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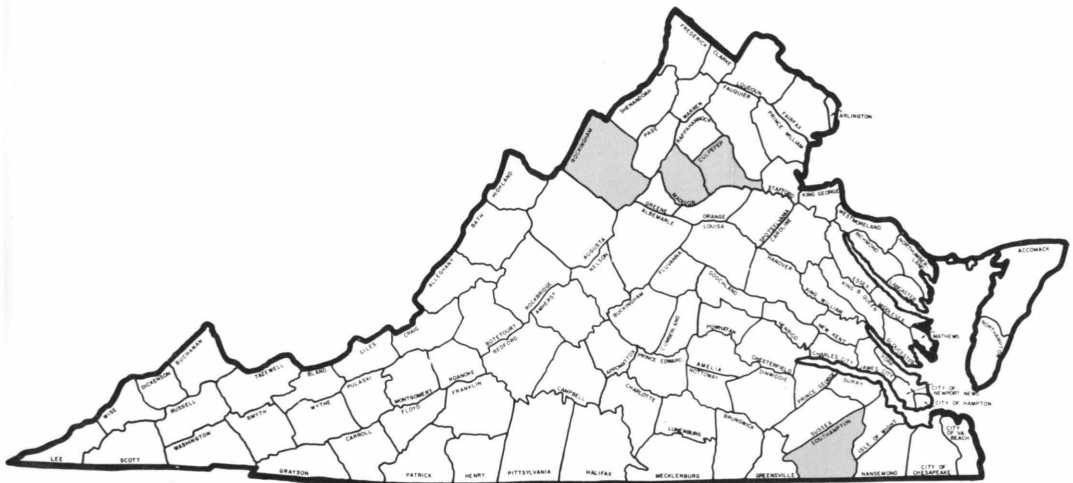
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# Alternative Housing— Acceptance by Householders in Four Virginia Counties

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n B. Crisco, and Doris Y. Dyer



**James R. Nichols, Dean and Director  
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The Virginia Agricultural and Mechanical College came into being in 1872 upon acceptance by the Commonwealth of the provisions of the Morrill Act of 1862 “to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.” Research and investigations were first authorized at Virginia’s land-grant college when the Virginia Agricultural Experiment Station was established by the Virginia General Assembly in 1886.

The Virginia Agricultural Experiment Station received its first allotment upon passage of the Hatch Act by the United States Congress in 1887. Other related Acts followed, and all were consolidated in 1955 under the Amended Hatch Act which states “It shall be the object and duty of the State agricultural experiment stations . . . to conduct original and other researches, investigations and experiments bearing directly on and contributing to the establishment and maintenance of a permanent and effective agricultural industry of the United States, including the researches basic to the problems of agriculture and its broadest aspects and such investigations as have for their purpose the development and improvement of the rural home and rural life and the maximum contributions by agriculture to the welfare of the consumer . . . ”

In 1962, Congress passed the McIntire-Stennis Cooperative Forestry Research Act to encourage and assist the states in carrying on a program of forestry research, including reforestation, land management, watershed management, rangeland management, wildlife habitat improvement, outdoor recreation, harvesting and marketing of forest products, and “such other studies as may be necessary to obtain the fullest and most effective use of forest resources.”

In 1966, the Virginia General Assembly “established within the Virginia Polytechnic Institute a division to be known as the Research Division . . . which shall encompass the now existing Virginia Agricultural Experiment Station . . . ”

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ALTERNATIVE HOUSING -- ACCEPTANCE BY HOUSEHOLDERS  
IN FOUR VIRGINIA COUNTIES

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## ABSTRACT

This study was concerned with factors associated with the public's acceptance of energy-efficient housing alternatives such as: passive and active solar, earth sheltered, retrofitted, and manufactured houses. The specific objectives were: (1) to determine consumers' acceptance of energy-efficient housing alternatives, and (2) to identify factors that act as constraints to the adoption of these alternatives including demographic characteristics, family resources, decision-making practices, and consumer perceptions of housing alternatives. Data were obtained by personal interviews with 312 Virginia households in four nonmetropolitan counties: Culpeper, Madison, Rockingham, and Southampton.

The data indicate that a majority of the respondents had heard about the six alternatives to the conventional house but had limited knowledge or experience with them. Overall, in rank of preference, respondents indicated the best-liked house as a conventional house, followed by retrofitted, passive solar, active solar, multifamily/apartment, earth-sheltered and manufactured/mobile homes. Results suggest that several constraints to the adoption of innovative housing commonly exist. Income and employment data revealed lower than average personal and household incomes. The respondents represented older, settled households who owned their conventional houses and were satisfied with them. Lack of availability and lack of experience with alternative housing forms may also have hindered the respondents' acceptance of these newer options.

## ACKNOWLEDGMENTS

The authors express their appreciation to several individuals and groups for their assistance in this study. The contribution of the officers and participants in S-141 who developed the interview schedule and made possible the timely implementation of this household survey is acknowledged. We recognize the county extension agents in Culpeper, Madison, Rockingham, and Southampton Counties who helped in identifying potential interviewers. Also, recognition is given to the personnel in the county offices of the Commissioner of Revenue who made property tax records available for identifying households to be surveyed. Special appreciation is extended to the six interviewers and the 312 households who provided the information that made this study possible and to Marilyn Cavell for her numerous hours of computer programming and analysis.

Also, we are particularly grateful to Dr. E. Neal Boyd, Administrative Advisor to the Southern Regional Housing Project of which the Virginia study was a part, for his guidance, support, and encouragement of our efforts.

## PREFACE

The data analyzed in this report consist of the Virginia component of a larger five-year, Southern Region Housing Research project (S-141) entitled "Housing for Low and Moderate Income Families." The survey was replicated in seven southern states by housing researchers associated with the Agricultural Experiment Stations of Alabama, Arkansas, Florida, Georgia, North Carolina, Oklahoma, and Virginia. During the period between Summer 1981 and Spring 1982, 1804 households residing in 28 counties in these states were interviewed for the purpose of determining family constraints to the adoption of energy-efficient housing alternatives. A brief history of Southern regional housing research projects for more than thirty years and the summary data produced by the S-141 regional household survey are reported in Shelton and Sweaney: Perceptions of Alternative Housing -- A Data Book (1983).

This report provides an overview of the Virginia sample and data from personal interviews with 312 households in four counties in Virginia: Culpeper, Madison, Rockingham and Southampton.





## INTRODUCTION

Substantial advances in housing design and technology have been made in recent years, but many of these innovations have not been adopted by the housing industry or the public. An understanding of the factors associated with the public's acceptance and adoption of energy-efficient housing alternatives may lead to greater utilization of these alternatives.

According to Rogers (1962), an individual passes through five stages in the process of deciding to adopt innovation: "awareness, interest, evaluation, trial, and adoption." Not everyone who hears about an energy-efficient housing innovation will adopt it. Persons may reject it at any of the five "adopter" stages. Many people will defer their adoption of a new idea or product until enough others are also willing to accept it.

Among the factors which may act as either constraints or incentives to the adoption of energy-efficient innovative housing forms are demographic characteristics and decision-making practices of households, present housing situation, and consumer acceptance. In a recent work, Rogers (1983) examined existing research to develop conclusions about the role of demographics in the adoption of

innovations. He reported that earlier adopters of innovations have more years of education, higher incomes, more social status, and more upward mobility than later adopters. Research has also indicated that adopters of innovations have higher occupational status and are in the earlier stages of the family life cycle (Lebay and Kinnear, 1981). Leonard-Barton (1981) found that adopters of solar equipment have previously had higher utility bills and larger houses. McCray and Weber (1981) and Shoemaker (1981) identified lack of consumer knowledge as an important constraint to the adoption of energy-efficient housing alternatives.

Constraints and incentives to the adoption of energy-efficient housing structures have received little research attention. This study documents some of these constraints, which create a significant problem particularly for low to moderate income families who are searching for acceptable housing.

## RESEARCH METHODOLOGY

The purpose of this study was to determine consumers' acceptance of energy-efficient housing alternatives and the familial constraints to the adoption of these alternatives. Potential constraints included demographic factors, limited family resources, decision-making processes, and consumer perceptions of housing alternatives. Data were collected during the summer of 1981.

### Terminology

Familial Constraints -- factors or characteristics within the family that hinder or impose limits on the family's willingness to accept alternative housing.

Housing Alternatives -- energy-efficient housing units that result from the use of innovative materials, designs, construction methods, and mechanical systems/or subsystems.

Adoption -- the final stage in the process of acceptance of an innovative idea or product (i.e. voluntary use).

### The Sample

The sample consisted of 312 households in four counties in Virginia. The number of households in the sample was determined by the state's proportion of non-farm households within the total areal sample (17.3%). The 1970 Census of

Population was used to determine the number of non-farm households since the 1980 Census data were not available at the time the sampling plan was developed.

#### Selection of Counties

A two-phase stratification process was used in the selection of the four counties in Virginia: Phase I was based on median annual income (MAI), and Phase II was based on the number of non-farm households (NFH). First, all non-SMSA (Standard Metropolitan Statistical Area) counties (excluding independent cities) were divided into two equal sets: one set classified as high MAI; the other as low MAI. Second, each of the MAI sets were equally divided into low NFH and high NFH within each county. The four-county strata were classified as follows:

1. LL -- low MAI, low NFH
2. LH -- low MAI, high NFH
3. HL -- high MAI, low NFH
4. HH -- high MAI, high NFH.

One county was randomly selected from each stratum (LL - Madison, LH-Southampton, HL - Culpeper, HH - Rockingham). Even though three of the four counties are in close proximity, they were selected randomly (see Figure 1).



Selection of Households

The number of non-farm households to be surveyed in each of the four counties was determined by the following formula:

$$\begin{array}{l} \text{Number of} \\ \text{households} \\ \text{surveyed} \\ \text{in county} \end{array} = \begin{array}{l} \text{State} \\ \text{allocation of} \\ \text{regional sample} \end{array} \times \frac{\text{number of NFH in county}}{\text{number of NFH in state}}$$

The number of households surveyed by county were as follows:

Madison	(LL)	38
Southampton	(LH)	109
Culpeper	(HL)	44
Rockingham	(HH)	<u>121</u>
TOTAL		312

An identification number for each tract of land in the selected counties was obtained from the Office of the Commissioner of Revenue, from which a computer-generated list of random numbers was determined for each county. The list of random numbers was approximately four times the sample size needed to allow for an alternate sample list to provide for refusals, ineligible farm households, nonresidential properties, and vacant housing units.

The owners' names and addresses of the selected tracts associated with the "randomly-chosen identification numbers" were determined and recorded from the 1980 property tax rolls for each county. Map numbers, legal descriptions, acreage, assessed value of buildings, and improvements were also recorded, if available, to assist in locating the residential properties, industrial and commercial properties;

properties that did not have a dwelling or mobile home site were eliminated.

### Data Collection

The interview schedule used in the data collection was developed, pretested, and revised by the S-141 Technical Committee. The revised schedule contained questions organized into four major sections: present housing situation, decision-making practices, consumer acceptance, and demographic characteristics. The four sections are described below.

Present Housing Situation. Questions in this section solicited information about housing characteristics, structural conditions, heating and cooling facilities, and energy-saving features.

Decision Making Practices. This section of the instrument was designed to determine how families make decisions regarding the choice of housing and other specific housing-related factors. Questions relative to energy conservation were included.

Consumer Acceptance. This section was designed to access the respondent's knowledge and his/her level of acceptability of seven different housing alternatives including manufactured/mobile home, apartment/multi-family, retrofitted/energy-improved, passive solar, active solar, and earth-sheltered housing.

Demographic Characteristics. This section solicited quantitative data about each household member. Questions pertained to size, composition, and income of household, and to sex, race, education, degree of disability, occupation, and employment status of each household member.

Following development of the instrument, an interviewer's manual was developed by the regional project participants to promote consistency in training interviewers and in data collection procedures throughout the regions. Interviewers in the four Virginia counties were hired and trained collectively by the project leaders in Virginia to assure consistency in the administration of the instrument. Personal interviews were conducted with 312 Virginia households during the summer of 1981 in Madison, Culpeper, Rockingham, and Southampton Counties.



## CHARACTERISTICS OF RESPONDENTS AND HOUSEHOLDS

The 312 respondents in the four Virginia counties and their household characteristics are described by demographic variables. In some cases, the number of respondents is less than 312 because certain questions were not applicable, or for some reason(s) data were incomplete. Although this section is essentially descriptive, significant differences among the counties as determined through the chi square test are presented when appropriate. Chi square tests are not reported when differences were not significant or when chi square was not the appropriate test.

### The Respondents

The respondents provided demographic data indicating their position within the household, sex, age, race, marital status, education, and degree of disability. These data are presented as percentage distributions by county in Table 1. Employment and income characteristics of the respondents are presented by county in Table 2.

Household Position. Of the respondents, 95 percent identified themselves as either the head of household, co-head (a joint head of household), or spouse (Table 1). Significant differences were found among the four counties

Table 1. Demographic Characteristics of Respondents by County

Characteristics	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Household position	(38)	(109)	(44)	(120)	(311)
Head	26.3	35.8	29.6	50.8	39.6
Co-head	68.4	17.4	63.6	2.5	24.4
Spouse	0.0	40.4	4.6	41.7	30.9
Other	5.3	6.4	2.3	5.0	5.1
	$\chi^2 = 121.0$		df = 9	p < 0.001	
Sex	(38)	(109)	(44)	(120)	(311)
Male	34.2	21.1	31.8	34.2	29.3
Female	65.8	78.9	68.2	65.8	70.7
Age in years	(38)	(109)	(44)	(114)	(305)
24 or less	5.3	4.6	11.4	3.5	5.3
25 - 34	29.0	16.5	15.9	11.4	16.1
35 - 44	18.4	21.1	22.7	16.7	19.3
45 - 54	10.5	21.1	15.9	14.9	16.7
55 - 64	13.2	14.7	18.2	22.8	18.0
65 - 74	18.4	21.1	9.1	17.5	17.7
75 or more	5.3	0.9	6.8	13.2	6.9
	$\chi^2 = 30.1$		df = 18	p < 0.05	
Race	(38)	(109)	(44)	(120)	(311)
Afro-American	36.8	40.4	13.6	6.7	23.2
White	63.2	57.8	86.4	93.3	76.2
Other	0.0	1.8	0.0	0.0	0.6
	$\chi^2 = 47.5$		df = 6	p < 0.001	
Marital Status	(38)	(109)	(44)	(120)	(311)
Single	15.8	6.4	6.8	7.5	8.0
Married	65.8	67.0	84.1	69.2	70.1
Widowed	15.8	21.1	6.8	17.5	17.0
Divorced	0.0	4.6	2.3	5.8	4.2
Separated	2.6	0.9	0.0	0.0	0.6
Education	(38)	(108)	(44)	(119)	(309)
Elementary school or less	13.2	22.2	11.4	26.9	21.4
Attended high school	15.8	25.9	15.9	15.1	19.1
High school graduate	42.1	21.3	31.8	29.4	28.5
Some college or trade school	13.2	13.9	18.2	14.3	14.6
College graduate	15.8	14.8	15.9	10.1	13.3
Post-graduate	0.0	1.9	6.8	4.2	3.2
Degree of Disability	(38)	(108)	(44)	(119)	(309)
None	92.1	77.8	84.1	83.2	82.5
Mild	5.3	12.0	6.8	5.9	8.1
Moderate	0.0	9.3	6.8	5.0	6.2
Extreme	2.6	0.9	2.3	5.9	3.2

in the household position of the respondents ( $p < 0.001$ ). Rockingham County showed the greatest proportion (51%) of household heads responding and Madison the least (26%). In Madison and Culpeper Counties, approximately two-thirds of the respondents were co-heads; whereas, in Southhampton and Rockingham, about 40 percent were spouses.

Sex. Between 66 and 79 percent of the respondents in each of the four counties were female. Southhampton had the lowest proportion of males (21%) responding. Male respondents were fairly evenly distributed in the other three counties; no statistically significant differences were found among the counties in the sex of the respondents.

Age. The respondents represented a broad age distribution, ranging from 16 to 95 years. Overall, they were fairly evenly distributed in the ten-year periods between the ages of 25 and 74 years; however, there were significant differences among the counties ( $p < 0.05$ ). The 25- to 34-year-olds comprised between 11 percent and 29 percent of the respondents in each of the counties. Madison had the largest percentage of respondents in this age group (25 to 34 year-olds). The 65 and over age group ranged from a high of 31 percent in Rockingham County to a low of 16 percent in Culpeper.

Race. Slightly more than three-fourths of the respondents were white, and almost one-fourth were Afro-American. Significant differences were found among the counties in the race of respondents ( $p < 0.001$ ). In the two counties in the

low household median income strata (Madison and Southampton), Afro-Americans comprised approximately 40 percent of the respondents compared to 14 percent in Culpeper and seven percent in Rockingham.

Marital Status. Overall, 70 percent of the respondents were married, 17 percent were widowed, eight percent were single, and four percent were divorced. No statistically significant differences were found among the counties in marital status, yet the largest proportion of single respondents (16%) were found in Madison County and the largest proportion of married respondents (84%) were in Culpeper County.

Education. Of the respondents, 40 percent had less than a high school education, 29 percent were high school graduates, and 31 percent had some advanced education. No statistically significant differences were found among counties in the educational attainment of the respondents. However, the highest portion (42%) of high school graduates were in Madison County, while Southampton County had the lowest (21%).

Degree of Disability. Fewer than 20 percent of the respondents had disabilities. Of these, eight percent were mild, six percent were moderate, and three percent were extreme. No statistically significant differences were found among the four counties in degree of respondent's

disability; however, 92 percent of the respondents in Madison had no disabilities compared to 78 percent with no disability in Southampton County.

Employment Status and Occupation. No significant differences were indicated among the counties in employment status or occupation of the respondents (Table 2). In each of the counties, 37 percent or more of the respondents were employed full-time. Overall, 12 percent were employed part-time, and 24 percent were retired. None of the respondents in Culpeper and Madison were unemployed compared to approximately five percent in Rockingham and Southampton.

Occupations were categorized by using 1980 Census of Population: Classified Index of Industries and Occupations (US Department of Commerce, 1980). The greatest portion of respondents indicated professional/technical occupations, ranging from 12 percent in Southampton to 25 percent in Rockingham. About one-fourth of the respondents reported clerical or sales occupations, and an additional 13 percent identified themselves as operators of machines or devices.

Frequency of Payment. Pay periods for the Virginia respondents were primarily weekly (37%) or monthly (39%). Bi-weekly payment was indicated by nearly 22 percent of the respondents. Although no significant differences among the counties were shown, Madison respondents differed from the other counties having the smallest proportion (4%) of

Table 2. Employment and Income Characteristics of Respondents by County

Characteristics	County				Total N=312	
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121		
	(Percent)					
Employment Status	(38)	(108)	(44)	(118)	(308)	
Full-time	44.7	42.6	40.9	37.3	40.6	
Part-time	15.8	13.0	11.4	9.3	11.7	
Retired	29.0	24.1	18.2	23.7	23.7	
Unemployed	0.0	4.6	0.0	4.2	3.3	
Homemaker	5.3	14.8	29.6	23.7	19.2	
Student	5.3	0.9	0.0	1.7	1.6	
Occupation	(23)	(61)	(27)	(72)	(183)	
Professional/technical	21.7	11.5	14.8	25.0	18.6	
Semi-technical	0.0	4.9	11.1	4.2	4.9	
Farmers and farm managers	0.0	1.6	3.7	2.8	2.2	
Managers, officials, pro- prietors	13.0	6.6	3.7	4.2	6.0	
Clerical	4.4	18.0	14.8	12.5	13.7	
Sales	13.0	13.1	3.7	12.5	11.5	
Craftsmen and foremen	8.7	6.6	7.4	6.9	7.1	
Operators	4.4	8.2	18.5	18.1	13.1	
Laborers	4.4	4.9	0.0	6.9	4.9	
Domestic service workers	26.1	14.8	7.4	1.4	9.8	
Other service workers	4.4	8.2	14.8	4.2	7.1	
Other	0.0	1.6	0.0	1.4	1.1	
Frequency of payment	(25)	(63)	(23)	(56)	(167)	
Weekly	40.0	33.3	43.5	35.7	36.5	
Bi-weekly	4.0	23.8	26.1	25.0	21.6	
Monthly	48.0	42.9	30.4	33.9	38.9	
Annually	8.0	0.0	0.0	3.6	2.4	
Other	0.0	0.0	0.0	1.8	0.6	
Months worked	(24)	(62)	(23)	(55)	(164)	
1 - 5	4.2	9.7	4.4	3.6	6.1	
6 - 11	50.0	12.9	8.7	14.6	18.3	
12	45.8	77.4	87.0	81.8	75.6	
	$\chi^2 = 21.4$		$df = 6$		$p < 0.01$	
Annual employment income	(23)	(61)	(23)	(42)	(149)	
\$0 - \$4,999	52.2	42.6	21.7	26.2	36.2	
\$5,000 - \$7,499	8.7	21.3	17.4	28.6	20.8	
\$7,500 - \$9,999	13.0	9.8	13.0	14.3	12.1	
\$10,000 - \$14,999	17.4	13.1	26.1	16.7	16.8	
\$15,000 - \$24,999	8.7	13.1	21.7	11.9	13.4	
\$25,000 or more	0.0	0.0	0.0	2.4	0.7	
Annual supplemental income	(8)	(36)	(17)	(30)	(91)	
\$3,000 or less	100.0	69.4	35.2	90.0	72.5	
\$3,001 - \$5,000	0.0	5.6	23.5	6.7	8.8	
\$5,001 - \$7,500	0.0	22.2	23.5	0.0	13.2	
\$7,501 - \$10,000	0.0	0.0	17.7	3.3	4.4	
\$10,001 - \$15,000	0.0	2.8	0.0	0.0	1.1	
	$\chi^2 = 29.8$		$df = 12$		$p < 0.01$	

respondents who were paid biweekly compared to the other three counties where approximately 25 percent of the respondents were paid biweekly.

Months Worked. Slightly more than three-fourths of the respondents were employed for the full year 1980. About 18 percent reported working six to 11 months of the year, while six percent worked less than half the year. There were significant differences among the counties in number of months worked ( $p < 0.01$ ); over half of the Madison County respondents indicated working less than the full year. Only about 46 percent of the respondents from that county worked for the full year 1980. In contrast, 87 percent of the respondents in Culpeper County worked a full year.

Annual Income. More than one-third (36%) of the 149 respondents who reported annual employment income indicated incomes of less than \$5,000. The proportion of respondents reporting the lowest income level ranged from 52 percent of Madison respondents to 22 percent of Culpeper respondents. Nearly 21 percent of the respondents had employment incomes between \$5,000 and \$7,499. Slightly more than 30 percent of the respondents had incomes exceeding \$10,000, with higher income being reported more frequently by Culpeper respondents.

Supplemental Income. In addition to regular or primary employment income, 91 respondents reported supplemental incomes. The greatest majority (73%) had supplemental incomes of \$3,000 or less. Significant differences in annual

supplemental incomes existed among the counties ( $p < 0.01$ ). Small supplemental incomes were reported by 100 percent of the respondents in Madison and by 90 percent of those in Rockingham while Southampton and Culpeper respondents reported supplemental incomes dispersed through the higher categories. Almost half (47%) of Culpeper respondents reported supplemental incomes between \$3,001 and \$7,500; 22 percent of Southampton respondents indicated supplemental incomes of \$5,001 to \$7,500. Nearly 18 percent of Culpeper respondents had supplemental incomes exceeding \$7,500.

#### The Households

The variables used to describe the households were size and type of household, stage in the family life cycle, and annual income. These variables are presented by county in Table 3. A cursory comparison of the percentages for size of household and annual income in this study and in the 1980 Housing Census for the four counties showed a close match. Comparable categories for type of household and stage in the family life cycle were not available.

Size of Household. The predominant household size in the total sample was two persons (41%). One, three and four person households were fairly equal, with 17 percent, 18 percent, and 14 percent respectively. Significant differences were noted among the counties in household size ( $p < 0.01$ ). Madison reported the highest frequency of one-person households (27%), while Culpeper reported the lowest (5%).



Table 3. Demographic Characteristics of Households by County

	County				
	Madison	South- ampton	Culpeper	Rocking- ham	Total
	N=38	N=109	N=44	N=121	N=312
	(Percent)				
Size of household	(37)	(106)	(44)	(120)	(307)
One	27.0	14.2	4.6	20.0	16.6
Two	43.2	41.5	36.4	42.5	41.4
Three	8.1	21.7	13.6	19.2	17.9
Four	18.9	13.2	18.2	11.7	14.0
Five	2.7	2.8	20.5	3.3	5.5
Six or more	0.0	6.6	6.8	3.3	4.6
	$\chi^2 = 37.1$		df = 15	p < 0.01	
Type of household	(38)	(109)	(44)	(120)	(311)
Family households					
Married couple	68.4	69.7	86.4	74.2	73.6
Male headed household-- no wife	0.0	2.8	0.0	0.8	1.3
Female headed household-- no husband	0.0	11.0	4.6	5.0	6.4
Non-family households					
Single male	5.3	4.6	2.3	5.0	4.5
Single female	21.1	9.2	2.3	15.0	11.9
Other	5.3	2.8	4.6	0.0	2.3
Family life cycle	(26)	(79)	(40)	(86)	(231)
New couple families with no children, wife less than 31	7.7	6.3	2.5	3.5	4.8
Childbearing families, oldest child less than 5	0.0	7.6	5.0	2.3	4.3
Families with oldest child 5 to 12	23.1	8.9	20.0	10.5	13.0
Families with oldest child 13 to 18	11.5	13.9	20.0	18.6	16.5
Families with oldest child 19 to 23	0.0	26.6	15.0	10.5	15.6
Couple families with no children, wife, 31-52	38.5	19.0	10.0	18.6	19.5
Couple families with no children, wife, 53 or older	19.2	17.7	27.5	36.1	26.4
	$\chi^2 = 35.9$		df = 18	p < 0.01	
Annual household income	(34)	(105)	(39)	(82)	(260)
\$7,499 or less	20.6	21.0	5.1	37.8	23.9
\$7,500 - \$9,999	2.9	13.3	2.6	7.3	8.5
\$10,000 - \$14,999	20.6	17.1	15.4	19.5	18.1
\$15,000 - \$24,999	35.3	26.7	51.3	20.7	29.6
\$25,000 or more	20.6	21.9	25.6	14.6	20.0
	$\chi^2 = 30.3$		df = 12	p < 0.01	

The percentage of two-person households was fairly consistent among the counties. Prevalency of three-person households varied from eight percent in Madison to 22 percent in Southampton; five or more person households varied from three percent in Madison to 27 percent in Culpeper.

Type of Household. The most prevalent household type in the study was a married couple with or without children (74%). Six percent of the family households were headed by a female with no husband present while only one percent were headed by a male with no wife present. Overall, 16 percent of the households were of single person, non-family type; 12 percent were single female households, and four percent were single male households. No statistically significant differences were found among the counties in relation to household type. Even so, it is interesting to note that Culpeper had the highest percentage of married-couple family households (86%) and Madison County had both the highest percentage of single female non-family households (21%) and of single male non-family households (5%).

Family Life Cycle. The family households were categorized into seven life-cycle stages derived from those identified by Aldous (1978). Overall, 49 percent of the families had children in the household; 51 percent were couples without children present. Slightly more than one-fourth of the family households were older married couples with no children or no children at home. Significant differences were

found among the counties for life cycle stage ( $p < 0.01$ ). While 45 percent of the families had children with the oldest child between five and 23 years of age, there was variation among the counties. Madison had the lowest proportion (35%) of families with the oldest child in this age range, and Culpeper had the highest (55%). There was also wide variation among the counties in the percentage of couple families with the wife between 31-52 and no children, ranging from ten percent in Culpeper to 39 percent in Madison. Rockingham had the highest percentage (36%) of older couple families, wife 53 years or older.

Annual Household Income. Household income was grouped into five categories with the modal group in the \$15,000 to \$24,999 range. Overall, 24 percent of the households earned less than \$7,500 and 20 percent earned \$25,000 or more. Significant differences were found among the counties in annual household income ( $p < 0.01$ ). There was wide variation among the counties in the portion of respondent households in the \$7,499 or less category, ranging from five percent in Culpeper to 38 percent in Rockingham. There was less variation among the counties for the two income groups ranging from \$7,500 to \$14,999. Culpeper had the highest percentage of households (77%) with annual incomes of \$15,000 or more compared to Rockingham with only 35 percent of households with incomes in the higher categories.



## PRESENT HOUSING SITUATION

The present housing situation of the 312 respondents is described in four general areas: 1) housing characteristics, 2) structural conditions, 3) heating and cooling facilities, and 4) energy saving features. Variables categorized under each of these areas may act or interact as either constraints or incentives to consumers' acceptance of energy-efficient housing alternatives. For example, location of homes in non-metropolitan areas may limit the availability of ..., and ownership of newer homes that are well insulated or homes with low monthly cost in relation to income may limit motivation and interest.

### Housing Characteristics

Housing units in the four counties are described in Table 4 by location, type of structure, tenure status, age and size of unit, number of rooms, bedrooms, and bathrooms, and presence of water utilities. A superficial examination of key factors in this study such as tenure status, number of bedrooms, and number of bathrooms shows that the percentages match closely with 1980 Housing Census data for the four counties. A larger percentage of housing units in the 1980 Census had fewer rooms and were older than in the four county study.

Table 4. Housing Characteristics by County

Characteristics	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Location of Housing Unit	(38)	(108)	(44)	(121)	(311)
Open Country	92.1	56.0	63.6	84.2	72.4
Suburban/Incorporated Area (up to 5,000 pop.)	5.3	44.0	2.3	15.0	22.2
Town (5,001 - 25,000 pop.)	2.6	0.0	34.1	0.8	5.5
	$\chi^2 = 125.1$ $df = 6$ $p < 0.001$				
Structure Type	(37)	(106)	(44)	(121)	(308)
Conventional	97.3	94.1	95.5	94.1	94.7
Mobile Home	2.7	2.9	0.0	4.2	3.0
Modular	0.0	2.0	0.0	1.7	1.3
Apartment	0.0	1.0	4.6	0.0	1.0
Tenure Status	(38)	(108)	(44)	(121)	(311)
Own (paid for)	47.4	48.2	25.0	71.9	54.0
Own (buying)	34.2	31.5	54.6	22.3	31.5
Rent (or lease)	15.8	12.0	18.2	5.0	10.6
Other	2.6	8.3	2.3	0.8	3.9
	$\chi^2 = 41.1$ $df = 9$ $p < 0.001$				
Age of Housing Unit (Years)	(28)	(87)	(39)	(119)	(273)
Less than 5	7.1	6.9	7.7	7.6	7.3
5 - 9	14.3	13.8	17.9	12.6	13.9
10 - 15	39.3	16.1	23.1	22.7	22.3
16 - 20	7.1	20.7	0.0	7.6	10.6
21 - 30	17.8	13.8	20.5	17.6	16.9
31 - 40	3.6	14.9	7.7	8.4	9.9
41 or more	10.7	13.8	23.1	23.5	19.1
Estimated Size of Housing Unit (Square Feet)	(38)	(109)	(44)	(121)	(312)
800 or less	29.0	16.5	11.4	53.7	31.7
801 - 1000	18.4	9.2	4.6	10.7	10.3
1001 - 1200	10.5	14.7	27.3	10.7	14.4
1201 - 1400	23.7	18.4	2.3	3.3	10.9
1401 - 1600	2.6	9.2	25.0	9.1	10.6
1601 - 2000	15.8	17.4	2.3	5.8	10.6
2001 or more	0.0	14.7	27.3	6.6	11.5
	$\chi^2 = 103.5$ $df = 18$ $p < 0.001$				
Number of Rooms in Housing Unit	(38)	(109)	(44)	(121)	(312)
4 or less	7.9	13.8	2.3	8.3	9.3
5	13.2	12.8	18.2	13.2	13.8
6	39.5	27.5	29.6	29.8	30.1
7	21.1	22.0	25.0	25.6	23.7
8	5.3	15.6	11.4	18.2	14.7
9 or more	13.2	8.3	13.6	5.0	8.3

Note: Percents may not add to 100 due to rounding error.

Table 4. Housing Characteristics by County, continued

Characteristics	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	(Percent)				
Number of Bedrooms in Housing Unit	(38)	(105)	(44)	(119)	(306)
1 - 2	29.0	27.6	15.9	26.1	25.5
3	52.6	51.4	56.8	61.3	56.2
4 - 7	18.4	21.0	27.3	12.6	18.3
Number of Bathrooms in Housing Unit	(38)	(108)	(44)	(121)	(311)
One	73.7	39.8	36.4	54.6	49.2
Two	5.3	26.9	18.2	22.3	21.2
Three or more	21.1	33.3	45.5	23.1	29.6
	$\chi^2 = 22.1$		$df = 6$		$p < 0.01$
Water Utilities					
Kitchen	(38)	(109)	(44)	(121)	(312)
Cold only	0.0	6.4	0.0	2.5	3.2
Hot and cold	97.4	85.3	97.7	93.4	91.7
None	2.6	8.3	2.3	4.1	5.1
Bath	(38)	(109)	(44)	(121)	(311)
Cold only	0.0	0.9	0.0	0.8	0.6
Hot and cold	97.4	85.3	95.5	94.2	91.6
None	2.6	13.8	4.6	5.0	7.7

Note: Percents may not add to 100 due to rounding error.

Location. Almost 75 percent of the respondents lived in housing units in the open country. Significantly more of the respondents in Madison and Rockingham Counties lived in the open country, 92 percent and 84 percent respectively ( $p < 0.001$ ). In Culpeper County, 34 percent of the respondents lived in a town of 5,001 to 25,000 population. Nearly 44 percent of Southampton respondents lived in a suburban/incorporated area.

Type of Structure. Of the households surveyed, 99 percent lived in single-family housing units. These single-family dwellings were mainly conventional houses (95%); however, slightly more than four percent of the households lived in mobile or modular homes. Multifamily units were most common in Culpeper County where approximately five percent of the respondents lived in apartments.

Tenure Status. Homeownership was a predominant characteristic of the households with about 86 percent of the respondents indicating that they owned their homes (paid-for or buying). Rockingham County respondents indicated significantly more paid for homes (72%) and significantly fewer rented units (5%) than the other counties ( $p < 0.001$ ).

Age of Unit. The housing units ranged in age from less than a year to 150 years. Slightly more than 21 percent of the respondents indicated their homes were less than ten years old, while nearly 46 percent of the homes were over 20 years in age. The housing units in Madison County tended to be newer than in the other counties. The highest percentage of housing units in Southampton County were 16 to 20 years old; in the other three counties higher percentages were in the 10 to 15 year category.

Size of Unit. Size of the dwelling generally influences the amount of energy used by the household. Respondents were asked to estimate the square footage of their homes. Overall, 32 percent of the households indicated a house size of 800 square feet or less. The largest variation



among the counties was Rockingham County with 54 percent having 800 square feet or less and Culpeper County with only 11 percent of this size. Approximately 80 percent of the respondents in Rockingham and Madison Counties lived in relatively small houses, 1400 square feet or less, while 55 percent of the Culpeper respondents lived in houses larger than 1400 square feet.

Number of Rooms, Bedrooms, and Bathrooms. The size of a housing unit may also be measured by number of rooms. Approximately 23 percent of all respondents indicated five or fewer rooms, and about 54 percent indicated six or seven rooms. There was little variation in number of rooms in the housing units among the four counties. Number of bedrooms ranged from one to seven. The three-bedroom dwelling was the most frequent, with 56 percent of the sample in this group. About 27 percent of the respondents from Culpeper County indicated homes with four to seven bedrooms compared to only 13 percent of Rockingham respondents. All of the respondents in the four counties indicated homes with at least one bathroom. Nearly 30 percent of the dwellings had three or more bathrooms; almost half (46%) of the dwellings in Culpeper County had three or more bathrooms, in contrast to Madison County where 74 percent of the units had only one bathroom.

Water Utilities. Both hot and cold running water were present in the kitchens and bathrooms of nearly 92 percent of the sample. Five percent of respondents, ranging from two percent in Culpeper to eight percent in Southampton, had no

water in the kitchens; about eight percent of the sample had no water in the bathrooms, ranging from three percent in Culpeper to 14 percent in Southampton County. Southampton dwellings lacked water facilities more frequently than homes in the other three counties.

### Structural Conditions

Respondents were asked to assess 17 structural conditions relative to their dwellings. For each structural condition the respondents indicated if a problem existed; and, if so, whether the problem was major or minor (Table 5). These data provide a general assessment of the structural condition of the housing units surveyed.

The largest percentage of minor and major problems experienced with structural integrity were missing or torn screens, peeling paint on the interior and exterior walls, and decay of porch and outside steps. Ninety percent or more of the households experienced no problem in relation to the other suggested structural deficits. If problems were identified, they tended to be minor rather than major ones. Significant differences were observed among the counties in the prevalency of 11 of the structural conditions. The percentage of housing units in Rockingham County with no problem was higher for every feature than in the other counties, whereas in Southampton County the percentage with minor and major problems was higher than in the other counties for 14 of the 17 features. The counties ranked in the following

Table 5. Structural Condition of Housing Units by County

Structural Condition/Problem	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	(Percent)				
Missing or torn screens	(38)	(109)	(44)	(121)	(312)
No problem	63.2	55.1	93.2	95.0	76.9
Minor	34.2	38.5	4.6	5.0	20.2
Major	2.6	6.4	2.3	0.0	2.9
Peeling paint on outside walls	(38)	(109)	(44)	(121)	(312)
No problem	73.7	72.5	86.4	90.9	81.7
Minor	23.7	21.1	9.1	9.1	15.1
Major	2.6	6.4	4.6	0.0	3.2
Peeling paint on inside walls	(38)	(109)	(44)	(121)	(312)
No problem	79.0	78.0	79.6	95.0	84.9
Minor	21.1	20.2	20.5	5.0	14.4
Major	0.0	1.8	0.0	0.0	.6
Decay of porch and outside steps	(38)	(108)	(44)	(120)	(310)
No problem	86.8	83.3	86.4	97.5	89.7
Minor	10.5	14.8	4.6	2.5	8.1
Major	2.6	1.9	9.1	0.0	2.3
Crack(s) in wall or ceiling	(38)	(109)	(44)	(121)	(312)
No problem	79.0	89.9	84.1	96.7	90.4
Minor	18.4	6.4	13.6	3.3	7.7
Major	2.6	3.7	2.3	0.0	1.9
Uneven floors	(38)	(108)	(44)	(121)	(312)
No problem	94.7	88.0	90.9	95.0	92.0
Minor	5.3	8.3	9.1	5.0	6.8
Major	0.0	3.7	0.0	0.0	1.3
Leak(s) in roof	(38)	(109)	(44)	(120)	(311)
No problem	89.5	89.0	93.2	95.8	92.3
Minor	10.5	7.3	6.8	3.3	6.1
Major	0.0	3.7	0.0	0.8	1.6
Broken or missing panes	(38)	(109)	(44)	(121)	(312)
No problem	97.4	85.3	93.2	96.7	92.3
Minor	2.6	12.8	4.6	3.3	6.7
Major	0.0	1.8	2.3	0.0	1.0
Broken or missing materials on exterior walls or foundations	(38)	(109)	(44)	(121)	(312)
No problem	92.1	87.2	95.5	96.7	92.6
Minor	7.9	11.9	4.6	3.3	7.1
Major	0.0	0.9	0.0	0.0	0.3

Note: Percents may not add to 100 due to rounding error.

Table 5. Structural Condition of Housing Units by County, continued

Structural Condition/Problem	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Decay of doors and window frames	(38)	(109)	(44)	(121)	(312)
No problem	97.4	87.2	88.6	98.4	93.0
Minor	2.6	11.0	9.1	1.7	6.1
Major	0.0	1.8	2.3	0.0	1.0
Condition of plumbing system	(38)	(100)	(43)	(118)	(299)
No problem	97.4	84.0	95.4	99.2	93.3
Minor	2.6	11.0	2.3	0.9	4.7
Major	0.0	5.0	2.3	0.0	2.0
Sag(s) or bulge(s) in walls or ceilings	(38)	(109)	(44)	(121)	(312)
No problem	89.5	89.9	97.7	96.7	93.6
Minor	10.5	7.3	2.3	3.3	5.5
Major	0.0	2.8	0.0	0.0	1.0
Condition of electrical system	(38)	(109)	(44)	(121)	(312)
No problem	100.0	87.2	95.5	100.0	94.9
Minor	0.0	10.1	0.0	0.0	3.5
Major	0.0	2.8	4.6	0.0	1.6
Holes or badly worn places in floor	(38)	(109)	(44)	(121)	(312)
No problem	92.1	89.9	97.7	99.2	94.9
Minor	7.9	7.3	2.3	0.8	4.2
Major	0.0	2.8	0.0	0.0	1.0
Quality of water	(38)	(109)	(44)	(120)	(311)
No problem	97.4	94.5	88.6	98.3	95.5
Minor	2.6	2.8	4.6	1.7	2.6
Major	0.0	2.8	6.8	0.0	1.9
Condition of heating system	(38)	(105)	(44)	(121)	(308)
No problem	100.0	96.2	93.2	100.0	97.7
Minor	0.0	1.9	4.6	0.0	1.3
Major	0.0	1.9	2.3	0.0	1.0
Condition of cooling system	(23)	(95)	(44)	(117)	(279)
No problem	91.3	95.8	100.0	100.0	97.9
Minor	0.0	4.2	0.0	0.0	1.4
Major	8.7	0.0	0.0	0.0	0.7

Note: Percents may not add to 100 due to rounding error.

order on condition of housing units: Rockingham (best), Culpeper, Madison, and Southampton (poorest).

### Heating and Cooling Facilities

Respondents were asked to indicate energy sources used for water heating, types of equipment used for space heating and cooling, and alternative energy-saving characteristics of their dwelling's heating and cooling systems (Table 6).

Water Heating. The primary energy source used for water heating was electricity (82%). Culpeper respondents indicated use of natural gas (32%) for water heating, while the other counties reported essentially no utilization of natural gas in water heating.

Heating Equipment. Wood stoves were utilized in nearly half (49%) of the dwellings, ranging from 25 percent in Culpeper to 66 percent of Madison homes surveyed. Central heating was featured in 29 percent of the homes and electric baseboard/periphery heaters in 23 percent. About three percent of the Madison homes had solar heaters.

Cooling Equipment. Cooling equipment in the dwellings consisted primarily of free-standing fans (48%) and/or window air conditioners (31%). As an average for the four counties, nearly 18 percent had central air conditioning; however, this feature ranged from a high of 30 percent in Southampton County to a low of three percent in Madison County. About a quarter of the homes reported the use of window or attic fans for cooling.

Table 6. Heating and Cooling Facilities of Housing Units  
by County

Characteristic	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Source for water heating					
Electricity	92.1	84.4	56.8	86.0	82.1
Gas (bottled)	2.6	8.3	2.3	5.8	5.8
Gas (natural)	0.0	0.0	31.8	0.8	4.8
Other	5.3	6.4	6.8	9.1	7.4
Heating equipment					
	(38)	(109)	(44)	(121)	(312)
Wood stove	65.8	54.1	25.0	48.8	49.4
Central heating	10.5	32.1	34.1	28.9	28.5
Electric baseboard or periphery	34.2	21.1	34.1	17.4	23.1
Space heaters	0.0	32.1	9.1	7.4	15.4
Floor furnace	26.3	1.8	9.1	4.1	6.7
Radiators	2.6	0.0	11.4	3.3	3.2
Solar heater	2.6	0.0	0.0	0.0	0.3
Other	21.1	3.7	2.3	19.8	11.9
Cooling equipment					
	(38)	(109)	(44)	(121)	(312)
Free standing fans	71.1	56.9	22.7	43.0	48.4
Window air conditioner	26.3	45.4	47.7	14.1	31.2
Window or attic fan	26.3	25.7	31.8	20.7	24.7
Central air conditioning	2.6	30.3	22.7	9.1	17.6
Other	7.9	0.9	2.3	4.1	3.2
Alternative energy characteristics					
	(38)	(109)	(44)	(121)	(312)
Passive use of solar	5.3	0.9	6.8	0.0	1.9
None	94.7	99.1	93.2	99.2	97.8
Don't know	0.0	0.0	0.0	0.8	0.3

Note: Percents may not add to 100 due to multiple response items or rounding error.

Alternative Energy Characteristics. Overall, a few of the dwellings (2%) featured alternative energy characteristics for heating and cooling. These features were described as passive utilization of solar energy and occurred primarily in Culpeper and Madison Counties.

#### Energy-Saving Features

Respondents were requested to indicate, from a list of ten common energy-saving features, the extent (partial or complete) to which these features existed in their homes. In a majority of the dwellings (58% or more), respondents indicated complete ceiling, wall, and floor insulation, and storm windows and doors (Table 7). Many of the homes also featured complete caulking (56%) and weatherstripping (57%). Less well-utilized were 'individual' energy-saving features such as plastic covered windows (20%, partial or complete) or water heater insulation (32%, partial or complete). Double-pane windows were utilized at least partially in about 13 percent of the dwellings. Significant differences among the counties were found for each of the energy-saving features. Generally, Southampton or Madison counties had a larger proportion of homes indicating none of the energy-saving features.

Table 7. Energy-Saving Features of Housing Units by County

Feature	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
(Percent)					
Ceiling insulation	(33)	(106)	(42)	(118)	(299)
None	3.0	22.6	7.1	6.8	12.0
Partial	12.1	4.7	14.3	31.4	17.4
Complete	84.9	72.6	78.6	61.9	70.6
Wall insulation	(34)	(107)	(42)	(118)	(301)
None	11.8	24.3	14.3	9.3	15.6
Partial	5.9	7.5	7.1	33.1	17.3
Complete	82.4	68.2	78.6	57.6	67.1
Floor insulation	(29)	(105)	(40)	(115)	(289)
None	41.4	29.5	22.5	13.9	23.5
Partial	6.9	4.8	7.5	38.3	18.7
Complete	51.7	65.7	70.0	47.8	57.8
Storm windows	(35)	(106)	(44)	(119)	(304)
None	37.1	29.3	18.2	16.0	23.4
Partial	0.0	6.6	15.9	21.0	12.8
Complete	62.9	64.2	65.9	63.0	63.8
Storm doors	(35)	(109)	(44)	(120)	(308)
None	22.9	22.9	9.1	6.7	14.6
Partial	20.0	9.2	9.1	24.2	16.2
Complete	57.1	67.9	81.8	69.2	69.2
Weather stripping	(26)	(108)	(44)	(116)	(294)
None	15.4	26.9	18.2	12.9	19.1
Partial	23.1	13.9	4.6	40.5	23.8
Complete	61.5	59.3	77.3	46.6	57.1
Caulking	(25)	(102)	(44)	(118)	(289)
None	4.0	36.3	22.7	14.4	22.5
Partial	20.0	10.8	2.3	39.0	21.8
Complete	76.0	52.9	75.0	46.6	55.7
Plastic covering on windows	(34)	(103)	(44)	(118)	(299)
None	67.7	74.8	75.0	89.0	79.6
Partial	29.4	17.5	25.0	8.5	16.4
Complete	2.9	7.8	0.0	2.5	4.0
Added water heater insulation	(32)	(104)	(42)	(118)	(296)
None	90.6	59.6	61.9	70.3	67.6
Partial	0.0	2.9	2.4	24.6	11.2
Complete	9.4	37.5	35.7	5.1	21.3
Double pane windows	(33)	(102)	(44)	(117)	(296)
None	97.0	94.1	68.2	85.5	87.2
Partial	0.0	1.0	20.5	3.4	4.7
Complete	3.0	4.9	11.4	11.1	8.1

Note: Percents may not add to 100 due to rounding error.



## HOUSING DECISION MAKING

Information regarding housing choice and assessment was collected to identify housing opinions and knowledge of the 312 participating Virginia families and to examine how these opinions and knowledge influence housing decision-making. Information on housing-related energy issues and on information needs is also included in this section.

### Present Housing

In reference to their current homes, respondents were asked to provide data regarding former housing type, selection of and tenure in present home, and best and least liked features of their home (Tables 8 - 12).

Former House Type. The great majority of respondents (79%) had previously lived in a single-family, detached dwelling (Table 8). The next largest proportion (14 percent) previously lived in apartments. Five percent of the sample lived in mobile homes prior to moving into their current dwellings. Significant differences were found among the counties for previous housing type ( $p < 0.05$ ). Of the Madison respondents, 24 percent had previously lived in apartments compared to 11 percent of the Rockingham respondents. Seven percent of Culpeper respondents formerly lived in townhouses whereas fewer than three percent in the other

Table 8. House Type of Former Home by County

Housing Type	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
	(38)	(109)	(43)	(117)	(307)
Single family	71.1	78.0	65.1	86.3	78.5
Apartment	23.7	11.9	20.9	11.1	14.3
Mobile home	2.6	9.2	7.0	1.7	5.2
Townhouse	2.6	0.9	7.0	0.0	1.6
Other	0.0	0.0	0.0	0.9	0.3
	$\chi^2 = 25.5$		df = 12	p < 0.05	

three counties, had experienced this dwelling type. More than nine percent of Southampton respondents had formerly lived in mobile homes compared to fewer than two percent in Rockingham.

Reasons for Move from Former Home. Over half (51%) of the respondents moved from their former home because they wanted to build or buy (Table 9). About 24 percent moved due to employment changes, while more than one-fifth of the households had moved because they were dissatisfied with location (23%) or for family reasons (22%). Slightly more than 19 percent were dissatisfied with the home, and more than 16 percent cited economic reasons for moving. Madison respondents moved more often for changes in employment, dissatisfaction with location, economic reasons, and changes in spatial needs than did respondents in Southampton, Culpeper, or Rockingham Counties.

Table 9. Reasons for Moving from Former Home by County

Reasons	County				Total N=134
	Madison N=21	South- ampton N=52	Culpeper N=22	Rocking- ham N=39	
	(Percent)				
Wanted to build or buy	52.4	51.9	36.4	56.4	50.8
Changes in employment	38.1	17.3	27.3	23.1	23.9
Dissatisfied with location	33.3	23.1	22.7	18.0	23.1
Family reasons	9.5	38.5	9.1	15.4	22.4
Dissatisfied with home	14.3	26.9	27.3	7.7	19.4
Economic reasons	33.3	15.4	13.6	10.3	16.4
Increase in income	14.3	9.6	9.1	5.1	9.0
Changes in spatial needs	19.1	7.7	9.1	2.6	8.2
Displaced	4.8	9.6	4.6	0.0	5.2
Decrease in income	4.8	1.9	4.6	7.7	4.5
Other	4.8	3.9	22.7	18.0	11.2

Note: Multiple responses may not add to 100.

Selection of Present Home. Respondents most often cited the location or neighborhood (71%) and affordability (67%) as influential factors in the selection of their present dwelling (Table 10). Provision of additional space was also mentioned by nearly a third of the sample as important in the selection of their current home. Fifty-five percent of Southampton respondents cited the provision of more space compared to only 11 percent of the Rockingham respondents. More Culpeper respondents identified house design, plan, or layout (36%) as a reason for present home selection.

Years Lived In Present Home. About 22 percent of the respondents had lived in their present homes for less than five years (Table 11). Almost 21 percent had lived in their current dwellings between five and ten years, while about 22

Table 10. Reasons for Selection of Present Home by County

Reason	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Location, neighborhood	60.5	64.2	77.3	78.5	71.2
Affordable	73.7	67.0	47.7	72.7	67.3
Provide more space	31.6	55.1	36.4	10.7	32.4
Built new house	26.3	35.8	22.7	25.6	28.9
House design, plan and layout	26.3	25.9	36.4	14.1	22.8
Limited choice; immediate need	5.3	11.0	25.0	7.4	10.9
Other	5.3	9.2	11.4	17.4	12.2

Note: Multiple responses may not add to 100.

Table 11. Years of Residence in Present Home by County

Years	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
	(38)	(109)	(44)	(121)	(312)
Less than 5	23.7	18.4	29.6	13.2	22.4
5-9	23.7	27.5	11.4	16.5	20.5
10-15	23.7	19.3	25.0	24.0	22.4
16-20	5.3	14.7	4.6	10.7	10.6
21-30	10.5	11.0	6.8	15.7	12.2
31-40	2.6	6.4	11.4	9.1	7.7
41 or more	10.5	2.8	11.4	10.7	4.2

percent had lived in their homes for ten to 15 years. More than 24 percent had lived in their homes for more than 20 years.

Best and Least Liked Features. The three housing characteristics most liked by the respondents were neighborhood or neighbors (36%), location (36%), and privacy (11%) (Table

Table 12. Best and Least Liked Features of Present Home  
by County

Feature	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
Best Liked	(38)	(109)	(44)	(121)	(312)
Neighborhood and neighbors	31.6	21.1	29.6	53.7	36.2
Location	34.2	40.4	27.3	34.7	35.6
Privacy	23.7	12.8	13.6	5.0	11.2
Ease of maintenance and convenience	2.6	16.5	6.8	0.8	7.4
House design: size, plan, layout	7.9	5.5	11.4	0.0	4.5
Site and yard	0.0	0.9	9.1	0.0	1.6
Other	0.0	2.8	2.3	5.8	3.5
	$\chi^2 = 83.1$		df = 18	p < 0.001	
Least Liked	(38)	(109)	(44)	(120)	(311)
Amount of maintenance and inconvenience	36.8	10.1	15.9	23.3	19.3
Site and yard	5.3	17.4	4.6	8.3	10.6
House design: size, plan, layout	18.4	11.9	9.1	6.7	10.3
Lack of privacy	5.3	11.0	11.4	4.2	7.7
Cost of unit	5.3	4.6	9.1	9.2	7.1
Location	7.9	4.6	9.1	3.3	5.1
Neighborhood and neighbors	2.6	3.7	2.3	2.5	2.9
Other	18.4	36.7	38.6	42.5	37.0
	$\chi^2 = 38.7$		df = 21	p < 0.05	

Note: Percents may not add to 100 due to rounding error.

12). The most frequent dislikes regarding the respondents' homes were the amount of maintenance and the inconvenience of the dwelling (19%), site and yard (11%), and the house design (10%). 'Other' varied characteristics were specified by 37 percent of the respondents as displeasing in regard to their homes. Significant differences were found among the counties for both liked ( $p < 0.001$ ) and disliked features ( $p$

< 0.05). Neighborhood and neighbors were most important to the Rockingham respondents (54%) and least important to the Southampton respondents (21%). Privacy was most important to Madison respondents (24%) and least important to respondents in Rockingham (5%).

### Housing Satisfaction

General satisfaction with the home was measured by asking the respondents to indicate an overall satisfaction level and by asking if they would like to move in the next two years (Table 13). Respondents were also asked to report reasons why they would or would not like to move (Table 14).

Extent of Satisfaction. More than half (54%) were very satisfied with their homes; an additional 36 percent were

Table 13. Housing Satisfaction by County

Satisfaction	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
(Percent)					
Extent of satisfaction					
Very satisfied	29.0	60.6	61.4	53.7	54.2
Satisfied	47.4	27.5	29.6	43.0	36.2
Neither	18.4	7.3	9.1	3.3	7.4
Dissatisfied	5.3	4.6	0.0	0.0	2.2
			$\chi^2 = 28.5$	df = 9	p < 0.001
Desire to Move					
Yes	21.1	16.5	25.0	5.0	13.8
No	60.5	78.0	56.8	94.2	79.2
Maybe	18.4	5.5	18.2	0.8	7.1

Note: Percents may not add to 100 due to rounding error.

Table 14. Desire to Move: Reasons for Moving and Not Moving by County

Reasons	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Desire to Move	(15)	(24)	(19)	(7)	(65)
Dissatisfied with conditions of present dwelling	26.7	54.2	21.1	42.9	36.9
Improve location	46.7	16.7	36.8	42.9	32.3
Change in family structure	20.0	33.3	31.6	14.3	27.7
Plan to build or buy	26.7	20.8	26.3	28.6	24.6
Present home is wrong size	33.3	16.7	31.6	14.3	24.6
Plan to change job	13.3	0.0	5.3	14.3	6.2
Other	6.7	4.2	36.8	57.1	20.0
Do Not Desire to Move	(23)	(85)	(25)	(114)	(247)
House meets family needs	73.9	89.4	76.0	51.8	69.2
Location	56.5	89.4	76.0	54.4	68.8
Economic reasons	52.2	75.3	48.0	27.2	48.2
Privacy	17.4	74.1	32.0	36.8	47.4
Convenience	13.0	76.5	32.0	23.7	41.7
Close to relatives	21.7	62.4	20.0	18.4	34.0
Other	0.0	5.9	36.0	20.2	15.0

Note: Multiple responses may not add to 100.

satisfied (Table 13). Significant differences in extent of housing satisfaction among the counties were found ( $p < 0.001$ ). Madison County respondents seemed to be somewhat less satisfied with their dwellings than respondents in the other counties.

Desire to Move. Nearly 80% of the respondents had no desire to move in the next couple of years. About 14 percent of the respondents would like to move; seven percent said they might like to move. Significant differences were also found among the counties regarding desire to move ( $p <$

0.001). Culpeper respondents indicated the greatest desire to move (43%), while Rockingham respondents had the least desire (6%).

Reasons for Desiring to Move. Of the 65 families indicating a desire to move, 37 percent cited dissatisfaction with present housing conditions, 32 percent wished to improve location, and 28 percent gave a change in family structure as contributing to their wish to move (Table 14). About one-fourth of the respondents indicated that their homes were the wrong size for their families; the same proportion (25%) planned to build or buy a home.

Reasons for Not Desiring to Move. Many of the 247 families who did not want to move indicated that their present home met family needs (69%) or that the location of their home was desirable (69%). Economic reasons for not moving were mentioned by 48 percent of the families and privacy of the home by 47 percent.

#### Housing Adjustment

Although it was expected that many of the families would be generally satisfied with their dwellings, it was also expected that the households would seek some changes or make adjustments in housing behavior, expenditure, or structure. Information was collected regarding housing-related costs and changes made in the household to reduce these costs (Table 15); respondents were also asked if they had



plans to change, repair, or improve their dwelling in the next couple of years (Table 16).

Change in Housing-Related Costs. Costs incurred by respondents were recorded for three general areas: utility costs, other housing costs, and transportation costs (Table 15). In relation to these expenditures, respondents were asked if changes had been made to reduce their costs.

Reduction of Utility Costs. More than three-fourths of the respondents (244 households) reported changes to reduce utility costs. Of these households, nearly 70 percent lowered thermostats in the winter, 62 percent reported using appliances more efficiently, and almost 62 percent used wood stoves or energy-efficient heaters. More than half (51%) closed off rooms in the winter. Other frequent utility-cost reduction strategies were use of fans instead of air conditioning (47%), lowering water heater thermostats (46%), and reducing wattage or lighting use (43%). Some differences in utilization of the various behaviors can be noted among the counties. Southampton respondents used appliances more efficiently (83%) compared to the respondents in Culpeper (68%), Rockingham (46%), and Madison (28%). Rockingham respondents were less likely to close off rooms, use fans instead of air conditioners, or lower water heater thermostats than those in the other three counties.

Reduction of Other Housing Costs. Of the 117 respondents who reported changes to reduce other housing costs, 87 percent did their own maintenance and repair. Almost a third

Table 15. Changes Made to Reduce Housing-Related Costs by County

Type of Change/ Changes Made	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Area of recorded costs					
Utility costs	76.3	89.0	90.9	64.5	78.2
Other housing costs	15.8	59.6	65.9	14.9	37.8
Transportation costs	73.7	70.6	65.9	47.1	61.2
Changes made to reduce utility costs	(29)	(97)	(40)	(78)	(244)
Lowered thermostat in winter	69.0	70.1	75.0	66.7	69.7
Used appliances more efficiently	27.6	82.5	67.5	46.2	61.9
Used wood stove or energy-efficient heater	86.2	59.8	50.0	60.3	61.5
Closed off rooms	65.5	79.4	45.0	12.8	50.8
Used fans instead of air conditioner	37.9	64.9	60.0	21.8	47.1
Lowered water heater thermostat	41.4	54.6	62.5	28.2	45.9
Reduced wattage or lighting use	72.4	63.9	35.0	11.5	43.4
Added or increased insulation	17.2	30.9	40.0	33.3	31.6
Weatherstripped and caulked	10.3	43.3	47.5	16.7	31.6
Covered windows with plastic	10.3	18.6	22.5	2.6	27.9
Added storm or double-pane windows	24.1	18.6	32.5	19.2	21.7
Raised thermostat in summer	3.4	18.6	22.5	0.0	11.5
Added insulation to water heater	6.9	9.3	10.0	5.1	7.8
Other	0.0	5.2	5.0	11.5	6.6
Changes made to reduce other housing costs	(5)	(65)	(29)	(18)	(117)
Did own maintenance and repairs	100.0	84.6	93.1	83.3	87.2
Changed to low maintenance materials	0.0	53.8	6.9	5.6	32.5
Deferred maintenance and repairs	0.0	13.8	24.1	16.7	16.2
Doubled up with another household	0.0	21.5	6.9	0.0	13.7
Moved to less expensive dwelling	0.0	1.5	3.4	5.6	2.6
Other	0.0	1.5	0.0	16.7	3.4
Changes made to reduce transportation costs	(28)	(77)	(29)	(57)	(191)
Made fewer trips	89.3	83.1	62.1	82.5	80.6
Used more efficient car	35.7	55.8	34.5	28.1	41.4
Used carpool	28.6	55.8	44.8	10.5	36.6
Rode bus or public transportation	0.0	16.9	0.0	0.0	6.8
Moved closer to job	3.6	6.5	17.2	0.0	5.6
Other	0.0	1.3	3.4	5.3	2.6

Note: Multiple responses may not add to 100.

(33%) changed to low-maintenance materials for their dwelling, and about 16 percent deferred needed maintenance and repairs, while 14 percent doubled up with another household to combine costs. About three percent indicated they had moved to a less expensive housing unit to reduce costs. There was wide variation among the counties in strategies used to reduce other housing costs. The only strategy used by Madison respondents to reduce their costs was to do their own maintenance and repair. Fewer than seven percent of the respondents in Culpeper and Rockingham Counties changed to low maintenance material compared to 54 percent of the respondents in Southampton County.

Reduction of Transportation Costs. More than 80 percent of the 191 respondents who made changes to reduce transportation costs reported making fewer trips. About 41 percent of the respondents used more efficient cars, and 37 percent utilized a carpool to reduce their costs. Respondents in Southampton County, 17 percent, were the only ones who utilized public transportation; probably, it was not available in the other counties. Overall, about six percent of respondents had moved closer to their jobs as an attempt to reduce transportation costs. No respondents in Rockingham reported moving closer to their job.

Dwelling Improvement Plans. Almost a third of the respondents had plans to change, repair, or make improvements to their dwellings in the next couple of years (Table 16). Significant differences in the incidence of planned

Table 16. Planned Changes, Repairs, or Improvements: Intent to and Type of Planned Change by County

Change/Type	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	(Percent)				
Plan to change, repair or improve					
Yes	42.1	37.6	47.7	19.8	32.7
No	52.6	48.6	43.2	61.2	53.2
Not applicable/Don't know	5.3	13.9	9.1	19.0	14.1
	$\chi^2 = 28.9$		df = 9	p < 0.001	
Types of planned improvements or repairs	(16)	(41)	(21)	(24)	(102)
Painting - interior	50.0	61.0	76.2	33.3	55.9
Painting - exterior	62.5	51.2	57.1	37.5	51.0
Improving landscape	31.3	29.3	28.6	29.2	29.4
Adding insulation	43.8	19.5	23.8	16.7	23.5
Adding rooms	37.5	19.5	23.8	12.5	21.6
Adding caulking and weatherstripping	18.8	19.5	19.0	20.8	19.6
Remodeling kitchen and/or bath	6.3	26.8	9.5	16.7	*17.6
Adding storm windows or doors	31.3	22.0	9.5	0.0	15.7
Making cosmetic changes (building cabinets, bookshelves....)	6.3	24.4	4.8	12.5	14.7
Adding sunporch	18.8	22.0	0.0	12.5	14.7
Repairing roof	6.3	14.6	9.5	16.7	*12.7
Repairing or improving plumbing	0.0	19.5	9.5	0.0	9.8
Adding flooring	6.3	12.2	4.8	4.2	7.8
Repairing or improving electrical system	0.0	12.2	14.3	0.0	7.8
Adding greenhouse	12.5	4.9	0.0	12.5	6.9
Adding solar panels	0.0	7.3	0.0	8.3	4.9
Adding solar water heater	0.0	9.8	0.0	4.2	4.9
Enclosing patio with glass	6.3	7.3	0.0	0.0	3.9
Adding siding	0.0	0.0	0.0	12.5	2.9
Other	0.0	12.2	33.3	12.5	14.7

Note: Multiple responses may not add to 100.

improvements were found among the counties ( $p < 0.001$ ). Fewer of the Rockingham respondents (20%) planned repairs in the next two years while about 48 percent of Culpeper respondents indicated planned improvements for their dwellings.

Type of Planned Improvements. The most frequently mentioned improvements were painting (56%) and exterior (51%) painting of dwelling. About 29 percent of respondents plan to improve landscaping, and nearly 24 percent want to add insulation. Almost 22 percent plan to enlarge their homes by building additional rooms. One-fifth of the respondents also plan to add caulking and weatherstripping to their homes. Fewer Rockingham County respondents than the 4-county average planned to make improvements in most of the categories listed in the survey.

#### Informational Needs

Housing decisions may be influenced by/or made as a result of perceived needs and available knowledge. For example, the energy crisis, a combination of past fuel shortages and escalating energy costs, seems to have led consumers to conserve or, at least, consciously consume energy. Although the need for information regarding energy and other housing topics seems evident, utilization of available, free information may be less than desired. Respondents were asked their perceptions regarding potential use of and needs for

housing information (Table 17) and were also queried regarding the energy crisis (Table 18).

Use of Housing Information. Only 18 percent of the respondents said they would definitely use free housing information if it were available; an additional 36 percent thought they might use such information (Table 17). About 41 percent of the respondents would not utilize free housing information. Significant differences were found among the counties in the likelihood of utilizing free housing information ( $p < 0.001$ ). Rockingham respondents were least likely to utilize information and Madison respondents were most likely to do so.

Table 17. Free Housing Information: Utilization of and Types Desired by County

Use/Type	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Would Use					
Yes, definitely	10.5	28.4	20.5	9.1	17.6
Yes, maybe	63.2	30.3	40.9	31.4	36.2
No	21.1	39.5	38.6	50.4	41.4
Don't know	5.3	1.8	0.0	9.1	4.8
Helpful Information	(38)	(109)	(44)	(121)	(312)
Energy conservation	65.8	62.4	34.1	47.9	53.2
Financing	81.6	57.8	36.4	26.5	45.5
Building methods	63.2	46.8	20.5	15.7	33.0
Remodeling	23.7	45.9	15.9	19.0	28.5
Insurance and taxes	36.8	46.8	31.8	0.0	25.3
Housing maintenance	18.4	39.5	29.6	9.9	24.0
Buying a house	39.5	8.3	20.5	0.8	10.9
Other	0.0	0.9	2.3	1.7	1.3

Note: Percents may not add to 100 due to multiple responses or rounding error.

Helpful Types of Information. Respondents were asked to indicate the kinds or topics of housing information they felt would be helpful. Significant differences existed among the counties for the specific information categories desired. More than half (53%) the respondents designated energy conservation information as helpful, and nearly 46 percent indicated financing materials would be helpful. More than a fourth of the respondents thought information on building methods (33%), remodeling (29%), and insurance and taxes (25%) would be helpful. House maintenance information was suggested by 24 percent of the sample, while eleven percent would find materials on purchasing a home beneficial. More Madison respondents thought information on financing (82%) and building methods (63%) would be helpful than did respondents in the other counties.

Energy Crisis Existence. Nearly 45 percent of the respondents indicated that they believe an energy crisis does exist while slightly fewer than 25 percent stated that no crisis exists (Table 18). Significant differences among the counties were found ( $p < 0.001$ ), with respondents in Madison (63%) and Southampton (54%) believing in the energy crisis and 48 percent of Culpeper respondents denying the existence of an energy crisis. About 42 percent of the Rockingham respondents were "not sure" if an energy crisis exists.

Energy Crisis Severity. Of the 138 respondents who believed in the existence of an energy crisis, about 24 per-

Table 18. Energy Crisis Beliefs by County

Response	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Existence of Crisis	(38)	(109)	(44)	(121)	(312)
Yes	63.2	54.1	31.8	34.7	44.6
No	18.4	18.4	47.7	23.1	24.4
Not sure	18.4	27.5	20.5	42.2	31.1
Severity of Crisis	(24)	(59)	(14)	(41)	(138)
Not at all severe	0.0	1.7	0.0	2.4	1.5
Somewhat severe	100.0	50.9	71.4	65.9	65.9
Severe	0.0	33.9	28.6	22.0	23.9
Very severe	0.0	13.6	0.0	9.8	8.7
Energy situation made an impact on housing decision	(38)	(109)	(44)	(121)	(312)
Yes	79.0	81.7	88.6	52.1	70.8
No	15.8	11.9	11.4	43.0	24.4
Don't know	5.3	6.4	0.0	5.0	4.8

Note: Percents may not add to 100 due to rounding error.

cent felt that the crisis was severe, and nearly nine percent indicated the crisis was very severe. Two-thirds of the respondents agreed that the crisis was somewhat severe; all of the Madison respondents felt the crisis was only somewhat severe.

Impact of the Energy Situation. Nearly 71 percent of the respondents stated that the energy situation had impacted their housing decisions. Significant differences among the counties were indicated ( $p < 0.001$ ). Rockingham respondents (52%) reported the least impact of the energy situation upon housing decisions, and Culpeper respondents (87%) reported the greatest impact.



## CONSUMER ACCEPTANCE

Consumer acceptance of housing alternatives was assessed by a series of questions regarding the conventionally-built house, manufactured/mobile home, apartment/multi-family unit, retrofitted (energy-saving, improved) home, passive solar home, active solar home, and earth-sheltered/ underground home. These types were defined as follows:

Conventionally-built house - (single-family detached house) a house built for use by one family, surrounded on all four sides by land, and built using standard construction techniques.

Manufactured/mobile home - housing built in a factory that is transported to the site and used as a permanent, year-round residence.

Apartment/multi-family housing - a building with three or more housing units which use the same foundation systems, roof line, and wall divisions.

Retrofitted (energy-saving, improved) home - (remodeled or improved older home) an existing house that has been structurally improved for the purpose of increasing energy savings.

Passive solar house - a house which, through design,

construction, materials, landscaping, and site orientation, is generally cooler in summer and warmer in winter than houses without these features.

Active solar house - a house equipped with solar collectors which use energy from the sun to heat and cool the home.

Earth-sheltered/underground home - (earth-embanked house) a house surrounded partially or completely by soil, using the earth's natural ability to cool in hot weather and warm in cold weather. Skylights may be used to increase natural lighting and ventilation.

After viewing a "show and tell" workbook of pictures of the housing alternatives along with definitions, the respondents were queried regarding their knowledge of or previous exposure to each of the housing alternatives (Table 19). They were also asked if additional information about any of the alternatives had been sought (Table 20). Respondents were then asked if they would buy or consider living in each of the alternatives if they were moving to a new area or different housing unit (Table 21). To identify perceptions of the alternatives, the respondents indicated the features or characteristics they liked and disliked about each of the housing alternatives (Tables 22 - 28). Finally, respondents were asked to rank the housing alternatives from best to least liked (Table 29).

### Awareness of Housing Alternatives

Almost all of the respondents had heard about the alternative housing types of apartment/multi-family units (99.7%) and manufactured/mobile homes (99%) (Table 19). These two non-conventional housing types had also been seen and actually lived in by the greatest proportion of respondents. Nearly 95 percent of respondents had seen manufactured/mobile homes and 14 percent had lived in this housing type. Slightly more than 92 percent had seen apartment/multi-family housing and over a quarter (26%) of the respondents had lived in apartments or multi-family housing.

Approximately 30 percent or more of the respondents had read about the six non-conventional housing types, ranging from 29 percent who reported reading about retrofitted housing to more than 34 percent who indicated they had read about manufactured/mobile homes and passive solar houses. Slightly fewer than 56 percent had heard about retrofitted homes, while one-fourth of the respondents had lived in retrofitted housing. In total, seven percent, all of whom were Southampton respondents, had lived in retrofitted housing. More than three-fourths of the respondents had heard about both passive solar and active solar homes; a little more than 21 percent had seen these housing types. Approximately 82 percent of the respondents had heard about earth-sheltered homes, but only 14 percent had seen an example of this housing type. Few respondents had actually expe-

Table 19. Awareness of Housing Alternatives by County

House Type/Extent of Knowledge	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Apartment/multifamily	(38)	(109)	(44)	(119)	(310)
Heard about	89.5	100.0	100.0	97.5	99.7
Read about	31.6	47.7	18.2	22.7	31.9
Seen	84.2	92.7	97.7	92.4	92.3
Lived in	23.7	35.8	38.6	12.6	25.8
Manufactured home/ mobile home	(38)	(108)	(44)	(120)	(310)
Heard about	94.7	100.0	100.0	99.2	99.0
Read about	29.0	48.2	22.7	28.3	34.5
Seen	84.2	93.5	97.7	97.5	94.5
Lived in	5.3	24.1	11.4	9.2	14.2
Retrofitted home	(38)	(109)	(44)	(121)	(312)
Heard about	26.3	64.2	77.3	49.6	55.8
Read about	15.8	42.2	38.6	18.2	29.2
Seen	7.9	48.6	6.8	16.5	25.3
Lived in	0.0	19.3	0.0	0.0	6.7
Passive solar	(38)	(108)	(43)	(121)	(310)
Heard about	84.2	77.8	83.7	73.6	77.7
Read about	29.0	35.2	39.5	33.1	34.2
Seen	26.3	20.4	34.9	15.7	21.3
Lived in	5.3	0.9	2.3	0.0	1.3
Active solar	(38)	(109)	(43)	(121)	(311)
Heard about	79.0	77.1	86.1	71.1	76.2
Read about	23.7	31.2	37.2	28.9	30.2
Seen	36.8	20.2	34.9	13.2	21.5
Lived in	0.0	0.0	2.3	0.0	0.3
Earth-sheltered/underground	(38)	(107)	(44)	(121)	(310)
Heard about	89.5	83.2	93.2	75.2	82.3
Read about	36.8	28.0	40.9	27.3	30.7
Seen	15.8	12.2	25.0	11.6	14.2
Lived in	0.0	0.0	0.0	0.0	0.0

Note: Multiple responses may not add to 100.

rienced living in homes of energy-conserving design, none had lived in earth-sheltered housing, 0.3 percent had lived in active solar houses, and 1.3 percent reported living in a passive solar home.

### Information Search

Most of the respondents (83%) had not sought out information regarding the housing alternatives; however, about ten percent had looked for information on passive solar and/or active solar housing (Table 20). Nearly seven percent had looked for information pertaining to retrofitted homes, while four percent looked for underground or earth-sheltered home information. Significant differences among the counties were indicated ( $p < 0.001$ ). More Madison County respondents had sought information on the three ener-

Table 20. Search for Additional Information about Housing Alternatives by County

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Table 20. Search for Additional Information about Housing Alternatives by County					
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Housing Type	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
-----					
(Percent)					
Active solar	18.4	12.8	11.4	4.1	9.9
Passive solar	18.4	11.0	11.4	5.0	9.6
Retrofitted (energy- saving improved) home	2.6	12.8	0.0	5.0	6.7
Earth sheltered/underground	15.8	1.8	2.3	3.3	4.2
Manufactured/mobile home	0.0	4.6	2.3	0.0	1.9
Apartment/multifamily	0.0	0.9	0.0	0.8	0.6
None	81.6	70.6	84.1	93.4	82.7
-----					
		$\chi^2 = 20.8$	$df = 3$	$p < 0.001$	
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Note: Multiple responses may not add to 100.

gy-conservative house types (passive solar, active solar, and earth-sheltered), while few Rockingham respondents had looked for additional information. Respondents from Southampton County were more interested in retrofitted housing information than respondents in the other three counties. This finding may be explained, in part, by the fact that Southampton respondents reported a higher percentage of housing condition problems than respondents in the other counties.

#### Acceptance of Alternatives

The data revealed that the conventionally-built home was the most preferred housing option, with 69 percent of the respondents indicating that they would either definitely or probably consider this type of home (Table 21). There was a notable difference between respondents of Rockingham County and the other counties, ranging from 36 percent in Rockingham to approximately 90 percent in the other counties who would definitely or probably consider the conventionally built house. A retrofitted house was considered acceptable by about one-half of the respondents. There were differences among the counties ranging from 17 percent in Rockingham to 83 percent in Southampton who would definitely or probably consider a retrofitted home. About an equal proportion of respondents would consider the passive and active solar homes as would not. Approximately 60 percent of the respondents definitely or probably would not consider an

Table 21. Likelihood of Considering Various Housing Types for New Home by County

Housing Type/Consideration	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Conventional Home	(38)	(109)	(44)	(120)	(311)
Definitely would consider	47.4	56.0	72.7	13.3	40.8
Probably would consider	42.1	34.9	15.9	22.5	28.3
Undecided	7.9	2.8	4.6	25.8	12.5
Probably would not consider	0.0	3.7	6.8	33.3	15.1
Definitely would not consider	2.6	2.8	0.0	5.0	3.2
Apartment/Multifamily Unit	(38)	(109)	(43)	(120)	(310)
Definitely would consider	2.6	3.8	4.7	1.7	2.9
Probably would consider	29.0	29.4	34.9	6.7	21.3
Undecided	29.0	11.0	0.0	20.8	15.5
Probably would not consider	18.4	32.1	18.6	41.7	32.3
Definitely would not consider	21.1	23.9	41.9	29.2	28.1
Retrofitted Home	(38)	(109)	(44)	(121)	(312)
Definitely would consider	10.5	40.4	29.6	2.5	20.5
Probably would consider	29.0	42.2	31.8	14.9	28.5
Undecided	26.3	5.5	27.3	28.9	20.2
Probably would not consider	31.6	10.1	6.8	37.2	22.8
Definitely would not consider	2.6	1.8	4.6	16.5	8.0
Passive Solar Home	(38)	(109)	(44)	(121)	(312)
Definitely would consider	5.3	11.9	20.5	5.8	9.9
Probably would consider	36.8	26.6	31.8	14.9	24.0
Undecided	18.4	33.0	25.0	33.9	30.5
Probably would not consider	36.8	20.2	20.5	33.1	27.2
Definitely would not consider	2.6	8.3	2.3	12.4	8.3
Active Solar Home	(38)	(109)	(44)	(121)	(312)
Definitely would consider	15.8	10.1	18.2	4.1	9.6
Probably would consider	29.0	28.4	40.9	13.2	24.4
Undecided	21.1	37.6	25.0	35.5	33.0
Probably would not consider	31.6	15.6	13.6	33.1	24.0
Definitely would not consider	2.6	8.3	2.3	14.1	9.0

Table 21. Likelihood of Considering Various Housing Types for New Home by County, continued

Housing Type/Consideration	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Earth Sheltered/ Underground Home	(38)	(109)	(43)	(121)	(311)
Definitely would consider	15.8	8.3	7.0	5.8	8.0
Probably would consider	23.7	35.8	18.6	4.1	19.6
Undecided	7.9	11.1	7.0	19.0	13.2
Probably would not consider	23.7	24.8	30.2	37.2	30.2
Definitely would not consider	29.0	20.2	37.2	33.9	28.9
Manufactured/Mobile Home	(38)	(109)	(44)	(121)	(312)
Definitely would consider	0.0	5.5	2.3	5.0	4.2
Probably would consider	10.5	21.1	11.4	5.8	12.5
Undecided	2.6	2.8	0.0	16.5	7.7
Probably would not consider	29.0	38.5	18.2	36.4	33.7
Definitely would not consider	57.9	32.1	68.2	36.4	42.0

apartment/multi-family unit or earth-sheltered/underground home while 76 percent would not consider a manufactured/mobile home.

Differences among counties were small for the earth-sheltered housing option but relatively large for the manufactured/mobile home, especially in the definitely would-not-consider category, ranging from 32 percent in Southampton to 68 percent in Culpeper.

Conventional House: Likes and Dislikes. Almost 28 percent of all respondents indicated psychological perception (traditional, familiar, fulfillment) as something they liked



about the conventional single-family house, ranging from 16 percent of the Southampton respondents to 45 percent of the Rockingham respondents (Table 22). Nearly 12 percent liked the design/appearance of the conventional house, and ten percent specified comfort and convenience of the structure. These two characteristics were mentioned most often by Southampton respondents and least often by Rockingham respondents. Nearly ten percent of the respondents liked the

Table 22. Conventional Housing: Likes and Dislikes by County

Likes/Dislikes	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	Percent				
Likes	(44)	(157)	(82)	(127)	(410)
Psychological perception (traditional, familiar, fulfillment)	31.8	15.9	20.7	44.9	27.6
Design/Appearance	13.6	22.3	6.1	1.6	11.7
Comfort/Convenience (room arrangement, thermal comfort)	2.3	15.9	12.2	3.9	10.0
Spaciousness (large)	20.5	9.6	8.5	6.3	9.5
Privacy (including noise, exterior and interior)	4.5	3.2	13.4	2.4	5.1
Exterior environment (landscaping, lot size)	2.3	4.5	4.9	0.0	2.9
Quality of construction	13.6	1.3	1.2	2.4	2.9
Single unit	4.5	0.6	11.0	0.0	2.9
Cost (non-utility, initial, financing, resale)	2.3	3.2	1.2	1.6	2.2
Maintenance/Upkeep (interior and exterior)	0.0	1.9	6.1	0.8	2.2
Location (neighborhood, proximity to people and places)	0.0	1.3	2.4	1.6	1.5
Compactness (small)	0.0	1.3	1.2	1.6	1.2
Energy-efficient (use and cost)	0.0	0.6	1.2	1.6	1.0
Meets family needs (children, handicapped, elderly)	0.0	0.6	2.4	0.0	0.7
Everything	0.0	9.6	1.2	0.8	4.1
Nothing	0.0	1.3	0.0	3.9	1.7
Other	4.5	3.8	6.1	3.2	4.1
Uncertain/Don't know	0.0	3.2	0.0	23.6	8.5

Multiple responses may not add to 100.

Table 22. Conventional Housing: Likes and Dislikes by County continued

Likes/Dislikes	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	Percent				
Dislikes	(44)	(157)	(82)	(127)	(410)
Energy-efficient (use and cost)	14.0	17.9	4.0	21.8	16.5
Maintenance/upkeep (interior and exterior)	20.3	1.7	36.0	4.1	10.2
Cost (non-utility, initial, financing, resale)	27.9	4.2	10.0	0.8	7.2
Compactness (small)	2.3	1.7	4.0	0.0	1.5
More than one level	0.0	0.0	0.0	4.1	1.5
Psychological perception (traditional familiar, fulfillment)	0.0	0.9	2.0	1.6	1.2
Design/appearance	0.0	0.9	2.0	0.8	0.9
Spaciousness (large)	0.0	0.9	2.0	0.8	0.9
Location (neighborhood, proximity to people and placement)	2.3	0.9	0.0	0.8	0.9
Exterior environment (landscaping, lot size)	2.3	0.9	0.0	0.8	0.9
Privacy (including noise, exterior and interior)	0.0	0.0	0.0	1.6	0.6
Everything	0.0	0.0	0.0	4.9	1.8
Nothing	16.3	48.7	40.0	10.6	29.1
Other	2.3	0.9	0.0	4.9	2.4
Uncertain/don't know	9.3	20.5	0.0	43.1	24.3

Multiple responses may not add to 100.

spaciousness of conventional housing. Overall 29 percent of the respondents reported they disliked 'nothing' about the conventional house. Almost 49 percent of the Southampton respondents, compared with 11 percent of the Rockingham respondents, disliked nothing about the conventional home. Specific dislikes were the energy efficiency of conventional housing (17%), maintenance and upkeep (10%), and cost of the home (7%). Maintenance and cost dislikes were more frequently mentioned by respondents in Madison and Culpeper

Counties, while energy efficiency was a more frequent complaint of Rockingham and Southampton respondents.

Manufactured/Mobile Homes: Likes and Dislikes.

Respondents liked manufactured/mobile homes for several reasons (Table 23); 11 percent specified maintenance/upkeep of the home as a plus, seven percent mentioned the compactness of the unit, and nearly seven percent indicated comfort and convenience. Overall, slightly more than six percent specified cost of the home as a positive aspect of the manufactured housing alternatives, although 22 percent of the Madison respondents indicated cost as a like. However, about one-third of the respondents stated they liked nothing about this housing type. Specifically, 32 percent mentioned the compactness of the unit as a disadvantage, about 15 percent doubted quality of construction, and ten percent discounted the safety of manufactured/mobile homes. About eight percent reported disliking everything about manufactured housing.

Apartment/Multi-family Housing: Likes and Dislikes.

The general ease of or lack of maintenance and upkeep required for apartment/multi-family housing was cited by 22 percent of the respondents as a like. Fifty-six percent of the Madison respondents compared to only five percent of the Southampton respondents reported maintenance/upkeep as a like (Table 24). Overall, eight percent liked the comfort/convenience of multi-family housing, and six percent liked the design/appearance of these structures. Southampton County respondents cited these two features most often,

Table 23. Manufactured/Mobile Homes: Likes and Dislikes by County

Likes/Dislikes	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Likes	(41)	(137)	(54)	(132)	(364)
Maintenance/upkeep (interior and exterior)	12.2	4.4	11.1	17.4	11.0
Compactness (small)	7.3	8.8	3.7	6.8	7.1
Comfort/convenience (room arrangement, thermal comfort)	0.0	10.2	3.7	6.1	6.6
Cost (non-utility, initial, financial, resale)	22.0	3.6	7.4	3.8	6.3
Meets family's needs (children, handicapped, elderly)	0.0	5.8	3.7	8.3	5.8
Energy-efficient (use and cost)	0.0	10.9	1.9	1.5	4.9
Home furnishings	4.9	8.8	1.9	0.8	4.4
Design/appearance	0.0	8.8	0.0	2.3	4.1
Psychological perception (traditional, familiar, fulfillment)	0.0	1.5	1.9	3.0	1.9
Location (neighborhood, proximity to people and placement)	0.0	0.0	5.6	0.0	0.8
Exterior environment (landscaping, lot size)	0.0	0.0	3.7	0.8	0.8
Everything	0.0	1.5	0.0	0.0	0.5
Nothing	36.6	21.9	48.1	36.4	32.9
Other	2.4	3.6	5.5	10.8	6.5
Uncertain/don't know	14.6	10.6	0.0	2.3	6.3
Dislikes	(61)	(188)	(80)	(166)	(490)
Compactness (small)	39.3	26.6	22.5	39.1	31.6
Quality of construction	26.2	17.6	20.0	5.0	14.9
Safety (security and structural quality)	6.6	15.4	13.8	3.7	10.2
Confinement	3.3	6.9	8.8	7.5	6.9
Cost (non-utility, initial, financing, resale)	1.6	3.2	5.0	10.6	5.7
Energy-efficient (use and cost)	6.6	2.1	2.5	6.2	4.1
Design/appearance	6.6	5.3	6.3	0.6	4.1
Psychological perception (traditional, familiar, fulfillment)	0.0	2.1	1.3	1.9	1.6
Location (neighborhood, proximity to people and placement)	0.0	0.5	5.0	1.2	1.4
Comfort/convenience (room arrangement, thermal comfort)	1.6	2.1	0.0	0.0	1.0
Privacy (including noise, exterior and interior)	0.0	0.0	3.8	1.2	1.0
Meets family's needs (children, handicapped, elderly)	0.0	1.1	0.0	0.6	0.6
Everything	3.3	8.0	5.0	11.8	8.2
Nothing	1.6	4.8	0.0	4.3	3.5
Other	1.6	0.5	6.4	1.2	1.8
Uncertain/don't know	1.6	3.7	0.0	5.0	3.3

Note: Multiple responses may not add to 100.

Table 24. Apartment/Multifamily Units: Likes and Dislikes by County

Likes/Dislikes	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Likes	(41)	(143)	(58)	(132)	(374)
Maintenance/upkeep (interior and exterior)	56.1	4.9	36.2	24.2	22.3
Comfort/convenience (room arrangement, thermal comfort)	4.9	11.2	6.2	6.1	8.0
Design/appearance	0.0	13.3	5.2	1.5	6.4
Meets family's needs (children, handicapped, elderly)	0.0	2.8	17.2	4.5	5.4
High density of people	4.9	3.5	0.0	7.6	4.6
Compactness (small)	0.0	7.7	1.7	1.5	3.8
Spaciousness (large)	0.0	4.2	0.0	1.5	2.1
Location (neighborhood, proximity to people and placement)	0.0	1.4	1.7	3.8	2.1
Cost (non-utility, initial, financing, resale)	4.9	0.7	1.7	1.5	1.6
Energy-efficient (use and cost)	0.0	0.0	0.0	4.5	1.6
Psychological perception (traditional, familiar, fulfillment)	0.0	0.7	0.0	1.5	0.8
Lack of ownership	2.4	0.7	1.7	0.0	0.8
Everything	0.0	1.4	0.0	0.0	0.5
Nothing	14.6	21.7	24.1	26.5	23.1
Other	4.8	8.4	3.4	3.8	5.4
Uncertain/don't know	7.3	17.5	0.0	11.4	11.5
Dislikes	(43)	(169)	(66)	(147)	(425)
Privacy (including noise, exterior and interior)	46.5	37.3	36.4	12.9	29.6
High density of people	25.6	21.3	37.9	36.7	29.6
Compactness (small)	4.7	3.6	6.1	5.4	4.7
Location (neighborhood, proximity to people and placement)	2.3	1.2	3.0	9.5	4.5
Exterior environment (landscaping, lot size)	2.3	5.3	1.5	4.8	4.2
Meets family's needs (children, handicapped, elderly)	0.0	1.8	3.0	0.7	1.4
Quality of construction	0.0	1.8	0.0	2.0	1.4
Lack of ownership	0.0	1.2	1.5	0.7	0.9
Energy-efficient (use and cost)	0.0	1.8	0.0	0.0	0.7
Everything	0.0	2.4	3.0	7.5	4.0
Nothing	0.0	2.4	3.0	7.5	1.4
Other	2.3	13.7	3.0	2.7	7.3
Uncertain/dont know	16.3	4.1	0.0	15.0	8.5

Note: Multiple responses may not add to 100.

while Madison respondents mentioned them least often. About 23 percent reported liking nothing about multi-family housing. Overall, approximately 30 percent of the respondents disliked the lack of privacy and the same proportion disliked the high density of apartment/multi-family housing. Nearly five percent also specified the compactness of multi-family housing and the location of the units as dislikes.

Retrofitted Houses: Likes and Dislikes. Energy efficiency of retrofitted housing was the primary like indicated by 27 percent of the respondents (Table 25). Eight percent liked the design/appearance, and four percent cited the spaciousness of the unit as a like. Dislikes of retrofitted housing were cost (10%), design/appearance (4%), and required maintenance/upkeep (2%). Over 53 percent of the Culpeper respondents specified the cost of retrofitted housing as a dislike, while only three percent of Madison and Southampton respondents specified cost as a dislike. A portion of the respondents seemed unsure about the features of retrofitted housing; overall, 33 percent answered uncertain/don't know for likes, ranging from 11 percent of the Southampton respondents to 65 percent of the Rockingham respondents. Nearly 56 percent were uncertain of dislikes regarding retrofitted housing with a range from 20 percent of the Culpeper respondents to 84 percent of the Rockingham respondents.

Table 25. Retrofitted Homes: Likes and Dislikes by County

Likes/Dislikes	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Likes	(42)	(162)	(56)	(125)	(385)
Energy-efficient (use and cost)	35.7	31.5	19.6	21.6	26.9
Design/appearance	2.4	13.0	10.7	1.6	7.8
Spaciousness (large)	2.4	7.4	1.8	1.6	4.1
Comfort/convenience (room arrangement, thermal comfort)	2.4	8.6	1.8	0.0	4.1
Psychological perception (traditional, familiar, fulfillment)	0.0	6.8	5.4	0.8	3.9
Cost (non-utility, initial, financing, resale)	2.4	1.9	3.6	0.8	1.8
Privacy (including noise, exterior and interior)	2.4	2.5	0.0	1.6	1.8
Maintenance/upkeep (interior and exterior)	0.0	1.9	5.4	0.0	1.6
Everything	0.0	8.6	10.7	0.0	5.2
Nothing	0.0	2.5	0.0	1.6	1.6
Other	4.8	4.9	25.0	5.6	8.2
Uncertain/don't know	47.6	10.5	16.1	64.8	32.9
Dislikes	(39)	(112)	(45)	(121)	(317)
Cost (non-utility, initial, financing, resale)	2.6	2.8	53.3	5.0	10.3
Design/appearance	7.7	6.3	0.0	3.3	4.4
Maintenance/upkeep (interior and exterior)	2.6	4.5	0.0	0.8	2.4
Psychological perception (traditional, familiar, fulfillment)	2.6	0.0	4.4	0.0	0.9
Functional obsolescence (outdated mechanical systems, etc.)	0.0	1.8	0.0	0.8	0.9
Energy-efficient (use and cost)	0.0	1.8	0.0	0.0	0.6
Privacy (including noise, exterior and interior)	2.6	0.9	0.0	0.0	0.6
Everything	0.0	0.9	0.0	1.7	0.9
Nothing	10.3	43.8	13.3	0.8	18.9
Other	0.0	3.7	8.9	3.3	3.7
Uncertain/don't know	71.8	33.9	20.0	84.3	55.8

Note: Multiple responses may not add to 100.

Solar Housing: Likes and Dislikes. Fairly large percentages of the respondents, ranging from 40 percent to 65 percent, stated they were uncertain or did not know specific likes and dislikes of the passive solar and active solar housing alternatives (Tables 26 and 27). Differences among the counties were indicated, with Rockingham County having a large proportion of respondents indicating "uncertain/don't know" (60%) and with a small proportion of Culpeper respondents indicating this response (18). Of the respondents specifying likes, 32 percent indicated the energy efficiency of the passive solar house and 28 percent indicated the energy efficiency of the active solar house as their primary like. Five percent of the respondents liked the design and appearance of the two solar housing types; the use of natural environment was mentioned by nearly five percent of respondents in reference to passive solar housing and by about nine percent of the respondents for active solar homes.

Earth-Sheltered/Underground Housing: Likes and Dislikes. One-fifth of the respondents liked the energy efficiency, eight percent liked the comfort/convenience, and nearly eight percent liked the size of earth-sheltered housing (Table 28). Six percent liked the innovativeness/uniqueness of the structure. In contrast, 42 percent suggested the confinement of earth-sheltered/underground housing as a dislike. Nearly 14 percent disliked dampness/mildew/musty odor of underground housing, and seven percent disliked the design/appearance.



Table 26. Passive Solar Homes: Likes and Dislikes by County

Likes/Dislikes	County					Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121		
	(Percent)					
Likes	(39)	(122)	(57)	(123)	(341)	
Energy-efficient (use and cost)	41.0	35.2	33.3	25.2	32.0	
Design/appearance	0.0	4.9	12.3	2.4	4.7	
Using natural environment (sun)	5.1	2.5	10.5	4.1	4.7	
Spaciousness (large)	0.0	0.8	10.5	0.0	2.1	
Cost (non-utility, initial, financing, resale)	5.1	2.5	0.0	0.8	1.8	
Comfort/convenience (room arrangement, thermal comfort)	0.0	3.3	0.0	1.6	1.8	
Innovative/unique	0.0	0.0	5.3	1.6	1.5	
Psychological perception (traditional, familiar, fulfillment)	2.6	0.8	0.0	0.0	0.6	
Everything	0.0	0.8	0.0	0.0	0.3	
Nothing	2.6	4.9	0.0	2.4	2.9	
Other	2.6	1.6	10.5	1.6	3.2	
Uncertain/don't know	41.0	42.6	17.5	60.2	44.6	
Dislikes	(39)	(111)	(45)	(123)	(318)	
Cost (non-utility, initial, resale)	2.6	2.7	40.0	4.9	8.8	
Design/appearance	17.9	11.7	0.0	0.8	6.6	
Maintenance/upkeep (interior and exterior)	5.1	0.9	4.4	0.0	1.6	
Energy-efficient (use and cost)	2.6	0.0	2.2	0.0	0.6	
Spaciousness (large)	2.6	0.9	0.0	0.0	0.6	
Psychological perception (traditional, familiar, fulfillment)	0.0	1.8	0.0	0.0	0.6	
Exterior environment (landscaping, lot size)	0.0	0.9	0.0	0.8	0.6	
Everything	0.0	5.4	0.0	3.3	3.1	
Nothing	5.1	9.9	20.0	1.6	7.5	
Other	5.2	2.7	11.1	3.2	4.5	
Uncertain/don't know	59.0	63.1	22.2	85.4	65.4	

Note: Multiple responses may not add to 100.

Table 27. Active Solar Homes: Likes and Dislikes by County

Likes/Dislikes	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
Likes	(41)	(131)	(56)	(124)	(352)
Energy-efficient (use and cost)	48.8	30.5	14.3	25.8	28.4
Using natural environment (sun)	7.3	8.4	25.0	1.6	8.5
Design/appearance	0.0	6.9	12.5	1.6	5.1
Innovative/unique	0.0	2.3	5.4	4.8	3.4
Spaciousness (large)	0.0	2.3	12.5	0.8	3.1
Cost (non-utility, financing, resale)	7.3	1.5	1.8	1.6	2.3
Comfort/convenience (room arrangement, thermal comfort)	2.4	0.8	0.0	0.8	0.9
Everything	0.0	0.0	0.0	0.8	0.3
Nothing	4.9	6.9	0.0	0.0	3.1
Other	0.0	0.8	17.9	3.2	4.6
Uncertain/don't know	29.3	38.9	10.7	58.9	40.3
Dislikes	(39)	(114)	(45)	(122)	(320)
Cost (non-utility, initial, financing, resale)	28.2	5.3	33.3	7.4	12.8
Design/appearance	15.4	16.7	0.0	4.9	9.7
Unproven	0.0	0.9	4.4	3.3	2.2
Using natural environment (sun)	0.0	1.8	6.7	0.0	1.6
Safety (security and structural quality)	0.0	0.9	0.0	0.0	0.3
Energy-efficient (use and cost)	2.6	0.9	2.2	0.0	0.9
Spaciousness (large)	0.0	0.9	2.2	0.8	0.9
Extra solar system maintenance	0.0	2.6	0.0	0.0	0.9
Exterior environment (landscaping, lot size)	0.0	1.8	0.0	0.0	0.6
Everything	0.0	6.1	0.0	0.8	2.5
Nothing	0.0	5.3	15.6	2.5	5.0
Other	2.6	0.9	5.3	0.0	1.2
Uncertain/don't know	51.3	56.1	31.1	80.3	61.3

Note: Multiple responses may not add to 100.

Table 28. Earth Sheltered/Underground Homes: Likes and Dislikes by County

Likes/Dislikes	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	(Percent)				
Likes	(44)	(149)	(57)	(131)	(381)
Energy-efficient (use and cost)	29.5	24.8	12.3	15.3	20.2
Comfort/convenience (room arrangement, thermal comfort)	6.8	4.7	7.0	13.0	8.1
Safety (security and structural quality)	13.6	11.4	5.3	2.3	7.6
Innovative/unique	0.0	7.4	15.8	2.3	6.0
Privacy (including noise, exterior and interior)	2.3	9.4	1.8	2.3	5.0
Maintenance/upkeep (interior and exterior)	2.3	2.0	7.0	5.3	3.9
Design/appearance	0.0	4.0	14.0	0.0	3.7
Using or related to natural environment	0.0	2.7	0.0	0.8	1.3
Cost (non-utility, financing, resale)	2.3	1.3	0.0	0.8	1.0
Uncertain/don't know	20.5	17.4	3.5	25.2	18.4
Nothing	22.7	10.7	28.1	29.8	21.3
Other	0.0	4.0	5.3	3.2	2.5
Dislikes	(45)	(133)	(56)	(139)	(373)
Confinement (psychological)	40.0	44.4	48.2	37.4	41.8
Dampness/mildew/must odor	15.6	3.8	5.4	26.6	13.9
Design/appearance	8.9	7.5	7.1	5.0	6.7
Using or related to natural environment	2.2	4.5	7.1	0.7	3.2
Safety (security and structural quality)	2.2	5.3	0.0	0.0	2.1
Cost (non-utility, initial, financing, resale)	4.4	0.8	3.6	0.0	1.3
Maintenance/upkeep (interior and exterior)	2.2	2.3	0.0	0.0	1.1
Innovative/unique	0.0	0.8	3.6	0.0	0.8
Everything	4.4	2.3	0.0	11.8	5.6
Nothing	4.4	6.8	0.0	0.7	3.2
Other	6.6	4.6	21.5	2.1	6.5
Uncertain/don't know	8.9	17.3	3.6	15.8	13.7

Note: Multiple responses may not add to 100.

Approximately 18 percent were uncertain of likes and 14 percent were uncertain of dislikes regarding earth-sheltered homes.

Ranking of Housing Alternatives. The respondents were asked to rank the housing alternatives from one (home liked best) to seven (home liked least). Overall, the conventionally built home was liked best (ranked number one by three-fourths of the respondents)(Table 29). The largest population of the respondents ranked the retrofitted (energy-saving improved) home as their number two choice (31%) and as their number three choice (22%). The passive solar home was ranked as the number four choice by 27 percent of the respondents followed by number five, the active solar home (25%); and number six the apartment/multifamily unit (30%). The earth sheltered and manufactured/mobile home were the least liked alternatives by 39 percent and 43 percent respectively.

Among the four counties, the pattern of ranking choices one and seven agreed with the overall rankings; notable differences were shown among counties in the choices numbered two through six. The largest proportion of respondents in Culpeper (41%) and in Madison (29%) ranked passive solar as their number three choice. In Culpeper 57 percent ranked active solar as their number four choice, and 34 percent ranked manufactured/mobile home as their number six choice.

**Table 29. Preference Ranking of Housing Alternatives  
by County**

Preference Rank	County				Total N=312
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	
	(Percent)				
ONE (Best Liked)	(38)	(109)	(44)	(117)	(308)
Conventionally built home	60.5	70.9	90.9	75.9	74.4
Manufactured/mobile home	0.0	3.7	0.0	7.0	3.9
Apartment/multifamily unit	2.6	0.0	2.3	1.8	1.3
Retrofitted (energy-saving improved) home	5.3	10.9	4.6	1.8	5.9
Passive solar home	2.6	4.6	0.0	12.3	6.6
Active solar home	15.8	7.3	0.0	2.6	5.6
Earth sheltered/ underground home	13.2	2.8	2.3	0.9	3.3
TWO	(38)	(108)	(44)	(115)	(305)
Conventionally built home	2.6	13.6	2.3	4.3	7.1
Manufactured/mobile home	0.0	11.9	13.6	21.1	14.1
Apartment/multifamily unit	21.1	2.8	27.3	23.7	16.4
Retrofitted (energy-saving improved) home	26.3	48.2	43.2	10.5	30.7
Passive solar home	10.5	11.0	2.3	17.5	12.1
Active solar home	26.3	6.4	6.8	14.9	12.1
Earth sheltered/ underground home	13.2	6.4	4.6	7.9	7.5
THREE	(38)	(108)	(44)	(115)	(305)
Conventionally built home	15.8	9.1	0.0	8.6	8.4
Manufactured/mobile home	7.9	9.2	0.0	8.8	7.5
Apartment/multifamily unit	7.9	10.1	13.6	20.2	14.1
Retrofitted (energy-saving improved) home	21.1	19.1	22.7	23.7	21.6
Passive solar home	29.0	13.8	40.9	14.0	19.7
Active solar home	13.2	15.6	18.2	19.3	17.1
Earth sheltered/ underground home	5.3	23.9	4.6	2.6	10.8
FOUR	(38)	(109)	(44)	(115)	(306)
Conventionally built home	10.5	5.5	2.3	5.2	5.5
Manufactured/mobile home	0.0	10.1	0.0	1.8	4.3
Apartment/multifamily unit	15.8	21.1	2.3	6.1	12.1
Retrofitted (energy-saving improved) home	29.0	11.8	9.1	31.6	20.9
Passive solar home	34.2	23.9	25.0	27.2	26.6
Active solar home	7.9	14.7	56.8	15.8	20.3
Earth sheltered/ underground home	2.6	12.8	4.6	13.2	10.5

Note: Percents may not add to 100 due to rounding error.

Table 29. Preference Ranking of Housing Alternatives by County, continued

Preference Rank	County				
	Madison N=38	South- ampton N=109	Culpeper N=44	Rocking- ham N=121	Total N=312
	(Percent)				
FIVE	(38)	(108)	(44)	(115)	(305)
Conventionally built home	7.9	0.9	0.0	3.5	2.6
Manufactured/mobile home	2.6	7.3	2.3	6.1	5.6
Apartment/multifamily unit	10.5	21.1	22.7	15.8	18.0
Retrofitted (energy-saving improved) home	10.5	7.3	15.9	16.7	12.4
Passive solar home	18.4	27.5	25.0	19.3	23.0
Active solar home	29.0	26.6	13.6	25.4	24.6
Earth sheltered/ underground home	18.4	8.3	20.5	12.3	12.8
SIX	(38)	(108)	(44)	(115)	(305)
Conventionally built home	2.6	0.0	4.6	1.7	1.6
Manufactured/mobile home	23.7	16.5	34.1	20.2	21.3
Apartment/multifamily unit	39.5	31.2	25.0	27.2	29.8
Retrofitted (energy-saving improved) home	5.3	1.8	2.3	6.1	3.9
Passive solar home	2.6	12.8	6.8	7.0	8.5
Active solar home	5.3	26.6	4.6	21.9	19.0
Earth sheltered/ underground home	21.1	11.0	22.7	15.8	15.7
SEVEN (Least Liked)	(38)	(108)	(44)	(115)	(305)
Conventionally built home	0.0	0.0	0.0	0.9	0.3
Manufactured/mobile home	65.8	41.3	50.0	35.1	43.3
Apartment/multifamily unit	2.6	13.8	6.8	5.3	8.2
Retrofitted (energy-saving improved) home	2.6	0.9	2.3	9.7	4.6
Passive solar home	2.6	6.4	0.0	2.6	3.6
Active solar home	2.6	2.8	0.0	0.0	1.3
Earth sheltered/ underground home	26.3	34.9	40.9	47.4	39.3

Note: Percents may not add to 100 due to rounding error.

## SUMMARY AND IMPLICATIONS

This report provides an overview of the sample and data from personal interviews with 312 Virginia households in four nonmetropolitan counties: Culpeper, Madison, Rockingham, and Southampton. Respondents were interviewed during Summer 1981 for the purposes of determining consumers' acceptance of energy-efficient housing and identifying familial constraints to the adoption of such housing alternatives. The components of the survey, summarized here, were demographic characteristics, housing situation, decision-making practices related to housing, and consumer acceptance of housing alternatives.

### Demographic Characteristics

The respondents were primarily females (71%), who identified themselves as heads, co-heads, or spouses (94%) in the household. Respondents were distributed in age through five ten-year categories from 25 to 74 years of age, 76 percent were white, and 29 percent had a high school education while 31 percent had some advanced education. Seventy percent of the respondents were married and 17 percent were widowed. Household size was relatively small, with 58 percent being one or two person households. About 74 percent were married-couple households; more than half (51%) of the

survey households had no children present in the home. Income and employment data revealed lower than average personal and household incomes; nearly 24 percent of the respondents were retired.

#### Housing Situation

For the most part, homes of the respondents were owned (86%) conventional, single-family detached houses (95%), were fairly compact in size (56% had less than 1200 square feet), and had six or seven rooms (55%) -- three of which were bedrooms (56%). Quality of the houses was standard or above in most instances; all units had a bathroom(s) and 92 percent had hot and cold water in both kitchen and bathroom(s). The majority of households (77 to 98%) indicated no structural defects; the most common defects were missing/torn screens, peeling paint, or decayed porch/steps. The majority of households (56% or more) also featured energy-saving characteristics of insulation, storm windows/doors, and caulking/weatherstripping.

#### Decision-Making Practices

Location, neighborhood, and affordability were factors considered in selecting and evaluating the respondent's home. Ninety percent were satisfied with their homes, yet 20 percent desired to move in the next few years, and one-third planned to change, repair, or improve their dwelling in that time. While nearly 45 percent felt an energy crisis existed, 71 percent of the respondents said the ener-



gy situation had impacted their housing decisions. In order to reduce costs, more than half (51 to 86%) closed off rooms, used energy-efficient heaters/appliances, lowered winter thermostats, decreased car trips, and did their own repairs/maintenance. Despite dissatisfaction or desire to save money, fewer than 18 percent of the respondents said they would definitely use free housing information; types of information deemed helpful pertained to energy conservation, financing, or building methods.

#### Consumer Acceptance

A majority of the respondents (56 to 98%) had heard about the six alternative housing types, yet information-seeking and experience with the types, other than manufactured/mobile or multi-family/apartment, was substantially smaller; roughly one-third had read about and 25 percent or fewer had seen retrofitted, passive or active solar, or earth-sheltered housing. Only a few had lived in retrofitted or solar homes. About 17 percent had sought information on the housing types. Other than a conventional house, respondents said they might consider retrofitted or solar housing if they were moving. Although the data indicated limited knowledge or experience, respondents cited a number of likes and dislikes for each housing type. Overall, in rank of preference, respondents indicated the best-liked house was a conventional house, followed by retrofitted, passive solar, active solar, multifamily/apartment, and

earth-sheltered housing. The manufactured/mobile home ranked as the least liked.

Overall, the respondents represented older, settled households who owned their conventional houses. The Virginia households, located in nonmetropolitan counties, were not disadvantaged in their housing; in fact, the households and their houses seemed little, if any, different in desires, diversity, or housing quality from the nation as a whole. Despite this traditional housing situation, awareness of newer or innovative housing forms, especially those alternatives emphasizing energy-efficiency, was evident.

Lack of experience with the alternative housing forms may have hindered consumers' willingness to accept, yet dispersion of information regarding housing alternatives is evident. This information appears to come from media sources such as television, magazines, newspapers, and/or product bulletins/booklets rather than traditional word-of-mouth or neighbor sources. An encouraging note for the acceptance of the innovative alternatives is indicated by the number of consumers who would consider the alternatives if they were moving and by the overall preference ranking of the housing types. While not all of the alternatives, particularly earth-sheltered and multi-family housing, were equally acceptable, each appealed to some portion of households.

As a final synopsis, the value of these data in extending knowledge, promoting acceptance, and encouraging utilization of advancing household technology might be con-

sidered. The results of this study suggest that several familial constraints to the adoption of innovative housing commonly exist. Families are, still, concerned with economic and locational factors as well as household needs in selecting and evaluating housing. A variety of the housing alternatives should be available at relatively affordable prices. To create consumer demand for the alternative housing forms, factual information and education are necessary. Only a few consumers seek out desired information; the majority only skim information that is delivered or given to them free of effort such as in news programs or television shows or through advertisements. Innovation can also be promoted in steps; houses partially utilizing or featuring innovative characteristics can gradually, if only slowly, move consumers toward increasing levels of technology. For example, consumers living in retrofitted housing may be more willing to seek out solar housing for their next home after experiencing the retrofitted innovations. While familial constraints no doubt hinder the adoption of innovative housing in part, it must be remembered that the housing process also consists of manufacturers (i.e., builders and developers), promoters (real estate agents, architects, and educators), and regulators (officials and legislators).

Until all of the interacting components, from consumers to regulators, reach a balance of knowledge and delivery, impediments to the adoption of innovative housing forms will continue to exist.



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# Virginia's Agricultural Experiment Stations

- 1 — Blacksburg  
Virginia Tech  
Main Station
- 2 — Steeles Tavern  
Shenandoah Valley Research Station  
Beef, Sheep, Fruit, Forages, Insects
- 3 — Orange  
Piedmont Research Station  
Small Grains, Corn, Alfalfa, Crops
- 4 — Winchester  
Winchester Fruit Research Laboratory  
Fruit, Insect Control
- 5 — Middleburg  
Virginia Forage Research Station  
Forages, Beef
- 6 — Warsaw  
Eastern Virginia Research Station  
Field Crops
- 7 — Suffolk  
Tidewater Research and Continuing Education Center  
Peanuts, Swine, Soybeans, Corn, Small Grains
- 8 — Blackstone  
Southern Piedmont Research and Continuing Education Center  
Tobacco, Horticulture Crops, Turfgrass, Small Grains, Forages
- 9 — Critz  
Reynolds Homestead Research Center  
Forestry, Wildlife
- 10 — Glade Spring  
Southwest Virginia Research Station  
Burley Tobacco, Beef, Sheep
- 11 — Hampton  
Seafood Processing Research  
and Extension Unit  
Seafood

