severeness of the energy problem was the second predictor and accounted for an additional 4.5 percent of the variation in the attitude measure. The positive sign of the regression coefficient indicates that respondents who considered the energy problem to be serious were at the same time more favorable toward new energy sources.

Although only two independent variables are significant they are the same variables that were part of the model predicting ATTITUDE 1. Age and perceived severeness are related to favorable attitudes toward new energy sources in the same direction as to a favorable attitude toward energy conservation which lends support to the notion that both attitudes are compatible at least to some degree.

No other sociodemographic variables were significant in predicting a favorable attitude toward renewable energy sources. The both variables included in the model, however, accounted for 12.8 percent of the variance.

Results from Multiple Regression Analysis of the Behavioral Measures

In the second step of the analysis, sociodemographic and housing characteristics, together with the attitude measures which were analyzed in the first step, served as independent variables to describe behavioral measures. The list of independent variables contained the following variables in addition to those which had already been used to predict attitudes: The three attitude measures 'favor reducing energy consumption', 'favor conventional energy sources', and 'favor renewable energy sources'; the housing characteristics 'estimated value of the home' and 'year in which home was constructed'; and finally the 'highest educational level in the family'. Thus, the list of independent variables was extended to fifteen variables. For each of the ten dependent variables a separate model was developed. The ten behavioral measures were:

Basic structural features:		Additional structural features:	
existed	(BEHAVIOR 1)	existed	(BEHAVIOR 2)
were added	(BEHAVIOR 3)	were added	(BEHAVIOR 4)
existed or were added	(BEHAVIOR 5)	existed or were added	(BEHAVIOR 6)
planned	(BEHAVIOR 7)	planned	(BEHAVIOR 8)

No-cost practices:

adopted	(BEHAVIOR 9)	not adopted	(BEHAVIOR 10)

The results from the multiple regression analysis are presented in the same table form as the attitude measures in the previous section.

The analysis of structural energy conservation measures was confined to home owners since it was felt that renters did not have control over improving the structural energy performance of the homes they lived in, such as insulating walls and installing double glazed windows. Structural measures are either taken by the landlord or not taken at all and thus should be determined by the landlord's attitudes and not by those of the renter. No-cost measures, however, were analyzed in the whole sample including owners and renters.

BEHAVIOR 1: Basic Structural Energy Saving Features Existed

The number of basic energy saving features that were present when respondents moved in their home was best predicted by the follwing model, summarized in table 27.

Table 27

Best Model for the Behavioral Measure "Basic Structural Features Existed"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Year in which home was built	.050	235.97	.000	.267	.267
2. Favor conventional energy sources	.185	4.97	.026	.272	.006
3. Constant	-96.533	-	-	-	-

N = 650; Overall model: F-ratio = 121.17, p-value = .000

Only two variables were found to significantly predict the existence of basic structural energy conservation features. The year in which the house was built alone accounted for more than 26 percent of the variation in the dependent variable. The regression coefficient indicates that newer homes had more basic features already built in than older homes.

It shows clearly that changes in the construction industry have taken place. Basic energy saving features, like wall and ceiling insulation or double glazed windows have become standard in new structures. A recent survey conducted by the National Association of Home Builders Research Foundation revealed that 60 percent of the people who had bought new homes in 1977/78 considered energy saving features as an important factor and 79 percent of the respondents had said energy performance would be an important factor if they moved again (Changing

Times, May 1981, p. 22). The consumers' awareness of the importance energy saving features have, has forced home builders to react by constructing new homes with an eye on high energy cost.

The second variable in the model was the attitude toward conventional energy sources,explaining only .5 percent of the variance in the dependent variable. Yet, that was significant at the .05 level. The positive sign of the regression coefficient indicates that people who favored traditional energy sources were the same that lived in homes where basic energy saving features had already been built in.

This may appear contrary to expectations, since people who favor conventional energy sources may not want to reduce energy consumption. Two factors may be helpful in explaining this inconsistency. First, a large number of Oregonians seem to favor a double strategy of conserving energy and increasing production of energy at the same time. Second, basic structural conservation features may be part of any well constructed new house. The high cost of energy alone forces people to require a minimum of conservation measures built into a new home, regardless of their attitudes. People who have newer and better built homes are more likely to belong to a higher social class, with higher incomes, etc. Income, in turn, was found to be positively related to a favorable attitude toward conventional energy sources, hence people who can afford those new homes also have favorable attitudes toward non-renewable energy sources.

The effect of the attitude measure 'favor reducing energy use' was tested in a separate model. It was found that people who favored reducing energy consumption also had significantly more basic energy saving features in their homes ($F = 3.85$; $p = .050$). The contribution to the explained variance, however, was smaller than for the attitude 'favor conventional energy sources'. Including both attitude measures in one model did not yield a significant contribution from the attitude favoring reduced energy use.

All other variables had little or no explanatory value. The main reason for that may lie in the fact that many homes have those basic energy saving features, regardless of social status, education, etc. of the people who live there.

BEHAVIOR 2: Additional Structural Energy Saving Features Existed

Table 28 presents the 'best model' explaining the existence of additional structural energy saving features.

Table 28

Best Model for the Behavioral Measure "Additional Structural Features Existed"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Year in which home was built	$.433x10^{-2}$	10.53	.001	.019	.019
2. Perceived severeness of energy problem	$-.718x10^{-1}$	4.89	.027	.027	.008
3. Estimated value of home	$.160x19^{-5}$	4.68	.031	.030	.003
4. Total family income	$-.393x10^{-5}$	3.26	.071	.036	.005
5. Constant	-7.944	-	-	-	-

N = 588; Overall model: F-ratio = 5.37, p-value = .000

The variable with the highest explanatory power was again the year in which the house had been constructed. It accounted for slightly under 2 percent of the variance in the behavioral measure. Again, newer homes had more structural energy saving features built in than older homes. Age of the home was the only highly significant variable in the model.

The second variable entering the model was the perceived seriousness of the energy problem, adding .8 percent to the explained variance.

The sign of the regression coefficient indicates that people who took the energy problem less serious lived in homes where more additional energy saving features were already present at the time they moved in. This is contrary to what Jackson (1980) found. He stated a positive relationship between perceived seriousness of the energy problem and the number of energy conservation practices perceived and adopted. Two reasons may contribute to the explanation of this relationship. First of all, among those respondents who consider the energy problem to be serious are those who are better educated and of a higher social status. Higher status, at the same time, is related to better equipped homes and hence to homes that have more energy saving features already present. Second, the direction of this relationship may actually be reversed which means that respondents who lived in an already well-equipped home have had less need to be worried about the energy future.

The former line of reasoning is also reflected in the positive relationship between the estimated value of a home and the number of additional energy conservation features already present. The independent variable explained an additional .3 percent of the variation in the dependent variable.

The estimated value of a home, however, was a significant contribution to the model only after the total family income was entered in the model. Family income failed to be significant itself by a relatively small margin ($F = 3.26$; $p = .071$). Income was negatively related to the number of additional energy saving features which means that respondents with higher incomes lived in houses that had fewer additional features built in at the time they moved into the house. High income, it seems, reduces the importance to have additional energy saving measures.

Unlike the previous model where independent variables accounted for 27 percent of the variance in the dependent variable, independent variables in this model account only for 3.6 percent. Little variation in the dependent variable and lack of homogenity in the items that were combined in additional structural features, may account for this relatively low figure.

BEHAVIOR 3: Basic Structural Energy Saving Features Were Added

Adding basic energy saving features, like insulating walls and attics or caulking and weatherstripping windows, can be part of retrofit or a general facelift of an older house. It may also be an activity of people who are becoming aware of the importance to conserve energy and who want to reduce their utility bills. Table 29 presents the model that was found to best predict the number of basic structural energy saving features added to a home.

Table 29

Best Model for the Behavioral Measure "Basic Structural Features Were Added"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Year in which home was built	$-.245\times10^{-1}$	49.46	.000	.063	.063
2. Total family income	$.190\times10^{-4}$	16.14	.000	.089	.026
3. Favor reducing energy use	.266	11.49	.001	.107	.018
4. Constant	49.109	-	-	-	-

N = 585; Overall Model: F-ratio = 23.16, p-value = .000

The year in which the house was built again was the independent variable with the highest predictive power. It explained approximately 6 percent of the variation in the dependent variable. This time, however, the sign of the regression coefficient was negative which means that the older the house was, the more likely that respondents had added basic structural energy saving features. It proves that older houses are being adapted to the changed availability and prices of heating fuels through retrofit and upgrading of the energy performance of the house.

The second best predictor for the number of basic structural measures added to a house was the total household income which explained an additional 2.6 percent of the variance. Income was positively related to the dependent variable indicating that respondents with higher incomes did more in terms of basic retrofitting their homes. This relationship may become apparent when one considers the cost of insulating walls, adding double glazed windows, and the like.

The last variable entering the model was the attitude measure 'favor reducing energy consumption'. It explained 1.8 percent of the variance in the dependent variable. The sign of the regression coefficient indicates that respondents who held favorable attitudes toward energy conservation, added significantly more basic structural features to their homes than those who were less favorable toward reducing energy consumption. The directionality, however, may also be reversed, namely that people added energy saving features in order to cut their utility bills and in its wake changed their attitudes (see Kelman 1974; or Festinger 1957). But in any case, a significant positive relationship between conservation behavior and a conservation attitude was obtained. This is in accordance with Hogan and Paolucci's findings (1979) where a positive relationship between 'eco-consciousness' and energy conservation behavior was established.

BEHAVIOR 4: Additional Structural Energy Saving Features Were Added

People who add structural energy saving features to their homes beyond insulating and weatherstripping may be more of a risk-taking, innovative type. The independent variables that were included in a model to predict the number of additional structural features provide some insight into the kind of person that most likely adds less common energy saving devices. Table 30 summarizes that model.

Table 30

Best Model for the Behavioral Measure
"Additional Structural Features Were Added"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Favor renewable energy sources	.205	20.22	.000	.028	.028
2. Year in which home was built	$-.621\times10^{-2}$	12.22	.001	.045	.018
3. Number of investments	$.675\times10^{-1}$	15.91	.000	.063	.017
4. Highest education in the family	$-.638\times10^{-1}$	10.36	.001	.079	.016
5. Constant	13.037	-	-	-	-

N = 597; Overall model: F-ratio = 12.64, p-value = .000

The best predictor for the amount of additional structural energy saving devices was a favorable attitude toward new energy sources such as wind and solar energy. It explained 2.8 percent of the variance in the dependent variable. Respondents who were more favorable toward renewable energy sources were more likely to add structural energy conservation measures beyond insulation and weatherstripping. It appears that people who favor new energy sources may actually act consistently by installing a solar water heater or a heat pump.

The year in which a house was built again was found to be a highly significant predictor of behavior, adding 1.8 percent to the explained variance. Older homes were again more likely to have additional equipment retrofitted.

The number of different investments a family had made was positively related to the number of features added. Respondents who had had more experience with different investments were more likely to have energy saving measures added to their homes, perhaps because they were more aware of potential long term returns on investments in energy saving equipment, like for example a solar heating system.

The highest level of education in a family was negatively related to the amount of structural measures that were added. It explained 1.6 percent of the variation in the dependent variable. The direction of that relationship is contrary to previous research findings where education was positively related to the number of energy conservation practices adopted (Jackson 1980). In the present sample, however, high educational level predicted less additional strucutural measures added to the home.

All independent variables combined explained close to 8 percent of the variation in the dependent variable.

BEHAVIOR 5: Basic Structural Energy Saving Features Existed or Added

BEHAVIOR 5 is a combination of the two behavioral measures discussed previously, BEHAVIOR 1 and BEHAVIOR 3. It indicates the amount of basic energy saving features a house had built in by the time the survey was made, regardless of whether those features had already existed at the time the respondent moved into that house or whether they were added later on by the respondent him/herself. BEHAVIOR 5, therefore may be used as an indicator for the energy performance of a house since it measures all basic conservation devices that are present.

Since BEHAVIOR 5 is a composite of BEHAVIOR 1 and BEHAVIOR 3, it can be expected that at least some of the independent variables from the latter two behavioral measures are also predictors of the former measure. Table 31 summarizes the best model for basic structural energy saving features that already existed or were added.

The year in which a house was built was the single best predictor of the number of basic energy saving measures present in a home. It accounted for 9.5 percent of the variation in the dependent variable. From the analysis of the two behavioral measures that are combined in BEHAVIOR 5 it is known that the year in which a house was built was positively related to the number of existing features, but negatively

Table 31

Best Model for the Behavioral Measure
"Basic Structural Features Existed or Added"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Year in which home was built	$.262x10^{-1}$	55.38	.000	.095	.095
2. Estimated value of home	$.570x10^{-5}$	11.63	.001	.113	.018
3. Favor conventional energy sources	.189	4.38	.037	.119	.006
4. Sex of the respondent	.287	4.03	.045	.125	.006
5. Constant	-47.986	-	-	-	-

N = 584; Overall model: F-ratio = 20.74, p-value = .000

related to the number of features added by the respondent. The strong relationship between the age of a home and the number of existing features was overriding but it is much weaker in the present model although not cancelled out by the reverse relationship between the age of a home and the number of basic features added.

The estimated value of a house was the second best predictor, adding 1.8 percent to the explained variance. The regression coefficient indicates a positive relationship which lends support to the notion that basic energy saving features are part of any well constructed house and an indicator of a general awareness that energy performance is an important feature of a new home.

A favorable attitude toward conventional energy sources was positively related to BEHAVIOR 5. Explanations for this relationship which may not be expected were already presented in conjunction with existing basic energy saving features. The contribution to the explained variance was fairly small, .6 percent.

The last variable to enter the model was the respondents' sex. It explained an additional .6 percent of the variation in the dependent variable. Female respondents indicated significantly more basic energy conservation measures than male respondents. Since the selection of male and female respondents was random there should actually be no difference between households where the male head of household responded and those where the female head of household responded with regard to the number of basic energy saving features. Women, however, may have been more aware of those features than their male counterparts.

None of the other variables reached significance in explaining the dependent variable. This was true also for the conservation attitude. The overall model explained 12.5 percent of the variance in the dependent variable.

BEHAVIOR 6: Additional Structural Energy Saving Features Existed or Added

BEHAVIOR 6, again, is a composite of the two measures BEHAVIOR 2 and BEHAVIOR 4, it may therefore be taken as a predictor of the energy performance of a house, just like BEHAVIOR 5.

Unlike BEHAVIOR 5, the model predicting BEHAVIOR 6 contains the same independent variables as the two behavioral measures it represents with one exception. The year in which a house was built lost its predictive power due to the fact that its positive relationship to existing energy saving features and its negative relationship to features that were added cancelled each other out.

Therefore, a favorable attitude toward renewable energy sources became the most powerful predictor of the number of additional energy saving features existing in a house. It explained 1.8 percent of the variation in the dependent variable.

The number of different investments was the next variable to enter the model, adding 1.3 percent to the explained variance. Again, the more different investments respondents had made, the more additional energy saving features they had in their homes.

Table 32

Best Model for the Behavioral Measure
"Additional Structural Features Existed or Added"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Favor renewable energy sources	.194	14.25	.000	.018	.018
2. Number of investments	$.659 \times 10^{-1}$	12.21	.001	.031	.013
3. Highest education in the family	$-.623 \times 10^{-1}$	8.03	.005	.044	.013
4. Constant	1.184	-	-	-	-

N = 607; Overall model: F-ratio = 9.27, p-value = .000

The highest educational level in the family was negatively related to the number of additional energy saving measures. It explained 1.2 percent of the variance in the dependent variable.

The overall model explained only 4.4 percent of the variation in BEHAVIOR 6 which again may be due to the relatively small number of additional structural features that were present in respondents' homes.

BEHAVIOR 7: Basic Structural Energy Saving Features Planned

Planning to add energy saving devices to a home may be considered more of a behavioral intention than behavior itself. There is no commitment in terms of money spent or effort being exercised. The degree to which plans are actually put into reality may be one question that could be addressed in a follow-up study.

The respondents' age had the highest predictive power for plans to add basic energy saving features. It explained close to four percent of the variation in the dependent variable. Younger respondents tended to indicate more plans than older respondents.

Table 33

Best Model for the Behavioral Measure
"Basic Structural Features Planned"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Age of the respondent	$-.152 \times 10^{-1}$	29.52	.000	.038	.038
2. Year in which home was built	$-.104 \times 10^{-1}$	21.91	.000	.072	.034
3. Number of investments	$-.352 \times 10^{-1}$	2.92	.088	.076	.004
4. Constant	22.037	-	-	-	-

N = 629; Overall model: F-ratio = 17.26, p-value = .000

The second variable to enter the model was the year in which a house was built, adding 3.4 percent to the explained variance. Respondents who lived in older homes uttered significantly more plans to add basic energy saving features to their homes than those who lived in newer homes. Again, this may be explained by the fact that newer homes are already equipped with basic energy saving features, hence there is less need to add those features than in older houses.

The number of investments people had made failed to be significant only by a small margin and thus was included in the model. It explained an additional .4 percent of the variation in the dependent variable. The number of investments was negatively related to the number of plans to add basic energy saving devices. It may be an expression of the fact that energy saving measures are planned rather than implemented because of insufficient resources at the present time.

The overall model explained 7.6 percent of the variance in the dependent variable. This relatively low figure is mainly due to the fact that only a small percentage of the respondents reported plans to add basic energy saving features to their homes.

BEHAVIOR 8: Additional Energy Saving Features Planned

Like with basic energy saving features, the respondent's age was the single best predictor for the number of additional devices respondents planned to add to their homes. Younger people again were the ones that reported more plans to add such measures, rather than older people. Age explained 3.5 percent of the variation in the dependent variable.

The second independent variable which entered the model was a favorable attitude toward renewable energy sources, adding 1.8 percent to the explained variance. Respondents favoring new energy sources such as solar and wind energy were also more likely to have plans for adding energy saving devices other than basic insulation.

A significant impact of this attitude measure might be expected since solar heating and wind generators were part of the list of potential additional energy saving features. Attitudes and behavioral intentions thus were congruent in this case. As can be seen from the model predicting BEHAVIOR 4, actual behavior, namely adding those conservation devices, was also positively related to a favorable attitude toward renewable energy sources. Hence for additional energy saving features attitudes, behavioral intentions, and actual behavior point in the same direction.

Table 34 summarizes the best model predicting plans for additional energy saving features.

Thus far eight behavioral measures based on structural energy saving features have been presented. Following are two behavior measures based on no-cost conservation practices. Unlike structural measures, no-cost practices were analyzed using the whole sample not excluding renters.

Table 34

Best Model for the Behavioral Measure "Additional Structural Features Planned"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Age of the respondent	$-.871\times10^{-2}$	12.61	.000	.035	.035
2. Favor renewable energy sources	.164	11.20	.001	.054	.018
3. Constant	.926	-	-	-	-

N = 580; Overall model: F-ratio = 16.39, p-value = .000

BEHAVIOR 9: No-Cost Conservation Practices Adopted

Similar to structural conservation measures that are planned rather than implemented, no-cost energy conservation practices do not require money to be spent. They do, however, require some effort and changes in living patterns.

The best model predicting the adoption of no-cost practices was able to explain only about 4 percent of the variation in the dependent variable (see table 35, p. 81). The reason for this lies in the fact that many people had adopted some no-cost energy conservation practices which is indicated by a mean of 3.23 practices and a standard deviation of 1.5 out of six possible practices (see table 23, p. 58).

The respondent's sex was best predictor and explained 1.8 percent of the variance in the dependent variable. The regression coefficient indicates that female respondents reported no-cost practices more often than male respondents.

The second variable entering the model was a favorable attitude toward reducing energy consumption. Respondents who favored energy conservation also engaged in more energy saving practices, like turning down thermostats, closing off rooms, and the like.

Table 35

Best Model for the Behavioral Measure
"No-Cost Conservation Practices Adopted"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Sex of the respondent	.377	9.48	.002	.018	.018
2. Favor reducing energy use	.176	6.41	.012	.032	.013
3. Age of the respondent	$-.957\times10^{-2}$	6.22	.013	.042	.010
4. Constant	3.544	-	-	-	-

N = 596; Overall model: F-ratio = 8.63, p-value = .000

The respondent's age explained an additional 1.0 percent of the variance in the dependent variable. The sign of the regression coefficient indicates that younger respondents engaged in more conservation practices than older respondents. This finding suggests that younger people may be less resistant to changes in their living patterns that save energy,whereas older people may find it hard to adapt to lower thermostat settings, switching rooms, or taking advantage of natural convection.

BEHAVIOR 10: No-Cost Conservation Practices Not Adopted

BEHAVIOR 10 may be considered the reverse of the previously discussed BEHAVIOR 9. The reason for investigating both behavioral measures lies in the fact that not adopting conservation practices was better predictable than adopting them. This, in turn, is due to the fact that a number of no-cost practices were not applicable for some households, like setting thermostats lower when there was a wood stove as source of heating or closing off rooms when people lived in small apartments.

The best predictor for not engaging in conservation practices was again the respondent's sex, this time with a negative sign. It indicates that female respondents were less likely to report that they did not engage in conservation practices than male respondents. Sex accounted for slightly over 3 percent of the variance in the dependent variable.

Perceived severeness of the energy problem was the second best predictor, adding 2.7 percent to the explained variance. Respondents who took the energy problem less serious marked more often that they did not engage in conservation practices.

A favorable attitude toward reduced energy consumption was negatively related to BEHAVIOR 10 which means that respondents who favored energy conservation reported less often that they did not plan to adopt no-cost conservation practices. Both attitudes, the perceived seriousness of the energy problem and the attitude favor reducing energy use were related to energy conservation practices as previously reported in the literature (Jackson 1980; Hogan & Paolucci 1979). The findings lend support to the hypothesis that attitudes do make a difference in the kinds of behaviors that can be expected to occur. This relationship becomes apparent when no financial constraints are present, like in the case of no-cost energy conservation practices.

The estimated value of a home was the next variable to enter the model. It explained one percent of the variance in the dependent variable. The positive regression coefficient indicates that respondents who lived in more expensive homes cared less about no-cost practices than those living in less expensive homes. Maybe people who live in expensive homes are less willing to give up their convenience by turning down heat or using air conditioning less frequently.

The respondents' age was positively related to BEHAVIOR 10 indicating that older people were more reluctant to engage in conservation practices than younger people. Older people may not be able to change their life styles as easily as younger people. Age added another percent to the explained variance in the dependent variable.

Table 36

Best Model for the Behavioral Measure
"No-Cost Conservation Practices Not Adopted"

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Sex of the respondent	-.472	15.88	.000	.032	.032
2. Perceived severeness of energy problem	-.233	9.87	.002	.059	.027
3. Favor reducing energy use	-.185	7.17	.008	.073	.015
4. Estimated value of home	$.275 \times 10^{-5}$	4.07	.044	.083	.010
5. Age of the respondent	$.140 \times 10^{-1}$	11.26	.001	.094	.010
6. Number of persons in the family	.117	5.88	.016	.103	.009
7. Constant	1.162	-	-	-	-

N = 567; Overall model: F-ratio = 10.72, p-value = .000

The last independent variable adding significantly to the explained variance in BEHAVIOR 10 was the number of persons living in a family. Larger families did less in the way of closing off rooms or changing the use of some rooms, or at least they felt it would not apply to them. This may in fact be the case since closing off rooms is less feasible with large families than with small families. The family size explained an additional .9 percent of the variation in the dependent variable.

The overall model explained slightly over ten percent of the variance in BEHAVIOR 10.

In the last step of multiple regression analysis the impact of attitudes and conservation behavior in the context of sociodemographic, and housing characteristics on the amount of energy used,was investigated.

Results of the Multiple Regression Analysis of the Total Amount of Money Spent on Home-Energy

The final step of the analysis was an attempt to investigate the impact of energy related attitudes, conservation behavior, and contextual variables on actual energy consumption.

Since a large number of respondents did not provide complete and accurate information on the amount of energy they had used, the amount of money spent on energy was taken as a substitute for energy consumed in the previous year. The majority of respondents provided these data so that information about the money respondents had spent for various sources of energy could be combined to a figure representing the money spent for all different energy sources, like electricity, natural gas, oil, wood, coal, etc. The shortcoming of this figure 'total cost of energy' is that it assumes the cost per unit of energy is the same for each household and hence can be compared. This, however, is not true in reality since the mix of energy sources is different for each household and the price per unit of energy is not the same for each source of energy. Yet, the total cost of energy was the best figure that could be obtained.

The average amount of money spent for all the energy used at home (not including gasoline for transportation) was found to be $ 772.29 in 1980 for the sample. There were, however, large differences in actual expenses from one household to the other which is indicated by a large standard deviation of 406.78. The total cost of energy was found to range from a low of $ 118 per year to a high of $ 4,400 for the same time span. Due to incomplete data, the number of valid cases for the variable 'total amount of money spent for energy used in the home' was only 694 out of 834 cases, or 83.2 percent of the respondents.

The model predicting total cost of energy used all independent and dependent variables from previous steps of the analysis as potential independent variables. In addition the size of the house was included in the list of independent variables.

Best predictor of money spent on energy was the size of a home. The positive regression coefficient indicates that larger homes used more energy than smaller homes. The size of a house accounted for over 21 percent of the variance in the cost of energy consumed.

The second best predictor is the number of persons in a family, adding 3.5 percent to the explained variation. Larger families tended to have higher cost for their energy used in the home. The impact of both the first and the second independent variable can be easily recognized, since it takes more energy to heat a large home than a small one and each person has a certain requirement of energy causing large families to use more energy than small families.

The third variable to enter the model was income, adding 2.1 percent to the explained variance in the dependent variable. Income was frequently cited in the literature as the single best predictor of energy consumption (Donnermeyer 1977; Morrison, Keith, and Zuiches 1978; Cunningham & Lopreato 1977). Income had a significant positive effect on energy consumption. High income households paid more for energy even though the size of the home was already accounted for. This is probably due to the fact that high income households have more energy consuming appliances than low income households. A second factor may be that they use more expensive forms of energy to heat their homes, like electricity for example, for its convenience.

BEHAVIOR 6, which is a measure for the amount of additional energy saving features present in a home, was the next variable to enter the model. It explained 1.4 percent of the variation in the amount of money spent for energy. Homes that were equipped with more additional energy saving features used less energy than those homes which were less equipped. One reason why basic energy saving features are not in the equation may be that they were present in most houses,at least partly, so that they did not make that much additional difference in the amount of energy consumed by the household.

A favorable attitude toward renewable energy sources was negatively related to the amount of money spent on energy which means that respondents favoring renewable energy sources spent less money for the energy they used at home. ATTITUDE 3 explained .9 percent of the variation in

Table 37

Best Model to Predict the Total Amount of Money Spent for Energy Used at Home

Variable	Regression Coefficient	F-Ratio	p-Value	R-Square	R-Square Change
1. Size of the home (Sqft)	101.935	58.65	.000	.212	.212
2. Number of persons in the family	51.559	26.07	.000	.247	.035
3. Total family income	$.440\times10^{-2}$	15.43	.000	.268	.021
4. Additional structural features	-32.165	5.02	.026	.282	.014
5. Favor renewable energy sources	-41.399	5.16	.023	.291	.009
6. No-cost practices not adopted	21.904	4.64	.032	.298	.007
7. Housing tenure	-72.197	3.02	.083	.301	.003
8. Favor reducing energy use	-20.874	1.72	.190	.303	.002
9. Constant	220.740	-	-	-	-

N = 561; Overall model: F-ratio = 30.06, p-value = .000

the dependent variable. Entering ATTITUDE 1, a measure for favoring reduced energy consumption, into the model in the place of ATTITUDE 3 increased the explained variance in the dependent variable significantly ($F = 4.07$; $p = .044$). A positive regression coefficient would have indicated that respondents who favored reducing energy consumption actually paid less for energy. ATTITUDE 3, however, was a more powerful predictor. Since both attitude measures are correlated to some degree ($R = .22$) ATTITUDE 1 lost its predictive power when ATTITUDE 3 was already in the model. The contribution of ATTITUDE 1 dropped to an insignificant .2

percent of the explained variance in the dependent variable.

BEHAVIOR 10, indicating the amount of conservation practices not adopted, explained .7 percent of the variance. It was positively related to the money spent for energy which means that respondents who reported that they did not plan to engage in certain no-cost energy conserving practices paid more for their energy than those who reported that they did not plan to take steps to conserve.

Housing tenure failed to have a significant impact on the amount of money spent on energy by a small margin (p = .083). However, it strengthened the relationship between favorable attitudes toward renewable energy sources and the amount of money spent on energy, and the relationship between BEHAVIOR 10, which stands for conservation practices not adopted, and the dependent variable. It indicates that attitudes and behavior become better predictors of the amount of money spent on energy when the effect of housing tenure is removed, that is when people can live up to their attitudes or engage in behaviors they want to.

An attitude favoring reduced energy consumption was negatively related to the amount of money spent for energy. It was, however, not significant for reasons presented above.

The overall model was able to explain 30 percent of the variation in the amount of money a household spent on energy.

Discussion

Analysis of Energy Related Attitudes

Three energy related attitudes were identified using factor analysis: 1) favor reducing energy consumption, 2) favor conventional energy sources, and 3) favor renewable energy sources.

Selected sociodemographic variables explained only twelve to thirteen percent of the variance in those three attitude measures. It indicates that these three attitudes are explained primarily by variables other than the personal characteristics included in the list of independent variables. Some patterns emerging from the analysis of attitude measures, however, are worth being discussed.

The analysis of energy related attitudes provides evidence that people who considered meeting the nation's energy needs in the future to be a serious problem, held favorable attitudes toward both reducing energy consumption and developing renewable energy sources. Conversely, people who took the energy problem less seriously held favorable attitudes toward the development and use of conventional energy sources. It appears that an increase in the perceived seriousness of the energy problem among the population would also increase favorable attitudes toward energy conservation and the development of renewable energy sources and vice versa.

In accordance with previous findings in the area of energy related attitudes (e.g. Hogan & Paolucci 1979; SERI 1979) it was found that younger people were more favorable toward reducing energy consumption and toward the development and use of renewable energy sources than older people. It appears that it is more difficult for an older person to change his attitude toward energy sources than for a younger person. In fact, younger people may not even have to change their attitudes since their attitudes in relation to energy were established during the time of the 1973 oil embargo, disruptions in the supply of energy, and steep price increases for all types of energy.

Respondents from rural areas held less favorable attitudes toward energy conservation, but they were more in favor of traditional energy sources than respondents from urban areas.

Taken as a whole, findings on the determinants of energy related attitudes suggest that favorable attitudes toward energy conservation and toward renewable energy sources are to some degree governed by the same independent variables, whereas attitudes favoring conventional energy sources are not compatible with the former two attitudes.

Policies aiming at creating favorable attitudes toward energy conservation or the utilization of alternative energy sources thus are most likely to be successful when they can build on a perception of the energy problem as being serious. They will also be more readily accepted by younger people who live in metropolitan areas.

Analysis of Energy Conservation Behaviors

The explained variance in behavioral measures ranged from a low 3.6 percent to a high 27.2 percent. Where low relationships exist, the lack of variation in the dependent variable appears to be a major cause. Attitudes played only a limited role in predicting energy conservation behavior, although their impact was significant in some cases. Reasons for this weak relationship could relate to any of the following:

1) Both the behavioral measures and the attitudinal measures were less than ideal to capture the intended attitudes and behavior. In addition they were based only on a small number of items which caused the lack of variance in some cases. This is especially true for the attitude measures where only twelve opinion statements were available.

2) Attitudes may have not yet been firmly established. According to Kelman (1974) the process of forming attitudes is continuous and ongoing with attitudes guiding behavior and behavior shaping attitudes. Thus, the same analysis may yield stronger attitude - behavior relationships at a later point in time.

3) Attitudes and behavior may, in fact, not be strongly related. The price of energy may have the greatest influence on behavior; a variable that could not be investigated in the present study.

None the less, there are some significant relationships between attitudes and behaviors that will be presented.

Basic Structural Energy Saving Features like, for example, wall and ceiling insulation, double glazed or storm windows, etc. were found to be best predicted by the year in which a house was built and its qualitative standards. The newer a house, the more basic energy saving features were present, indicating that the energy crisis has had an impact on the construction industry and on home buyers.

The value of a house was also positively related to the presence of basic energy saving features, which supports the notion that basic energy saving measures are part of any well constructed house regardless of the attitudes of the person who lives in that house.

Income also had a positive impact on the number of energy saving features, indicating that financial resources play an important part in whether such measures can be realized or not.

In general, it appears that acceptance of basic structural energy saving features is less a matter of attitudes than of financial resources needed to implement them. Policies aiming at a broader acceptance of such basic energy saving features, therefore, should focus on an incentives approach, e.g. provide tax credits, change mortgage requirements, offer low interest loans, etc.

Additional Structural Energy Saving Features, such as wood stoves, solar water heaters, heat pumps, or window coverings were, at least to some degree, predicted by attitude measures. A favorable attitude toward renewable energy sources was more prevalent among those respondents who reported having more additional energy saving devices than among those who had fewer additional features.

The number of different investments a person had made was positively related to the amount of additional energy saving features in a house. It appears that experience with investments had a positive effect on energy saving investments, maybe because those people were more aware of the long term pay-backs of these investments.

The year in which a house was built did not predict the number of additional energy saving measures present at the time the survey was conducted. Newer homes had more of those features already built in, but older homes were retrofitted with energy saving devices to the same degree.

In general it may be concluded that those extra energy saving devices may find wider acceptance when favorable attitudes toward renewable energy sources are stronger and if people are aware of the long term benefits from those energy saving devices.

No-Cost Energy Conservation Practices, like turning down water heater and room thermostats, opening and closing windows, closing off some rooms, etc. do not face financial constraints like structural energy saving measures. Attitudes play the most important role in predicting these conservation practices.

A favorable attitude toward reducing energy consumption is more prevalent among those respondents who report engaging in more energy saving practices than among those who report less such activity.

People who consider the energy problem to be serious also engage in more of those no-cost measures. These findings are consistent with previous research (Hogan & Paolucci 1979; Jackson 1980) on the relationship between energy related attitudes and the amount of conservation practices adopted. These findings provide support for the notion that once financial constraints are removed, attitudes may have a greater impact on behavior than with those restraints present. They also suggest that attitudes play a more important role for energy saving measures that involve changes in living patterns , like closing off rooms that are not used, or using a wood stove instead of an electric heater, than for energy saving measures that require no changes or sacrifices in life styles, like adding insulation or double glazed windows.

At the same time it appears that younger rather than older people find it easier to adapt to these changes high energy costs have brought about. They are more open to alternate energy sources, as well as more likely to engage in energy saving practices that do not cost anything. However, it remains unclear whether younger families are forced to cut down on their energy consumption because they can not afford to use more energy, or whether it is a truly voluntary effort to save energy based on a strong energy conservation attitude.

In general, however, it can be stated that conservation practices are widely accepted, but that especially wealthier people (no need) and older people (no motivation) are reluctant to take steps that would save energy but also require changes in life-styles.

Analysis of the Amount of Energy Used in a Home

Energy consumption was operationalized in this analysis as the amount of money spent on energy used at home. It served as a measure to test the impact of attitudes and conservation behavior on the amount of energy actually consumed.

The three primary factors determining energy consumption were the size of a house, the number of people living together in a household, and the income level of a family. The first two factors are fairly obvious since it takes a certain amount of energy to heat (or cool) a cubic foot of living space. Similarly, each person uses a certain amount of energy so that larger families are likely to use more energy than smaller families. The additional effect of income on energy consumption may be due to life-styles which require more energy (e.g. many energy consuming appliances) in high income families.

Conservation behavior, although its impact was limited, made a significant difference in the amount of energy consumed in a household. Most effective was the presence of additional energy saving features. Basic energy saving measures, on the other hand, had no significant impact on the amount of energy consumed, most likely because most houses already have basic energy saving features. The number of conservation practices also had a significant impact on the amount of money people spent on energy. Those people who rejected no-cost measures more often paid higher energy bills.

A favorable attitude toward renewable energy sources also predicted lower energy expenditures, as well as a favorable attitude toward reducing energy consumption. The effect of the latter attitude was, however, not significant in conjunction with the former attitude measure.

It may be concluded that, although their effect is relatively small, conservation behavior and favorable attitudes toward energy conservation and renewable energy sources have a significant effect on the amount of energy that is consumed in a household as reflected by energy expenditures.

These findings may encourage policy makers to continue in their efforts to promote energy conservation and to provide programs that stimulate and enable citizens to put energy saving projects into effect, since they do make a difference in the amount of energy a household consumes and hence in the amount of energy that must be provided at ever higher costs to society.

CHAPTER V

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

This study was an investigation of the relationship between attitudes towards energy and energy conservation behavior in the context of sociodemographic and housing characteristics. In addition, the impact of attitudes and conservation behavior on actual energy expenditures was assessed. Data for this study were obtained from a Western Regional Agricultural Experiment Station Project (W-159) "Energy Directions: A Western Perspective".

Summary

Data Collection

The present analysis was confined to data obtained from Oregon residents. A random sample, stratified for rural and urban households was drawn from telephone directories. Data were collected by questionnaire mailed out to 1,503 Oregon households (753 rural and 750 urban) in the spring of 1981. Half the questionnaires were sent to the male head of household and the other half to the female head of household. The final number of usable questionnaires returned was 834, yielding a response rate of 55 percent. Both the design of the instrument and the mailing procedure followed a method developed by Dillman (1978) called "Total Design Method".

Sociodemographic Characteristics of the Sample

The average age of the 834 respondents was 47 years with a range from 17 to 96 years of age. Although initially an equal number of questionnaires had been sent to males as to females the sex distribution among those who had responded was 58.4 percent males and 41.6 percent females.

Fifteen percent of the respondents had not completed high school, 22 percent had graduated from high school, almost 43 percent had done at least some college work or had completed college, and close to nine percent of the sample held a graduate degree.

Occupational status was found to be distributed as follows: one third of the respondents were in blue collar occupations and two thirds in white collar occupations. The average total yearly family income was slightly below $ 24,000 in the sample. In addition, the mean number of different investments was found to be 3.8.

The average number of persons living together in one household was found to be 2.8 persons with roughly half being one and two person households and the other half being households with more than two persons.

The stratification for rural and urban was well reflected in the questionnaires that were returned with 50.8 percent rural and 49.2 percent urban households responding.

Housing Characteristics

In the present sample, only one out of seven families lived in a rented dwelling, whereas 85 percent owned a house. Of the houses in which respondents lived, 31 percent were built before 1950. 34 percent were constructed in the 1950's and 1960's, and 35 percent were built between 1970 and the time the survey was conducted.

The average size of a home in the sample was found to be 1,500 square feet. Respondents' homes had an average value of $ 75,555 in the year 1981.

Attitudinal Measures

Energy related attitudes were obtained by factor analyzing twelve Likert-type statements which assessed opinions about various energy sources and strategies. The three extracted factors explained fifty percent of the variance in the initial set of twelve statements. The three factors were interpreted as: 1) an attitude that favors reducing energy consumption, 2) an attitude favoring conventional energy sources, and 3) an attitude favorable toward renewable energy sources.

An additional attitude, not obtained from factor analysis but directly from the questionnaire, was the perceived seriousness of the energy problem. Of the respondents, 78.5 percent believed that meeting the U.S.' energy needs was at least a serious problem.

Behavioral Measures

Behavioral measures, which were intended to capture energy conservation behavior, were derived from two questions, one which asked respondents to report structural conservation measures and the other which asked respondents to indicate what conservation practices they had adopted.

Eight behavioral measures based on structural energy saving features were created. The measures distinguished between basic conservation features, like wall and ceiling insulation, double glazed or storm windows, etc. and additional energy saving features, like wood stoves, solar water heaters, insulated window coverings, and the like. Basic and additional features were further divided into features that had already existed at the time respondents moved into their homes, features added by the respondents themselves, and features respondents were planning to add within the following two years.

The average home had 3.5 basic energy saving features, but only one out of a list of eighteen additional energy saving devices. Plans for adding energy saving features averaged .5 measures in the sample.

Two behavioral measures were based on responses to direct questions about conservation practices. No-cost practices, like closing off rooms not used or turning down thermostats in winter, were quite common, with the average household reportedly engaging in 3.2 such no-cost conservation practices.

Analysis of Attitudinal Measures

Multiple regression analysis was employed to identify sociodemographic characteristics that are related to certain attitudes. The list of independent variables included age, sex, educational background, and occupational status of the respondent, the total family income and number of different investments a family had made, as well as housing tenure and residential location. In addition, the perceived severeness of the energy problem was included in the list of predictor variables.

For each of the three attitude measures a separate model was developed using a stepwise regression procedure. The models explained between twelve and thirteen percent of the variance in the attitude measures.

As a general outcome of the analysis of attitudes it can be stated that a favorable attitude toward reducing energy consumption and toward renewable energy sources are related to sociodemographic variables basically the same way. A favorable attitude toward conventional energy sources, on the other hand, is related to these sociodemographic variables in the opposite direction.

Perceived seriousness of the energy problem was the best predictor of the three attitude measures. Respondents who considered the energy problem to be serious, at the same time favored energy conservation and the development and use of renewable energy sources.

The respondents' age was similarly related to attitudes. Younger people were more favorable toward energy conservation and alternative energy sources, whereas older people favored traditional energy sources. Rural households tended to favor conventional energy sources, but held less favorable attitudes toward reducing energy consumption. High income families favored traditional energy sources, but white collar occupation was positively related to favoring reduced energy consumption.

Analysis of Behavioral Measures

The list of independent variables was extended by the above three attitude measures and housing characteristics, e.g. the value of a house and the year in which it was built. Again, for each of ten behavioral measures a separate model was developed. Independent variables accounted for 3.6 to 27.2 percent of the variance in the behavioral measures. Where the explained variance was low, lack of variability in the dependent variable appeared to be a major cause. Attitudes, in general, were only moderately useful in explaining behavior.

Basic Structural Energy Saving Features were found to be more common in newer houses than in older ones. This provides evidence that the housing industry and home buyers alike have become aware of the fact that energy efficiency is an important feature of a new home.

The estimated value of a house was positively related to the number of basic energy saving features present in a house,which lends support to the notion that those basic features are part of any well constructed house, regardless of the attitudes of the person who lives in that house.

The positive relationship between family income and the number of basic conservation features provides evidence for the fact that a certain amount of financial resources are necessary to implement these measures.

Additional Energy Saving Features were,to some degree,predicted by a favorable attitude toward renewable energy sources. Respondents holding favorable attitudes toward alternate energy sources had significantly more additional energy saving devices than those less favorable.

The number of different investments a family had made was positively related to the number of additional energy saving features that were present in a home. It appears that people who have experience with investments are possibly more aware of long term benefits resulting from investments in such energy saving devices.

No-Cost Conservation Practices were best predicted by attitude measures since these practices do not face financial constraints like the structural energy saving measures.

Both a favorable attitude toward reducing energy consumption and the perceived seriousness of the energy problem were more prevalent among respondents who engaged in more conservation practices than among those who cared less about energy saving practices.

These findings provide evidence for the notion that once financial restraints are removed, attitudes have a significant impact on behavior. The findings also suggest that attitudes play a more important role for energy saving measures that involve changes in living patterns than for those measures which do not require such changes.

Younger people were found to engage in more conservation practices than older people which is consistent with previous research findings.

In general it can be stated that conservation practices are widely accepted, but that especially wealthier people who have less need to conserve and older people who may not be motivated are reluctant to take steps that would save energy but also require changes in life-styles.

Analysis of Actual Energy Expenditures

Actual energy expenditures were used to determine the impact of energy related attitudes and conservation behavior on the amount of energy consumed in a household. Independent variables accounted for thirty percent of the variance in energy expenditures.

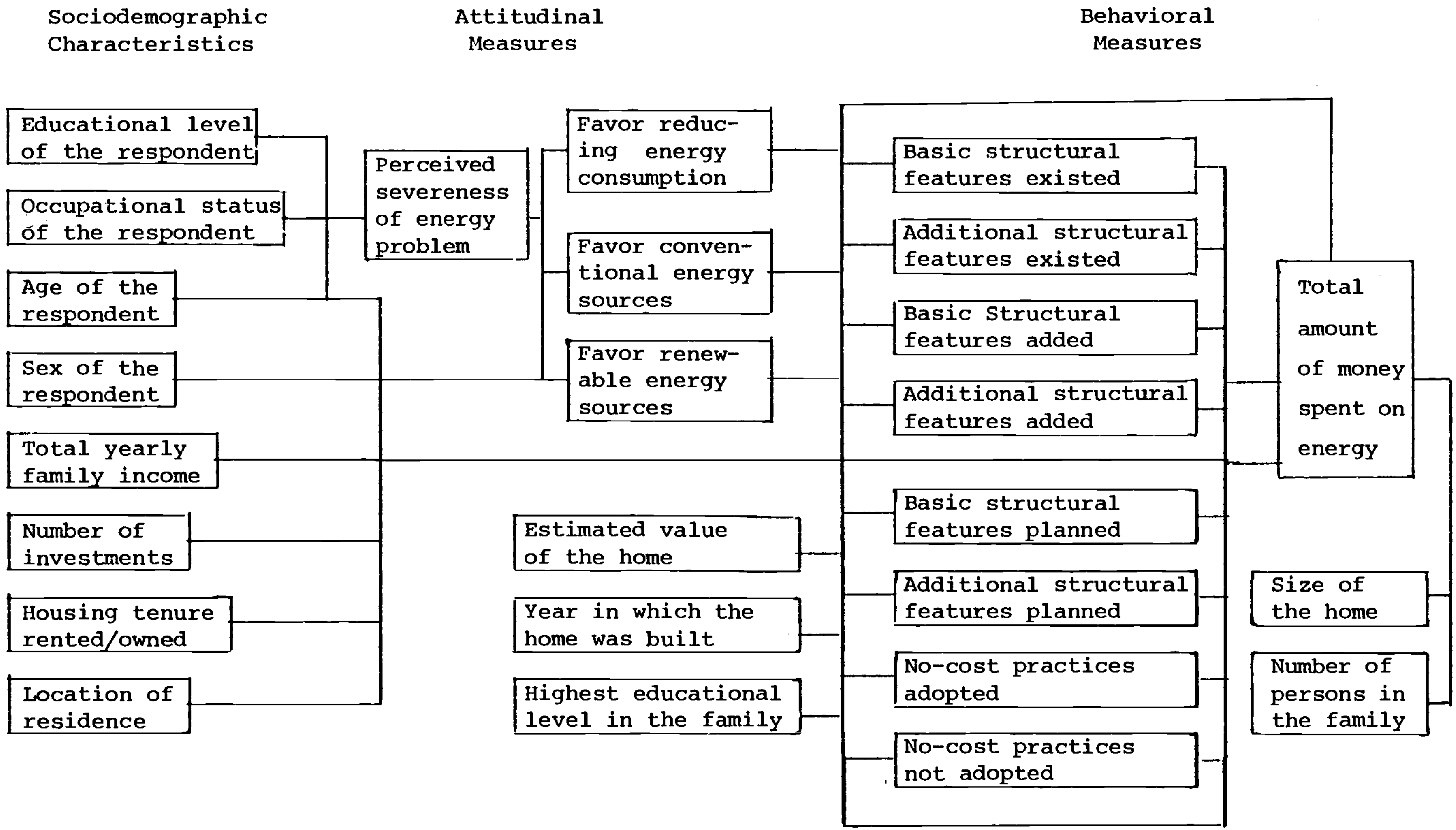
The largest impact on the energy consumed in a household was the size of a house, the number of people living together in a household, and the income level of a family.

Conservation behavior, although its effect was only limited, had a significant impact on the amount of energy used in a home. The presence of additional energy saving features and the adoption of conservation practices were significantly related to lower energy expenditures.

A favorable attitude toward reducing energy consumption or,alternatively,a favorable attitude toward renewable energy sources also had a significant effect on the amount of energy consumed in a household.

Following is a model summarizing the analysis of energy related attitudes and conservation behavior in the context of sociodemographic and housing characteristics.

Figure 5: A Model Summarizing the Relationships between Energy Related Attitudes, Behaviors, and Selected Sociodemographic Variables



Implications

Findings from the analysis of energy related attitudes and energy conservation behavior have several implications for public policy:

1. Increasing the public's perception of the energy problem as being serious may enhance favorable attitudes towards both energy conservation and development of renewable energy sources.
2. Basic energy saving features, such as insulation, double glazed windows, etc. may be promoted most effectively by providing the financial resources necessary to implement them, like tax credits, low interest loans, altered mortgage requirements, and the like.
3. Conservation measures which go beyond these basic energy saving features may be more readily accepted if their long term pay-back is better known to the public.
4. Promoting a conservation attitude may, in fact, lead to a larger number of conservation practices adopted by the public.
5. Policy makers should continue their efforts to promote energy conservation and alternative energy sources and carry on programs which stimulate and enable citizens to put energy saving projects into effect, since they do make a difference in the amount of energy consumed by a household.

Recommendations for further Research

It might be more fruitful to address somewhat differently some of the problems that were investigated in the present study. Also, some other aspects might be included in a subsequent analysis of the data.

1. The price of energy as an important independent variable in the analysis of energy consumption was not examined in the present study. Once regional data are available, with larger differences in the price of energy from one area to the other, price may be included

in the list of independent variables.

2. The number of items on which attitudinal and behavioral measures were based was relatively small. More opinion statements on various energy sources and different strategies to solve the energy problem, especially toward alternative energy sources, should be included in a questionnaire. Similarly the list of structural and no-cost conservation measures should be expanded to yield higher variability in the measures derived from these statements.

3. It proved to be fruitful to distinguish between basic and additional energy saving features. In the present study, however, the categorization of structural energy saving features was rather arbitrary and might be investigated more thoroughly by using factor analysis.

4. If a follow-up study on the present sample were conducted, it would be fruitful to investigate the impact of attitudes at the present time on behavior in the future, especially whether plans to install energy saving features (behavioral intents) are actually carried out and if there is a lag time between the attitude formation and actual change in the behavior.

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APPENDIX A

Questionnaire

1

THE BIG PICTURE

Q- 1 Some people feel that energy is a serious national problem, but other people feel it is not. We would like to know your opinion. Do you consider meeting the United States' energy needs during the next ten to twenty years to be: (Please circle number of your opinion.)

1 NOT A SERIOUS PROBLEM
2 A SOMEWHAT SERIOUS PROBLEM
3 A SERIOUS PROBLEM
4 A VERY SERIOUS PROBLEM

Q- 2 One way to meet our future energy needs is to cut back on energy use. Another way is to increase energy production. Which one of the following choices do you feel our country should make in order to meet our future energy needs: (Please circle number of your opinion.)

1 DEPEND ENTIRELY ON CUT-BACKS IN ENERGY USE
2 DEPEND MOSTLY ON CUT-BACKS IN ENERGY USE
3 DEPEND EQUALLY ON CUT-BACKS AND INCREASED ENERGY PRODUCTION
4 DEPEND MOSTLY ON INCREASED ENERGY PRODUCTION
5 DEPEND ENTIRELY ON INCREASED ENERGY PRODUCTION

Q- 3 To what extent do you favor or oppose each of the items listed below as a way of helping to meet our country's future energy needs?

	Please circle your opinion for each item				
A More use of solar energy.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
B Reduce energy use in homes.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
C More use of nuclear power	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
D More use of western coal.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
E Reduce energy use in business and industries.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
F More use of oil from western shale. .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
G Reduce energy use in individual travel.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
H More oil imports.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
I More exploration for oil in the U.S.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
J Reduce energy use by agriculture. . .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
K More use of wind energy	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR

ENERGY DIRECTIONS

2

Q- 4 Here are some actions that might be considered in order to reduce energy use in the United States. Please indicate the extent to which you favor or oppose each of them.

Please circle your opinion for each item

A	Place higher taxes on gasoline. . . .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
B	Require home thermostats to be no higher than 65°F in winter.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
C	Require home thermostats to be no lower than 78°F in summer	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
D	Require everyone's home to pass an energy "audit" (must have adequate insulation, double-pane or storm windows, etc.).	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
E	Provide larger tax credits for improving home energy efficiency. .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
F	Provide larger tax credit for adding home <u>solar</u> heating or cooling .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
G	Require utility companies to charge lowest <u>rates</u> to low energy users and highest <u>rates</u> to high users . .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
H	Discourage building homes away from towns and cities to lessen travel by car.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
I	Change building codes and mortgage requirements to encourage new types of energy-saving housing.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
J	Keep 55 MPH speed limit	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
K	Require better label information on appliances telling how much energy they use.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
L	Require utilities to provide regular reports to users on whether energy use is higher or lower than in previous years.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
M	Require manufacturers to make appliances that use less energy . .	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR
N	Rely on state instead of federal programs to encourage energy conservation.	STRONGLY OPPOSE	OPPOSE	NEUTRAL	FAVOR	STRONGLY FAVOR

3

WAYS TO CUT BACK

Q- 5 If the United States faced a crisis and it were essential for every family to voluntarily cut back its energy use, which one of the following would you be more willing to do? (Please circle number of your opinion.)

1 REDUCE WINTER HOME HEATING TO NO HIGHER THAN 65°F AND SUMMER COOLING TO NO LOWER THAN 78°F
2 REDUCE AUTOMOBILE USE BY ABOUT ONE-FOURTH

Q- 6 If our government had to take drastic action to save energy, which one of the following would you be more willing to accept?

1 RATION HOME HEATING FUEL AND ELECTRICITY SO THAT PEOPLE GET ABOUT ONE-FOURTH LESS
2 RATION GASOLINE SO THAT PEOPLE GET ABOUT ONE-FOURTH LESS

Q- 7 If you were asked to reduce your energy consumption during the entire next year by one-fourth--that is, 25 percent less than you now consume--do you feel you could do it?

1 DEFINITELY YES
2 PROBABLY YES
3 I DON'T KNOW
4 PROBABLY NO
5 DEFINITELY NO

Q- 8 Costs for heating fuel, gasoline, and electricity have gone up a great deal in the last few years. To what extent, if at all, have higher energy costs made you cut back on any of the items listed below.

	To what extent have higher energy costs made you cut back? (Please circle your answer.)			
A Groceries	NONE	A LITTLE	SOME	A LOT
B Meals out	NONE	A LITTLE	SOME	A LOT
C Driving the car (or other vehicle)	NONE	A LITTLE	SOME	A LOT
D Health care	NONE	A LITTLE	SOME	A LOT
E Vacations	NONE	A LITTLE	SOME	A LOT
F Recreation	NONE	A LITTLE	SOME	A LOT
G Education	NONE	A LITTLE	SOME	A LOT
H Housing (rent, mortgage or upkeep)	NONE	A LITTLE	SOME	A LOT
I Purchase of appliances or furnishings	NONE	A LITTLE	SOME	A LOT
J Money put in savings	NONE	A LITTLE	SOME	A LOT
K Clothes	NONE	A LITTLE	SOME	A LOT

Q-9 All things considered, do you feel that changes in the cost of energy in the last five years have made your life: (Please circle number of your answer.)

1 A LOT WORSE THAN IT WAS
2 A LITTLE WORSE THAN IT WAS
3 NO EFFECT
4 A LITTLE BETTER THAN IT WAS
5 A LOT BETTER THAN IT WAS

ENERGY EFFICIENCY AT HOME

4

Q-10 Listed below are certain energy-saving features that might be added to your home (by you or if you rent, your landlord). For each item, please circle the one best answer:

Energy-saving measures:	Existed When I Moved In	Added Since I Moved In	Plan To Add Within Two Years	Doesn't Exist And No Plans To Add Within Two Years	I Don't Know	Doesn't Apply To My Home
A Double panes or storms on most windows. . . .	EXISTED	ADDED	PLAN	NO	DK	NA
B Good weatherstripping and caulking on most doors and windows. . .	EXISTED	ADDED	PLAN	NO	DK	NA
C More than 4 inches of ceiling insulation . .	EXISTED	ADDED	PLAN	NO	DK	NA
D Insulation in outside walls.	EXISTED	ADDED	PLAN	NO	DK	NA
E Thick floor insulation .	EXISTED	ADDED	PLAN	NO	DK	NA
F Storm doors on all entrances.	EXISTED	ADDED	PLAN	NO	DK	NA
G Clock set-back thermostats.	EXISTED	ADDED	PLAN	NO	DK	NA
H Glass doors on fire-places	EXISTED	ADDED	PLAN	NO	DK	NA
I Wood-burning stove . . .	EXISTED	ADDED	PLAN	NO	DK	NA
J Solar hot-water heater .	EXISTED	ADDED	PLAN	NO	DK	NA
K Solar heating.	EXISTED	ADDED	PLAN	NO	DK	NA
L Evaporative cooler . . .	EXISTED	ADDED	PLAN	NO	DK	NA
M Outdoor window shades. .	EXISTED	ADDED	PLAN	NO	DK	NA
N Insulated window coverings	EXISTED	ADDED	PLAN	NO	DK	NA
O Other: (Please write in) ________	EXISTED	ADDED	PLAN	NO	DK	NA

Q-11 Thinking about the last three years (1978 --1980), about how much money have you spent to improve the energy efficiency of your home (e.g., weather-stripping, insulation, set-back thermostats, storm doors, solar equipment)? (If none, please put "0.")

$________ YOU SPENT IN 1978

$________ YOU SPENT IN 1979

$________ YOU SPENT IN 1980

5

Q-12 In order to pay for any energy efficiency improvements made in your home from 1978 to 1980, which did you do: (Please circle all that apply.)

1 SPENT NO MONEY ON ENERGY EFFICIENCY IMPROVEMENTS
2 USED MONEY FROM CURRENT INCOME
3 DELAYED OTHER PURCHASES
4 CUT BACK ON OTHER PURCHASES
5 USED LOAN FROM UTILITY COMPANY
6 USED OTHER LOAN OR CREDIT
7 USED MONEY FROM SAVINGS
8 OTHER (Write in) ______________________

Q-13 In recent years, it has been possible to claim federal and, in some places, state tax benefits for improving the energy efficiency of one's home. Which best describes your awareness of these tax benefits? (Please circle the number of your answer in each column.)

Federal Income Tax Credit (Circle one answer)	State Tax Benefit (Circle one answer)	
1	1	NOT AWARE OF THIS BENEFIT
2	2	AWARE, BUT HAVE MADE NO CLAIM
3	3	AWARE, AND A CLAIM MADE ON 1978, 1979, OR 1980 TAXES
	4	NO TAX BENEFIT IN MY STATE

→ (If claim made) Would you have probably made these improvements if the tax benefits had not been available?

1 DEFINITELY NO
2 PROBABLY NO
3 PROBABLY YES
4 DEFINITELY YES

Q-14 Here are some other efforts you may or may not be doing to save heating and cooling costs in your home. For each item, tell whether you now do it, or plan to do it in the future.

(Please circle the best answer.)

	Energy-saving efforts	This Is Done Now	Don't Do Now, But Plan To Do Within Two Years	Don't Do Now, And No Plans For Future	Doesn't Apply To My Home
A	Close off some rooms	NOW	PLAN	NO PLAN	NA
B	Have water heater set to 120°F (or less) . .	NOW	PLAN	NO PLAN	NA
C	In winter, set thermostat at 65°F or lower .	NOW	PLAN	NO PLAN	NA
D	In summer, set thermostat at 78°F or higher.	NOW	PLAN	NO PLAN	NA
E	Change use of rooms to take advantage of sun-warmed or shaded areas	NOW	PLAN	NO PLAN	NA
F	Open and close window coverings to take advantage of sun and temperature differences	NOW	PLAN	NO PLAN	NA
G	Home inspected ("audited") for energy efficiency	NOW	PLAN	NO PLAN	NA

Q-15A People have different concerns about housing and make many choices about the housing units in which they live. Here are some statements which express people's concerns about housing. To what extent do you agree or disagree with each statement?

	To what extent do you agree or disagree? (Please circle your answer.)				
	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE
A Homeowners are the backbone of our country.	SA	A	U	D	SD
B It is all right to bring up children in apartments.	SA	A	U	D	SD
C Homeownership is one of the best ways to get a tax break	SA	A	U	D	SD
D If I had two school-age children of the same sex, I would prefer that they had separate bedrooms	SA	A	U	D	SD
E It is all right if the value of my home does not keep up with inflation	SA	A	U	D	SD
F People should consider the rate of return on their investment when buying a home. .	SA	A	U	D	SD
G Neighbors should not be expected to take care of each other's property	SA	A	U	D	SD
H People wanting quality in housing construction are limited to custom-built homes. .	SA	A	U	D	SD
I Home improvements should only be done if they add to the resale value of that home.	SA	A	U	D	SD
J A home-buyer should make the largest down payment he/she can.	SA	A	U	D	SD
K Building equity in a home is a good idea. .	SA	A	U	D	SD
L Young people today should consider renting as their permanent housing choice	SA	A	U	D	SD
M The risks involved in buying a home worry me.	SA	A	U	D	SD
N People should live close to the place where they work	SA	A	U	D	SD
O I would prefer not to know the rate of return on my housing investment	SA	A	U	D	SD
P Home-buyers ought to buy detached single-family dwellings.	SA	A	U	D	SD
Q Families with enough income ought to own their own homes	SA	A	U	D	SD
R A home should be kept in good repair to assure resale value	SA	A	U	D	SD
S I would not pay cash for my home even if I could	SA	A	U	D	SD
T The federal government should not give tax breaks for homeownership.	SA	A	U	D	SD
U A person's home is a poor indicator of that person's social status.	SA	A	U	D	SD
V I prefer to live in a neighborhood where people have similar incomes	SA	A	U	D	SD
W A home-buyer should pay cash for a home . .	SA	A	U	D	SD
X The amount of space needed in a home is greater if there are more people in the household	SA	A	U	D	SD

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ABOUT YOUR HOME

Q-16 Which of the following best describes the building in which you live? (Please circle number of your answer.)

1 A MOBILE HOME OR TRAILER
(If Yes Is It:) ___*IN A MOBILE HOME PARK OR SUBDIVISION*
___*ON A LOT YOU OWN*
___*ON A LOT YOU RENT*
2 A ONE-FAMILY HOUSE DETACHED FROM ANY OTHER HOUSE
3 A BUILDING FOR TWO TO FOUR HOUSEHOLDS (FAMILIES)
4 A BUILDING FOR FIVE OR MORE HOUSEHOLDS (FAMILIES)
5 OTHER: (Please describe.)________________________________

Q-17 Is the home in which you live:

1 RENTED BY YOU
2 OWNED BY YOU
3 OWNED IN CONDOMINIUM BY YOU
4 OTHER: (Please describe.)________________________________

Q-18 Which of these broad categories best describes the number of square feet in your home? Do not include a garage, unfinished basement, or space rented to members of another household. Just your best estimate is fine.

1 LESS THAN 500 SQUARE FEET
2 501 TO 1,000 SQUARE FEET
3 1,001 TO 1,500 SQUARE FEET
4 1,501 TO 2,000 SQUARE FEET
5 2,001 TO 2,500 SQUARE FEET
6 MORE THAN 2,500 SQUARE FEET

Q-19 How many rooms do you have in your home? Please do not count bathrooms, porches, balconies, foyers, halls, half-rooms, or space rented to other households.

_____NUMBER OF ROOMS

Q-20 How many years have you lived in your present home?

_____NUMBER OF YEARS (if less than a year, _____ MONTHS)

Q-21 To the best of your knowledge, about when was your home built? We mean first constructed and not when remodeled, added to, or converted.

1 BEFORE 1940
2 1940 TO 1949
3 1950 TO 1959
4 1960 TO 1969
5 1970 TO 1974
6 1975 OR AFTER → (If known, please put exact year: _____.)

Q-22 How do you feel about the energy efficiency of your present home? (Please circle number of your opinion.)

1 ABOUT AS ENERGY EFFICIENT AS IT CAN BE
2 A LITTLE IMPROVEMENT CAN BE MADE
3 SOME IMPROVEMENT CAN BE MADE
4 A LOT OF IMPROVEMENT CAN BE MADE

HOME ENERGY COSTS

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Q-23 Compared to homes similar to yours, do you feel your home is: (Please circle number of your answer.)

1 A LOT LESS ENERGY EFFICIENT
2 SOMEWHAT LESS ENERGY EFFICIENT
3 ABOUT THE SAME
4 SOMEWHAT MORE ENERGY EFFICIENT
5 A LOT MORE ENERGY EFFICIENT

Everyone

Q-24 About how much a month do you pay for rent or house payments? (Include space rent if in mobile home park.)

1 NO PAYMENT OR RENT
2 LESS THAN $100
3 $100 TO $199
4 $200 TO $299
5 $300 TO $399
6 $400 TO $499
7 $500 TO $749
8 $750 TO $999
9 $1,000 OR MORE

Home owners only

What is the value of your home? That is, about how much do you think it would sell for if it were for sale?

1 LESS THAN $25,000
2 $25,000 TO $49,999
3 $50,000 TO $74,999
4 $75,000 TO $99,999
5 $100,000 TO $124,999
6 $125,000 TO $174,999
7 $175,000 TO $249,999
8 MORE THAN $250,000

Q-25 Next, we would like to ask about how much energy it took to run your home in 1980. Please answer as best you can. If your bills are handy, they could be very helpful. (If you lived in your home only during part of 1980, please put number of months here: ______.)

Please provide as much of the following as you can. Your best estimate will be fine.

	Your Cost For 1980 (Put "R" if included in rent.)	Approximate Amount Used In 1980
A Electricity	$________COST	__________KILOWATT HOURS
B Heating oil	$________COST	__________GALLONS
C Wood.	$________COST	__________CORDS
D Natural gas	$________COST	__________ __________ (Put purchase unit: cubic feet or therms?)
E Other: (e.g., coal, propane, or?) ____________________	$________COST	__________ __________ (Put purchase unit)

Q-26 Which of the above is your main source of energy for:

______________WATER HEATER

______________SPACE HEATING

Finally, we would like to ask a few questions about yourself to help with analysis of the results.

Q-27 Where is your residence located?

______________________________ COUNTY

______________________________ ZIP CODE

______________________________ TOWN OR CITY IN WHICH (OR NEAREST TO) YOUR RESIDENCE IS LOCATED

→ Is your home: (Please circle.)

1 INSIDE THE CITY LIMITS
2 OUTSIDE THE CITY LIMITS

Q-28 Do you have any of these recreation-related items: (Circle all that you have.)

1 A HEATED SWIMMING POOL, HOT TUB OR JACUZZI
2 A SECOND HOME OR CABIN
3 A MOTOR HOME
4 ANOTHER RECREATIONAL VEHICLE (e.g., CAMPER)
5 NONE OF THE ABOVE

Q-20 Are you: (Please circle number of your answer.)

1 MARRIED
2 DIVORCED
3 WIDOWED
4 SEPARATED
5 NEVER MARRIED

Q-30 Please list everyone who lives in your household by their relationship to you, starting with the adult(s). (Please list as husband, wife, parent, friend, son, daughter, etc.--names aren't necessary.)

		Age (In Years)	Sex (M = Male; F = Female)
1	Yourself		
2			
3			
4			
5			
6			

If more space is needed, please put ages here:

FEMALES ____; ____; ____; ____;

MALES ____; ____; ____; ____

Please answer these questions for yourself and your spouse or other adult living partner (if you have one).

	YOURSELF	SPOUSE OR LIVING PARTNER
Q-31	Are you: 1 EMPLOYED FULL TIME 2 EMPLOYED PART TIME 3 NOT EMPLOYED OUTSIDE THE HOME 4 UNEMPLOYED 5 STUDENT 6 RETIRED	Is he/she: 1 EMPLOYED FULL TIME 2 EMPLOYED PART TIME 3 NOT EMPLOYED OUTSIDE THE HOME 4 UNEMPLOYED 5 STUDENT 6 RETIRED
Q-32	Your usual occupation when employed (or before retirement): __________TITLE __________KIND OF WORK __________TYPE OF COMPANY OR BUSINESS	His/her usual occupation when employed (or before retirement): __________TITLE __________KIND OF WORK __________TYPE OF COMPANY OR BUSINESS
Q-33	(If employed) About how far is it from home to where you work? ______MILES	(If employed) About how far is it from home to where he/she works? ______MILES
Q-34	Your highest level of education: 1 NO FORMAL EDUCATION 2 GRADE SCHOOL 3 SOME HIGH SCHOOL 4 HIGH SCHOOL GRADUATE 5 TRADE SCHOOL 6 SOME COLLEGE 7 COLLEGE GRADUATE 8 SOME GRADUATE WORK 9 A GRADUATE DEGREE	His/her highest level of education: 1 NO FORMAL EDUCATION 2 GRADE SCHOOL 3 SOME HIGH SCHOOL 4 HIGH SCHOOL GRADUATE 5 TRADE SCHOOL 6 SOME COLLEGE 7 COLLEGE GRADUATE 8 SOME GRADUATE WORK 9 A GRADUATE DEGREE

Q-35 Some people have many types of investment experiences, and others do not. Which of the following types of investments, if any, have you owned in the last ten years: (Please circle all that apply.)

1 A BUSINESS
2 A HOME
3 OTHER REAL ESTATE THAN YOUR HOME
4 UNITED STATES SAVINGS BONDS
5 PASSBOOK SAVINGS ACCOUNT
6 TIME SAVINGS DEPOSITS
7 MUTUAL FUNDS
8 MUNICIPAL BONDS
9 TREASURY NOTES OR BILLS
10 GOLD OR SILVER COINS
11 STOCKS OR BONDS OF CORPORATIONS
12 MONEY MARKET CERTIFICATE
13 NONE

Q-36 Which of these broad categories describes your total family income before taxes in 1980? (Please circle the appropriate category.)

1 LESS THAN $5,000
2 $5,000 TO $9,999
3 $10,000 TO $14,999
4 $15,000 TO $19,999
5 $20,000 TO $24,999
6 $25,000 TO $29,999
7 $30,000 TO $39,999
8 $40,000 TO $49,999
9 $50,000 OR MORE

APPENDIX B

Letters to Participants

First Mailing:

School of
Home Economics

Oregon State University

Corvallis, Oregon 97331 (503) 754-3551

March 9, 1981

Costs for heating fuel and electricity continue to go up, and energy shortages seem possible. Yet, little is known about how people are being affected by these concerns. Nor do we know what directions and actions, if any, people want taken. To find out, we need your opinions.

Your household is one of a small number being asked to help. It was chosen in a random sample of Oregon and nine other western states. To truly represent the people throughout the region, it is important that each questionnaire be completed.

An equal number of men and women are being asked to help. In your household we would like to ask that the questionnaire be completed by an adult female if there is one. If not, then an adult male should complete it.

You may be assured of complete confidentiality. You will see an identification number on the front of the questionnaire. This is so your name can be checked off the mailing list when it is returned. Your name will not be placed on the questionnaire or associated with any of the information you provide. We hope you will participate. However, the study is voluntary, and if you do not want to answer, please let us know by returning the blank questionnaire.

We believe it is important that results of this study be brought to the attention of interested people including those concerned with our nation's energy policies. If you would like a summary (it's free), please print "send results" on the back of the return envelope.

I would be most happy to answer any questions you might have. Please write or call. My telephone number is (503)754-3211. Thanks for your help with this important effort.

Cordially,

Redacted for Privacy

Suzanne Badenhop
Project Director

Second Mailing:

School of
Home Economics

Oregon State University

Corvallis, Oregon 97331 (503) 754-3551

March 30, 1981

About three weeks ago I wrote seeking your opinion about some home-related energy issues facing people throughout the western United States. To the best of my knowledge, I have not received your completed questionnaire.

This study has been undertaken as a regional project by ten Agricultural Experiment Stations in the belief that citizens of the western region should be heard in the formation of public policy concerning energy. It is the largest study concerning energy opinion conducted in the western region.

Your name was selected through a scientific sampling process in which every household in Oregon had a chance of being drawn. This means that you represent a large number of Oregon households. In order that the results be truly representative, it is essential that each person return the questionnaire.

In the event that your questionnaire has been mislaid, a replacement is enclosed. Your help is greatly appreciated.

Cordially,

Redacted for Privacy

Suzanne Badenhop
Project Director

Enclosure