

*A Research Note on:*

*CONSUMER PREFERENCES FOR SELECTED ENERGY CONSERVATION  
FEATURES IN HOUSING*

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*ABSTRACT*

*This paper examines preferences of Utah residents for energy conservation strategies for space heating. The results are based on data collected in 1981 and 1983 by a mail survey of Utah residents. In both surveys, energy conservation features were found to be important considerations in choosing a dwelling. In particular, more than 70 percent of the respondents reported they would be more likely or much more likely to buy a house that has solar heating. The acceptance of solar heating is broad-based, with no significant differences with respect to location, age, sex, income or education of respondent. Nearly two-thirds of the respondents indicate that the presence of a wood-burning stove would favorably affect their housing choice. Younger respondents and those located in rural areas were the most likely to prefer a wood-burning stove. The impact of conservation features on house selection preferences diminished from 1981 to 1983, but, with the exception of solar heating, the changes are not statistically significant.*

*INTRODUCTION*

Rapidly increasing energy prices and adverse economic conditions throughout the United States during the 1970s and early 1980s focused attention on energy problems. Consumers reacted to higher energy costs in a variety of ways. Some changed their lifestyles by limiting travel, health, education, recreation, clothing and food expenditures. Others reduced household energy bills by lowering thermostat settings, installing energy conserving materials or changing their source of heating energy (Chatelain, 1983).

The purpose of this paper is to examine preferences for energy saving features in housing using data from two mail surveys. The respondents were asked to indicate how selected energy conservation features would affect their decision to purchase a house. The responses are analyzed in terms of demographic characteristics of consumers. In addition, changes in preferences between 1981 and 1983 also are reported.

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*DATA COLLECTION AND QUESTIONNAIRE ITEMS*

Utah data from Western Regional Project W-159, *Consequences of Energy Conservation Policies for Western Region Households*, were used for this study (Makela et al., 1982). This regional project involved a survey of households in 10 western states in 1981 and 1983 using a mail questionnaire. Although some items were changed for the 1983 study, the questions on which this paper is based used identical wording and response categories in both survey years.

*The 1981 and 1983 Surveys*

For the 1981 survey, a stratified (rural/urban) random sample of approximately 1,500 households was selected in each state from telephone directories. In Utah, usable returns were obtained from 63 percent of those who received the questionnaire - a total of 830 respondents. For the 1983 survey, a new stratified random sample of about 800 households was drawn from telephone directories. In Utah, the number of returns was 504 - a response rate of 63 percent. In addition, respondents to the 1981 study were resurveyed, and 77 percent, or 556 Utah households, returned their questionnaires.

The 1981 data and the 1983 resurvey are of particular interest in this paper. Responses to the 1981 survey can be viewed as representing preferences from a period in which energy conservation was a highly visible issue and the government was actively involved in its promotion. In contrast, the responses to the 1983 resurvey reflect preferences when energy issues were less publicized and the government was less active. Matching the 1981 and the 1983 responses allow the data to be used to identify changes in preferences over the two-year period.

*Questionnaire Items*

The main set of questions on which this paper is based was prefaced by the following statements:

Suppose you were in the market for a new house. How much more or less likely would you be to buy a particular house if it had each of these features?

For each housing feature the individual was requested to mark one of five categories ranging from "much less likely" to "much more likely."

The housing features considered in this paper can be grouped into two categories:

A. Sources of Space Heat

1. Solar Heating
2. Electric Heating
3. Gas Heating
4. Wood-burning Stove

B. Energy Conservation Features

1. Most windows on the south side
2. House partially earth-covered

*ATTITUDES TOWARD HOUSING FEATURES*

Based on the 1983 random sample, preferences for the six space heating sources and conservation features are shown in Table 1. The solar heating alternative received the most support. Over 72 percent of the respondents said they would be more likely or much more likely to buy a home that had solar heating. In contrast, 73.2 percent of the respondents said they would be less likely or much less likely to purchase a house with electric heat. Natural gas was viewed as a favorable factor in house selection by 55.6 percent. Sixty-four percent of the respondents indicated they would be more or much more likely to buy a house with a wood stove. In general, the data suggest, as would be expected, that houses that do not use high-cost energy are considered more desirable to own.

Considering the second set of features, 68 percent of the 1983 survey respondents said they would be more likely to buy a house with south-facing windows. In contrast, 41.1 percent of the respondents said they would be less likely or much less likely to buy a house that is partially earth-covered. This suggests that, though such a structure could be termed "energy efficient", the design may be too drastic a departure from traditional houses to be readily accepted.

Table 1. Housing Preferences: 1983 Random Sample

	Much Less Likely	Less Likely	Percentage Responding		
			Neutral	More Likely	Much More Likely
<b>SOURCES OF SPACE HEATING</b>					
1. Solar Heating	3.0	4.9	19.9	43.8	28.4
2. Electric Heating	42.7	30.5	16.3	9.0	1.4
3. Gas Heating	6.0	13.0	25.3	42.4	13.2
4. Wood-burning Stove	6.5	9.5	19.9	40.0	24.0
<b>Energy Conservation Features</b>					
1. Most windows on south side	0.9	5.0	26.2	45.8	22.2
2. House partially earth-covered	19.3	21.8	28.6	21.6	8.8

N = 504

#### *HOUSING FEATURES AND DEMOGRAPHIC CHARACTERISTICS*

Based on the 1983 random sample, Table 2 shows the relationship between preferences for space heating sources and housing features and the demographic characteristics of the respondents surveyed. With respect to solar heating, there are no significant differences in preference associated with the location, age, sex, income or education of the respondent. In contrast, the data suggest that older respondents and females are more favorably disposed to electric heating. Gas heating is especially attractive to urban dwellers and to older respondents.

Wood-burning stoves are viewed more favorably by respondents living in rural areas. It may be that wood is more accessible in such areas and that some rural areas have limited alternatives in terms of heating sources. Younger respondents are more likely to favor wood-burning stoves. Perhaps they see securing wood for the stove as an adventure as well as an economic advantage.

Having windows on the south positively influences house selection, but there are no significant differences with respect to location, sex, income or education of the respondents. With respect to the energy conservation feature, "partially earth-covered house", younger respondents and males are more likely to favor this house type. The age variable is also significant, but there is no clear pattern of preference.

#### *CHANGES IN ATTITUDES*

Changes in attitudes were examined using data from the 1981 survey and the 1983 survey. To assure that the questionnaire was completed by the same person in both years, a screening procedure was used. This procedure first checked to see if the sex of the 1983 respondent matched that of the 1981 respondent. Those questionnaires that matched by sex were then evaluated by age. The reported age of respondents in 1983 should be two years greater than reported in 1981. Only those observations that matched on the basis of both sex and age were used in this portion of the analysis (Anderson et al., 1985). The resulting matched sample consists of 295 respondents.

As shown in Table 3, the respondents were slightly more favorable to solar heating in 1981 than they were in 1983, although the difference is not statistically significant. The total proportion indicating that natural gas heating would make them more or much more likely to buy a house was about the same in 1983 as in 1981, but the "much more likely" category was smaller in 1983. In this case, the change is significant. Historically, heating homes with gas has been relatively inexpensive. Recent price increases for gas may account for the change in preferences.

With respect to wood-burning stoves, the "much more likely" category decreased by nearly 10 percentage points between 1981 and 1983, but the change in preference is not statistically significant. The changes are also not statistically significant for electric heating, south side windows and earth-covered homes.

Table 2. Housing Preferences: 1983 Random Sample by Demographic Characteristics of Respondents

	Rural/ Urban	Category or Range Most Favorable			
		Age	Sex	Income	Education
SOURCES OF SPACE HEATING					
1. Solar Heating	***	***	***	***	***
2. Electric Heating	***	Older	Females	***	?
3. Gas Heating	Urban	Older	***	***	***
4. Wood-burning Stoves	Rural	Younger	***	***	***
ENERGY CONSERVATION FEATURES					
1. Most windows on south side	***	?	***	***	***
2. House partially earth-covered	***	Younger	Males	?	***

N = 504

\*\*\* No significant difference

? = Significant at .05, but the nature of the relationship is not clear.

*SUMMARY*

In both the 1981 and 1983 surveys, energy conservation features were viewed as an important consideration in choosing a house. There was broad acceptance of solar heating among Utah respondents, with no significant differences associated with the location, age, sex, income or education of the respondent. Natural gas and wood stoves were also favorably viewed in evaluating a house. Gas heat was more likely to influence the selection of older or urban dwellers, while rural or younger respondents indicated a greater preference for wood stoves. In general, the conservation features of "windows on the south" and "house partially earth-covered" received greater support among the younger, male and rural dweller categories.

Solar energy, wood-burning stoves, south side windows and earth-covered houses were less likely to favorably affect purchase decisions in 1983 than in 1981, but the changes are not statistically significant. This finding suggests that less emphasis on energy problems and issues by the media and by government has had only a slight effect on housing preferences.

Table 3. Housing Preferences: 1981 and 1983

	Percentage of those Responding				
	Much Less Likely	Less Likely	Neutral	More Likely	Much More Likely
SOURCES OF SPACE HEATING					
1. Solar Heating					
1981	3.5	3.0	25.3	41.7	26.4
1983	1.4	6.7	23.4	49.9	18.5
2. Electric Heating					
1981	51.2	24.6	12.9	9.2	2.2
1983	46.8	34.2	9.4	8.6	1.1
3. Gas Heating**					
1981	7.8	6.7	18.8	49.7	17.0
1983	4.0	10.3	20.0	55.2	10.5
4. Wood-burning Stove					
1981	9.6	6.3	18.1	40.2	25.8
1983	10.2	10.7	18.0	44.7	16.4
ENERGY CONSERVATION FEATURES					
1. Most windows on south side					
1981	2.2	4.0	25.8	42.1	25.8
1983	1.3	5.7	30.3	44.1	18.6
2. House partially earth-covered					
1981	21.3	17.3	29.7	23.6	8.0
1983	17.5	22.0	30.0	23.1	7.3

N = 295 matched respondents

\*\*Significant at  $p < .05$

#### REFERENCES

- Anderson, M.A., Iams, D., Jones, J.C., Chatelain, L.B., Dillman, D.A., and Anderson, D.A. *Energy Directions for the United States: A Western Perspective Two Years Later*. University of Wyoming, 1985 (Forthcoming).
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