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MARKET DIFFUSION AND THE EFFECT OF DEMONSTRATIONS: A STUDY OF THE DENVER METRO PASSIVE SOLAR HOME PROGRAM

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Abstract/Summary

This paper is a report on the reactions to and effects of the Denver Metro Passive Solar Home demonstration program, conducted in the Spring of 1981. The purpose of the program was to provide impetus to builders for incorporating passive solar designs in spec-built homes and to demonstrate those designs to prospective buyers to increase buyer-receptivity.

A pre-post exposure analysis of the effect of the program is reported on here, with four separate groups of prospective new home buyers studied. The first group heard publicity about and voluntarily visited a demonstration home. The second group saw the home, but was recruited to come to the site. The third group, also in Denver, did not see the site, but answered the same set of questions after receiving a description of and pictures of passive solar homes. The fourth group was a control group, similar to the third, but located in Kansas City. A total of 245 individuals participated.

Analysis of the study results leads to the following conclusions:

- Due to the high level of prior awareness and pre-disposition toward passive solar in Denver, relatively few changes in attitudes occurred.
- The demonstration was effective in reducing concern about aesthetics and about builders' capability of producing passive solar homes.
- The demonstration encouraged those individuals exposed to the site to actively seek additional information about passive solar.
- Exposure to the demonstration program reduced individuals' sensitivity to the cost of passive solar.

The study identified the following actions and communications program-messages that builders and public policy makers should consider in accelerating the diffusion of passive solar:

- Teach prospective buyers how to evalute the financial aspects of passive solar.
- Show how passive solar can provide protection against fuel price increases.
- Develop statistics showing that passive solar increases the resale value of homes.
- Develop relationships with the financial community so that passive solar can easily be included in conventional mortgages.

The implication of the study for evaluating the impact of a demonstration program on market penetration is discussed in terms of the theory of diffusion of innovations and implications for further research are reviewed.

1. Background:

The U.S. Department of Energy has the responsibility for developing policies that meet congressional market penetration objectives for renewable resources, including solar energy. The lessening of our domestic demand for fossil fuels is critical to the long term economic and strategic security of the nation; many policy makers believe that solar energy, in its various forms, can provide important elements of our move toward self sufficiency.

Many alternatives to fossil fuels, including most solar energy systems, require that buyers adopt new ways of thinking about energy use when making investments in their homes. To sell alternative energy systems successfully, especially in the home building market, manufacturers and home builders alike must adopt new marketing and communication programs that are sensitive to the changing needs of potential adopters.

Unlike previous 'energy transitions' (wood-to-coal, for example) the present energy transition is not the result of discovering a new primary fuel that is cheaper, more abundant and more environmentally acceptable than the current sources of energy. This contrast points to the unique problem facing those trying to enter the solar market: solar devices represent the first major new building technology that adds substantially to the first cost of a structure and whose justification is found in a stream of savings delivered over time. Solar devices and technologies also require consumers to rethink traditional notions of building design and to accept uncertainty with respect to performance and desirability in many cases.

Unlike active solar energy systems, i.e., solar energy systems that use electrical and/or mechanical energy to effect thermal transfer, passive solar energy systems (our focus here) use the structure of the building itself to collect, store and circulate heat from the sun. Very little, if any, mechani-

cal assistance is needed. The structure of the home must fit the specific site and climatic conditions to obtain the best results. Different solar energy features, such as Direct Gain, Trombe Wall, Solarium or Greenhouse (see Appendix 1), can be included in an otherwise conventional home to decrease the amount of energy used for heating and cooling the home.

Thus, passive solar energy systems are more modifications of existing housing designs and structures while active systems are generally major additions. Diffusion theory suggests that passive solar energy might diffuse through the marketplace at a different rate than active solar and that there will be significant barriers to market penetration.

2. Diffusion Processes and Diffusion Theory

A diffusion process refers to the set of phenomena that occur during the early stages of a new product's introduction. One of the underlying concepts of the diffusion process is that different consumers adopt an innovation at different times after it becomes available. The first adopters or innovators then exert influence (word-of-mouth effect) on others. For purposes of analysis, consumers are usually classified as innovators, early adopters, early majority, late majority and laggards, according to when they adapt (Rogers 1962, Rogers and Shoemaker, 1971) or their propensity to adapt (Midgeley 1977). As the diffusion process occurs, adopters may become active in improving the innovation itself (Rogers, 1978).

Innovators, the early buyers of the product who exert (positive or negative) influence in later potential adopters have several distinguishing characteristics. Rogers and Stanfield (1968) have classified over 2400 research studies. In general, they have found that an innovator is likely to be educated and knowledgeable, with a high income, to have a positive attitude

toward change and high personal aspirations and to be linked to external information sources of media and change agents.

Personal influence plays a large role in the adoption of new products. Kotler (1980) reports that personal influence is important in the evaluation stage of the adoption process, especially for risky situations.

Of initial importance are the characteristics of the product and their relationship to the rate of diffusion. Five charactristics (Rogers, 1962) have an especially important influence on the rate of adoption:

1. Relative advantage: the degree to which the adoption appears to be superior to previous ideas. The greater the perceived relative advantage, in terms of higher profitability, reliability, ease of operations, etc., the quicker the innovation will be adopted.
2. Communicability: the degree to which the operation and benefits can be demonstrated to others. Innovations that are more readily demonstrated diffuse faster.
3. Complexity: the degree to which the innovation is relatively difficult to understand or use. The more complex innovations are likely to take a longer time to diffuse.
4. Divisiblity: the degree to which an innovation can be tried on a limited basis. Divisiblity helps increase the rate of adoption.
5. Compatibility: the degree to which the innovation is consistent with the values and experiences of those individuals in the social system.

These characteristics have important implications for the diffusion of passive solar energy. In terms of relative advantage, the less costly it is

and the more energy it saves, the faster it would be expected to diffuse. In terms of communicability, a physical demonstration of benefits would be expected to have more impact on the relative rate of receptivity and diffusion than a written message or system description. This relates also to the concept of complexity: the system is somewhat complex and difficult to understand and both written descriptions and physical demonstrations are likely to lead to more rapid diffusion. As for divisibility, the system must be integrated, as a whole, into the structure of a house; as such, its rate of diffusion is expected to be relatively slow. Finally, in terms of compatibility, the innovation would be expected to diffuse more rapidly in an area where energy and environmental consciousness were high. Such an area was chosen as the site of the Denver Metro Home Builders program, the focus of this report.

3. The Study

DOE, SERL, Western SUN and the Colorado Office of Energy Conservation, with cooperation from the Home Builders Association of Metro Denver sponsored a program to promote the wide-scale residential use of passive solar energy. The purpose of that program has been to encourage home builders to adopt passive solar design concepts into new home construction, demonstrating, (and selling) the results to buyers. The basic idea behind this program is consistent with the concepts of innovation diffusion outlined above: by demonstrating the innovation, communicating its benefits/relative advantage in an area where it is compatible with community values, the rate of diffusion will be increased.

In conjunction with this program, as a test of its effectiveness, potential benefits, and as a way to provide quantitative feedback to builders, a small

market experiment was run. Four recently built passive solar homes formed the focus of the study. The homes were built as part of the Denver Metro Program, all by different builders, including a variety of passive solar features: large amounts of south facing glass, skylights, brick walls and floors, special window shades, a trombe wall, moveable insulation and a solarium.

Four groups of individuals made up the total sample. All respondents had to qualify on two accounts: they had to be at least 22 years old and be planning the purchase of a newly constructed home within the next two years.

- Group I were respondents who came to the passive demonstration completely on their own. They were intercepted before seeing the home, given a preliminary questionnaire and then re-interviewed following the home visit.
- Group II were screened approximately six weeks earlier through contact at the Denver House and Garden Show. They either were unaware or had not anticipated attending the demonstration and were given a $15 incentive for participation. The questioning for this group was identical to that of Group I.
- Group III were also screened at the Denver House and Garden show. They were then interviewed by phone and mailed information about passive solar energy. They responded by mail to the same set of questions given in the post-viewing interview for groups I and II.
- Group IV is a control group, from Kansas City, screened at random by phone. The question-format was identical with that of Group III.

Each group received a 'pre'-questionnaire (prior either to seeing the

demonstration or to receiving mailed information) and then a 'post' questionnaire. The pre-questionnaire collected demographic information, previous awareness and knowledge of solar energy and perceptions of its applicability and feasibility. The post questionniare repeats some of the earlier perceptual questions, looking for changes, and asks about purchase intentions, perceptions of present and expected fuel prices and personal innovativeness. Exhibit 1 summarizes the experimental setting.

Briefly, the pre-post nature of this design enables the measurement of the effects of the demonstration or information on the individual. The several groups give us: II vs I = self-selection effect, I or II vs III = the effect of the demonstration and III vs IV = a measure of the area effect (considerable publicity occurred in Denver announcing this program, necessitating such a control group).

Copies of the measurement instruments are attached as Appendix 2. The data were all collected by Market Facts, Inc.

4. Data Description:

Exhibit 2 gives the responses, by group, to key questions from the pre-exposure questionnaire. Item 1 shows a high overall intention to include solar. Item 2 shows that solar panels have generally been seen by this group. Items 3 and 4 show that the Denver group is significantly more likely to have sought information in solar and to know a solar owner. Item 5 shows a generally high stated awareness of government incentives for solar.

Items 6-10, the attitudinal questions shows a similar pattern -- more positive and knowledgeable position in Denver than in Kansas City. We return to these below, comparing them with post-exposure attitudes.

Exhibit 3 gives the demographics of the sample. The typical respondent is in his/her late 20's or 30's, has a college background, is planning 2-4 people to occupy the home and has a family income over $25,000.

Exhibit 4 gives post-exposure attitudes toward passive solar. Recall that only groups 1 and 2 saw the demonstration; groups 3 and 4 received mailed information. Items 1 through 5 correspond to items 6 through 10 in Exhibit 2 for the pre-questionnaire.

Exhibit 5 compares these five perceptual items. Looking down the columns there is little difference in the patterns for any item between the pre- and the post groups. In other words, exposure to the demonstration did not appear to do more (less) than exposure to information. In fact we see surprising little change in attitude here. Apparently the mailed information made recipients in Kansas City feel they understood the financial aspect of passive solar as well as the fact that passive solar provides reliable/dependable heating. (Items 1 and 3.) Everyone strongly agreed they understand how passive solar works (Item 2) and most agree that passive solar makes some economic sense. (Item 3 -- although Kansas City is skeptical.) In terms of prospects for diffusion (Item 5) exposure to the site did little to affect the already-high prospects shown by groups 1 and 2. Group 3 showed a downward move after exposure to information (an apparent anomaly) while Group 5 significantly increased its perceptions of potential penetration.

On net, Exhibit 5 seems to suggest that in Denver, at least, where awareness is high and attitude toward passive solar is rather favorable, exposure to the site had little measurable impact on improving already favorable impressions. This is in marked contrast to similar results reported by Lilien and Johnston (1980) for active solar systems. There, exposure to more infor-

mation reduced prior, positive attitudes. Passive solar apparently has more to offer the consumer than active solar.

Returning to Exhibit 4, items 6-8, 10-14, 16, 18-21 all show a similar pattern, with the Denver groups more pro-passive solar than the Kansas City group. Item 9, on aesthetics shows that exposure to the demonstration reduces the perception that passive solar is unattractive. (Groups 1 and 2 are significantly more favorable here than groups 3 and 4.) Item 15 shows that those who have seen the passive solar demonstrations are significantly less likely to agree that builders cannot build passive solar homes than those who only saw the concepts. Item 17 shows that, after exposure to the demonstration, more positive attitudes toward the concept are generated ("I would admire a neighbor who built a passive solar home"). This positive social attitude can be a key determinant of the rate of diffusion.

Item 22 shows that those who have seen the home are much more likely to look for more information about passive solar, i.e., to take further action than those who only received the mailed information. Items 23 and 24 show that the mailed information was sufficient to generate interest in making even a 30 minute trip to visit a passive solar home.

Item 25 shows all three Denver groups highly likely to install passive solar or buy a home with passive solar. Items 26 and 27 provide further evidence of the pattern of Denver vs Kansas City overall attitudes toward solar.

In summary, the data appear to show that, the Denver Metro Program did not improve perceptions of passive solar, because those perceptions were already highly favorable. The program apparently succeeded in dealing with several existing uncertainties regarding appearance, builder qualifications, and attitudes toward a neighbors' building a passive solar home. And, signi-

ficantly, those who saw a passive solar home are more likely to seek more information about passive solar than those who did not see the demonstration. This suggests that the demonstration program appears likely to accelerate passive solar diffusion.

5. Likelihood of Purchase Analysis

In order to better understand likely purchase behavior for passive solar, a series of probability of purchase questions were included. These were in the form of 11 point scales, framed in terms of probability of purchase from 0 to 99 out of 100. (Appendix 2, Question 33.) In addition, four scenarios were presented to each individual in which the passive solar cost and savings parameters were varied. Cost increment scenarios were given at 5 percent and 10 percent of the purchase price of the house while savings were given at 1/3 and 2/3 of the monthly fuel bill. (These figures were developed in conjunction with the builders and with SERL engineers.) Exhibit 6 gives the overall picture of likelihood of purchase by groups for these four scenarios. These stated likelihoods are all quite high with the Denver groups (1-3) more likely to purchase than the Kansas City groups. These probabilities will not, of course, translate into purchase behavior, although relationships between purchase intentions and purchase behavior have been studied for several product classes (Juster, 1966, Morrison, 1979), and at least a monotonic relationship seems to exist. It would be of great value to follow-up with these individuals, tracing their actual purchase behavior. (Such an effort is currently underway by the author for active solar water heating systems.)

We focus now on how these purchase likelihoods relate to probability of purchase. An appropriate model, relating probabilities of purchase to indirect variables is the logit model:

$$p_j = \frac{1}{1+c^{-a_o - \sum_i a_i X_{ij}}}$$

where

p_j = probability of purchase for individual j,

X_{ij} = dependent variable value for variable i, individual j,

a_i = coefficients.

In-depth correlation analysis and investigation of extended data-tabulations led to the following observations:

(1) Significant differences in purchase likelihood appear to exist between groups.

(2) Cost of passive solar affects the likelihood of purchase for all groups. However, the level of the affect is different between groups 1 and 2 than between 3 and 4.

(3) The level of savings associated with passive solar are important for all groups except those who self-selected.

(4) The self-selected group appears to have an income-correlate of purchase-likelihood. No other group displayed this or any other demographic-related differences.

(5) Several attitudinal variables appeared to be important correlates of purchase likelihood including:

   (a) level of understanding the financial aspects of passive solar

   (b) ease of inclusion of passive solar in the mortgage

(c) belief that passive solar protects against increases in energy costs

(d) belief that solar increases the resale value of the home

These observations led to the specification of the probability of purchase model. The model was calibrated using the GLM procedure in SAS, with $\log\left(\frac{p}{1-p}\right)$ as the dependent variable. The results are shown in Exhibit 7.

The model was constructed so that each group could have a different intercept. Thus, the 'base' value of probability of purchase varies across groups: All other things being equal groups 1 and 2 would see about the same probability of purchasing passive solar (X1, X2); group 3 would see a significantly higher probability of purchase (X3), while group 4, the Kansas City group, would be a significantly lower probability of purchase (X4). (The higher group 3 effect is partially the result of the different cost-sensitivity but may, in fact, reflect true differences in the samples.)

The cost effects are quite interesting (Y5, X6). Those who saw the demonstrations, groups 1 and 2, show significantly lower sensitivity to the cost of passive solar than do the groups who did not see the demonstration. This points to an important effect of the demonstration.

Savings (X7) was significant, but not for group 1. The self-selected group (Innovators?) are less interested in this side of the equation and are more interested in passive solar for other reasons. Interestingly, the income effect (X8) is significant for this group, with higher income people somewhat less inclined toward solar.

The attitudinal measures (X9-X13) outlined above were significant for all groups. (Variables X10 and X11 refer to Exhibit 4, items 10 and 27 respec-

tively, two different measures of the same effect that, empirically, were relatively independent). These suggest important actions and communications programs for accelerateing passive solar diffusion; all deal with perceptions and understanding of finances. A communications program that: (a) shows how to evaluate solar from a financial standpoint, (b) shows how solar protects against fuel price increases, (c) shows that solar increases the resale value of the home, and (d) demonstrates that solar can easily be covered in a mortgage, is likely to have a significant impact on the rate of passive solar market penetration. Builders, public policy officials and others interested in seeing passive solar succeed should work with lending agencies to be certain that point (d) becomes reality, should work with real estate agencies to gather data on (c) and prepare brochures and information communicating points (a) and (b).

The probability of purchase model was able to explain only about a quarter of the variance in the dependent variable. Part of this is due to the large error inherent in this measure; data grouping would artifically raise this figure without influencing the explanatory power of the model. Part of the problem is also due to the large amount of uncertainty still surrounding solar; this may lead to a substantially non-rational initial evaluation process which cannot be captured in a rational choice model such as that developed here.

It is important to note that this model does not pretend to predict purchase. Even under the best of circumstances (complete awareness, lack of negative feedback, availability of alternatives) probability of purchase will not translate into actual purchase behavior on a 1:1 basis. This model <u>should</u> be useful in having identified the factors most likely to exert relatively

significant influence on the rate of diffusion of this technology, however.

6. Evaluation/Conclusion

The analysis presented here has two sets of conclusions: one for passive solar specifically and one for the role of demonstrations in innovation diffusion more generally.

This specific study had a variety of conclusions for passive solar; some of which were somewhat surprising. First, it appeared that the Denver population is sufficiently knowledgeable about and predisposed toward solar so that many of the expected attitude - change effects resulting from the demonstration did not materialize. The effects that did materialize had to do generally with reducing concern about aesthetics and the ability of builders to successfully build passive solar designs. In addition, the program had the apparent effect of influencing those who saw the demonstration (even those recruited) to search for more information.

In terms of purchase likelihood, the program apparently reduced the cost-sensitivity of those who saw the design versus those who did not. This may be an important effect and should be followed up in further work.

As outlined at the end of the previous section, the analysis also points to some clear actions with respect to lending institutions, and realtors as well as communications programs that would be most effective in accelerating diffusion.

In order to evaluate properly the cost/benefit of the program, however, it will be necessary to follow-up with those respondents to see how many were "converted" due to exposure to the site. A telephone call-back survey could gather the data to perform this analysis.

With regard to implications for diffusion theory more generally, several

caveats are in order. First, the sampling process was not random -- the House and Garden Show selected people (Groups 2 and 3) may be inherently different than Group 1 and Group 4. The effects read here could then we spurious. In addition, the samples were rather small and it would be a mistake to interpret the results too broadly. With these limitations in mind, a main hypothesis/conclusion appears to be that demonstrations of a viable technology (communicability) has the potential to lower the required relative economic advantage (cost sensitivity in this case) required for a given rate of diffusion. This apparent interaction between these two factors associated with the rate of diffusion suggests the need for further exploration to understand its potential importance in the diffusion process. This study underscores the importance of reducing apparent complexity, mostly in terms of financial understanding here for diffusion acceleration. And, finally, the analysis also supports the notion of compatibility. As the Denver population (clearly more favorably predisposed to solar in general than the Kansas City population), provides a receptive environment for diffusion of passive solar.

In conclusion, this study shows that many of the effects of a market demonstration program may be subtle and unsuspected and that careful measurement and analysis of the potential range of influences in awareness, liking, preference as well as purchase behavior is needed to understand the impact of the program. A demonstration program has the potential to affect diffusion rates; more studies of this nature are required to understand better the ways in which those effects can be realized and when such programs are most beneficial.

Exhibit 1: Structure of Study

Group	Area	Size	Setting	Data Collection Forms	
				Pre	Post
I	Denver	75	Self-Selected; Saw Demo.	Personal	Personal
II	Denver	55	Recruited/Incentive; Saw Demo.	Personal	Personal
III	Denver	70	No Demo.	Phone	Mail
IV	Kansas City	45	No Demo.	Phone	Mail
	TOTAL	245			

Exhibit 2: Pre-Questionnaire Selected Questions
Mean (Standard Error)

		Group 1	Group 2	Group 3	Group 4
1.	Plan To Use Solar In Your New Home? (1=Yes; 2=No)	1.00 (-)	1.02 (.02)	1.04 (.02)	1.17 (.06)
2.	Seen Solar Panels? (1=Yes; 2=No)	1.13 (.04)	1.24 (.06)	1.03 (.02)	1.23 (.06)
3.	Know a Solar User: (1=Yes; 2=No)	1.54 (.06)	1.49 (.07)	1.31 (.05)	1.68 (.07)
4.	Sought Solar Information (1=Yes; 2=No)	1.22 (.05)	1.29 (.06)	1.20 (.05)	1.51 (.07)
5.	Aware of Gov't Incentives? (1=Yes; 2=No)	1.10 (.03)	1.12 (.05)	1.21 (.05)	1.27 (.07)
6.	Understand Financial Aspects of Passive? (5=Strongly Agree; 1=Strongly Disagree)	4.24 (.07)	4.17 (.12)	4.25 (.08)	3.73 (.13)
7.	Understand How Passive Solar Works? (5=Strongly Agree; 1=Strongly Disagree)	4.53 (.07)	4.59 (.08)	4.62 (.07)	3.93 (.12)
8.	Agree that Passive Provides Reliable/Dependeable Heating? (5=Strongly Agree; 1=Strongly Disagree)	4.72 (.06)	4.80 (.06)	4.63 (.06)	4.32 (.12)
9.	Agree that Passive Solar Makes Economic Sense? 5=Strongly Agree; 1=Strongly Disagree)	4.86 (.04)	4.33 (.06)	4.08 (.04)	4.46 (.13)
10.	Agree that Passive Solar will be Widely Used in Area in 5 Years? (5=Strongly Agree; 1=Strongly Disagree)	3.92 (.09)	3.83 (.13)	4.28 (.09)	2.83 (.13)

Exhibit 3: Sample Demographics

Age	
< 25	2%
25-34	48%
35-44	29%
45-54	14%
55 +	7%

Education	
< High School	1%
High School	17%
Some College	30%
College	32%
Graduate	20%

People in New Home	
1	4%
2	43%
3	19%
4	23%
5	8%
6+	3%

Family Income	
< $15	5%
$15-25	18%
$25-40	44%
Over $40K	33%

Sex	
M	79%
F	21%

Exhibit 4: Post Questionnaire Attitudes

5=Strongly Agree; 1=Strongly Disagree)	Group 1	Group 2	Group 3	Group 4
1. Understand Financial Aspects of Solar	4.21 (.09)	4.29 (.10)	4.10 (.10)	3.84 (.14)
2. Understand How Passive Solar Works	4.51 (.05)	4.46 (.06)	4.41 (.06)	4.34 (.07)
3. Agree that Passive Solar Provides Reliable/Dependable Healing?	4.79 (.03)	4.78 (.02)	4.60 (.03)	4.50 (.02)
4. Agree that Passive Solar Makes Economic Sense?	4.90 (.02)	4.82 (.02)	4.80 (.02)	4.51 (.03)
5. Agree that Passive Solar Will be widely Used in 5 years?	4.04 (.09)	3.84 (.11)	4.22 (.08)	3.50 (.07)
6. Agree Protects from Fuel Shortages?	4.55 (.03)	4.57 (.02)	4.22 (.06)	4.16 (.07)
7. Agree Increase Resale Value of Home?	4.63 (.04)	4.58 (.05)	4.42 (.06)	4.28 (.10)
8. Passive Energy System Failure Would Mean Financial Hardship	3.00 (.13)	2.99 (.11)	2.94 .12)	3.14 (.18)
9. Agree Makes Home Less Attractive?	1.66 (.00)	1.64 (.10)	2.00 (.10)	2.10 (.10)
0. Easy to Include Cost of Solar in Mortgage?	3.83 (.10)	4.02 (.15)	3.81 (.10)	3.53 (.16)
1. Initial Cost is Key Importance?	2.08 (.09)	2.00 (.08)	2.23 (.11)	2.49 (.13)
2. If Savings is Low than Family Would see Economic Hardship?	2.51 (.09)	2.55 (.15)	2.51 (.10)	2.58 (.16)
3. Solar Protects From Rising Energy Costs?	4.28 (.09)	4.18 (.13)	4.04 (.11)	3.63 (.17)
4. Vote for Zoning Ban on Passive Solar?	1.19 (.06)	1.11 (.04)	1.17 (.07)	1.44 (.10)
5. Builders Can't Build Passive Solar Homes?	3.00 (.14)	2.73 (.18)	3.23 (.13)	3.41 (.16)
6. Passive Solar Needs More Maintenance?	2.39 (.13)	2.01 (.14)	2.27 (.12)	2.41 (.16)

Exhibit 4 (Cont.)

17.	Would Admire a Neighbor who Built a Passive Solar Home?	4.38 (.09)	4.44 (.08)	4.06 (.13)	3.95 (.14)
18.	There will be Cheaper Ways to Heat Homes than Solar in a Few Years	1.52 (.09)	1.43 (.00)	1.60 (.00)	1.95 (.00)
19.	Expected Savings more Important than Initial Cost	3.90 (.11)	3.96 (.12)	3.68 (.10)	3.47 (.15)
20.	Heat is Too Small to Worry About	1.47 (.07)	1.35 (.07)	1.44 (.06)	1.80 (.11)
21.	Passive Solar Mulfunction Might be Dangerous	1.76 (.10)	1.75 (.12)	1.70 (.09)	2.07 (.13)
22.	Likelihood of Looking for More Importance (4=Very Likely; 1= Very Unlikely)	3.89 (.04)	3.87 (.04)	3.55 (.10)	3.17 (.15)
23.	Likelihood of Visiting Passive Site in Town (4=Very Likely; 1-Very Unlikely)	*	*	3.68 (.08)	3.54 (.12)
24.	Likelihood of Visiting Passive Site 30 Minutes Away (4=Very Likely; 1=Very Unlikely)	*	*	3.54 (.09)	3.38 (.14)
25.	Overall Likelihood of Installing Solar (6=Definitely Will; 1=Definitely Won't)	5.64 (.08)	5.52 (.11)	5.58 (.08)	4.84 (.19)
26.	If Passive Increases Resale Value, I'd be _____ to install one (4=Amost Certain; 1=No More Likely)	3.64 (.06)	3.58 (.10)	3.50 (.09)	3.27 (.09)
27.	If it were Easy to Include Passive Solar in the Mortgage, I'd be _____ to Install (4=Almost Certain; 1= No More Likely)	3.58 (.09)	3.58 (.09)	3.47 (.10)	3.09 (.11)

* = Not Applicable

Exhibit 5: Pre-Post Attitude Differences

Item	Group	Pre-Exposure Attitude	Post Exposure Attitude
1. Understand Financial Aspects of Passive Solar	1	4.72	4.79
	2	4.80	4.78
	3	4.63	4.60
	4	4.32	4.50 *
2. Understand How Passive Solar Works	1	4.86	4.90
	2	4.83	4.82
	3	4.88	4.80
	4	4.46	4.52
3. Agree that Passive Solar Provides Reliable/Dependable Heating	1	3.92	4.04
	2	3.83	3.84
	3	4.28	4.22
	4	2.83	3.50 ***
4. Agree that Passive Solar Makes Economic Sense	1	4.24	4.21
	2	4.17	4.29
	3	4.25	4.09
	4	3.73	3.84
5. Agree that Passive Solar Will be Widely Used in the Area in the Next 5 Years	1	4.53	4.51
	2	4.59	4.46
	3	4.62	4.40 **
	4	3.93	4.34 ***

* Difference significant at 10% Level
** Difference significant at 5% Level
*** Difference significant at 1% Level

Exhibit 6: Stated Probability of Purchasing Passive Solar at Different Levels of Cost/Savings

	Cost 10% Sav 1/3	Cost 5% Sav 1/3	Cost 10% Sav 2/3	Cost 5% Sav 2/3
Group 1	79.7	84.7	87.9	91.1
Group 2	76.2	84.5	88.4	93.4
Group 3	71.9	79.9	85.0	91.4
Group 4	64.7	78.0	78.7	86.7

Exhibit 7: Probability of Purchase Model

Y: Dependent Variable: log (p/(1-p))

	Independent Variable	Coefficient	t-Stat
X1:	Group 1 Intercept	2.37	3.73
X2:	Group 2 Intercept	2.47	2.63
X3:	Group 3 Intercept	4.95	5.46
X4:	Group 4 Intercept	-3.66	-5.28
X5:	Group 1, 2 Cost	-1.3×10^{-4}	-2.81
X6:	Group 3, 4 Cost	-2.2×10^{-4}	-4.23
X7:	Group 1, 3, 4 Savings	.023	5.73
X8:	Group 1 Income	- .052	-4.56
X9:	Financial Understanding	.317	3.33
X10:	Ease of Inclusion in Mortgage 1	.389	4.74
X11:	Ease of Inclusion in Mortgage 2	.370	3.54
X12:	Protection Against Energy Cost Increases	.361	4.61
X13:	Increase in Resale Value of Home	.205	2.70

R^2 = .24
C.V. 75.3
Mean Y: 2.50
Std. Dev. 1.88
F(735,12): 18.68
N: 747

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MARKET FACTS, INC., 100 SOUTH WACKER DRIVE, CHICAGO, IL 60606
JOB NO. 6447

DENVER METRO PASSIVE SOLAR HOME STUDY

GLOSSARY

1. Passive Solar Energy: A passive solar energy system uses the structure of a building itself to collect, store and circulate heat from the sun. Very little, if any, mechanical assistance is needed. The structure of the home must fit the specific site and climatic conditions to obtain the best results. Different solar energy features can be included in an otherwise conventional home to decrease the amount of energy used for heating ahd cooling that home.

2. Direct Gain: is the simplest passive feature. A large area of glass is included on the south-facing side of the home. Usually double or triple glazed glass (glass that is two or three panes thick) is used, and less glass than usual is included on the other three sides of the homes. Heat from the sun warms the room (s) directly. The floor plan must place main living areas in direct contact with the south-facing windows. During the winter months, the sun is low in the sky. This increases the amount of sunlight and therefore, the heat that enters the house. During the summer months, the sun is high in the sky. This decreases the amount of sunlight and, heat that enters the house. (See Illustration 1)

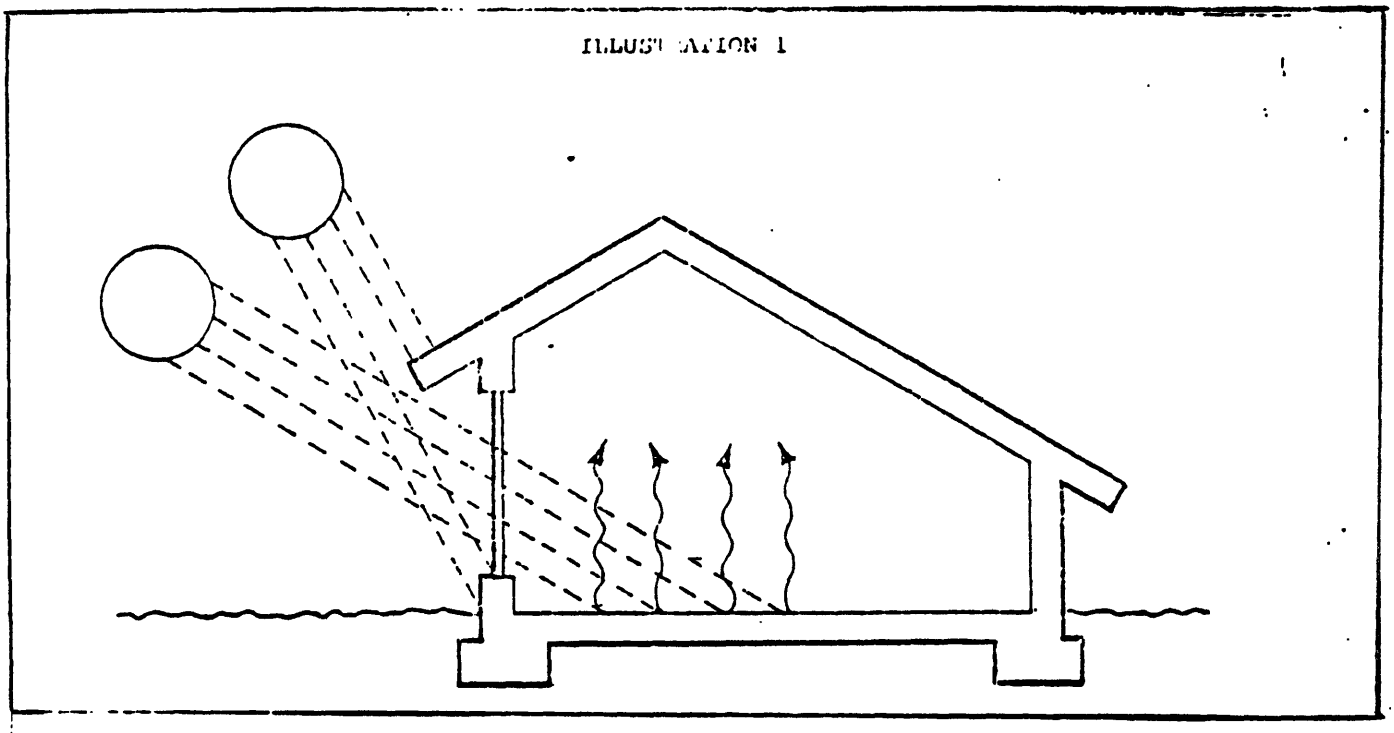
3. Trombe Wall: A Trombe wall is a wall that absorbs and stores heat from the sun. A Trombe wall is placed behind large south-facing glazed windows, through which sunlight enters, and absorbs and stores the sun's heat. This wall, which can be painted black to increase its absorption capacity, may consist of water in containers or heavy masonry. A Trombe wall may be made of concrete, adobe, stone or composites of brick, block and sand (See Illustration 2)

4. Solarium: A solarium is a glass-enclosed room or porch exposed to sun's rays. (AN INTERNAL GREENHOUSE)

5. Greenhouse (SUNSPACE): A greenhouse is an addition to a house that collects the sun's heat through large amounts of south-facing glass and stores the heat in a storage wall, floors, benches or other material objects. The heat enters other portions of the house through windows or vents in the storage wall. (See Illustration 3

6. Active Solar Energy: A solar energy system that uses electrical/ mechanical energy to effect thermal transfer.

DIRECT GAIN



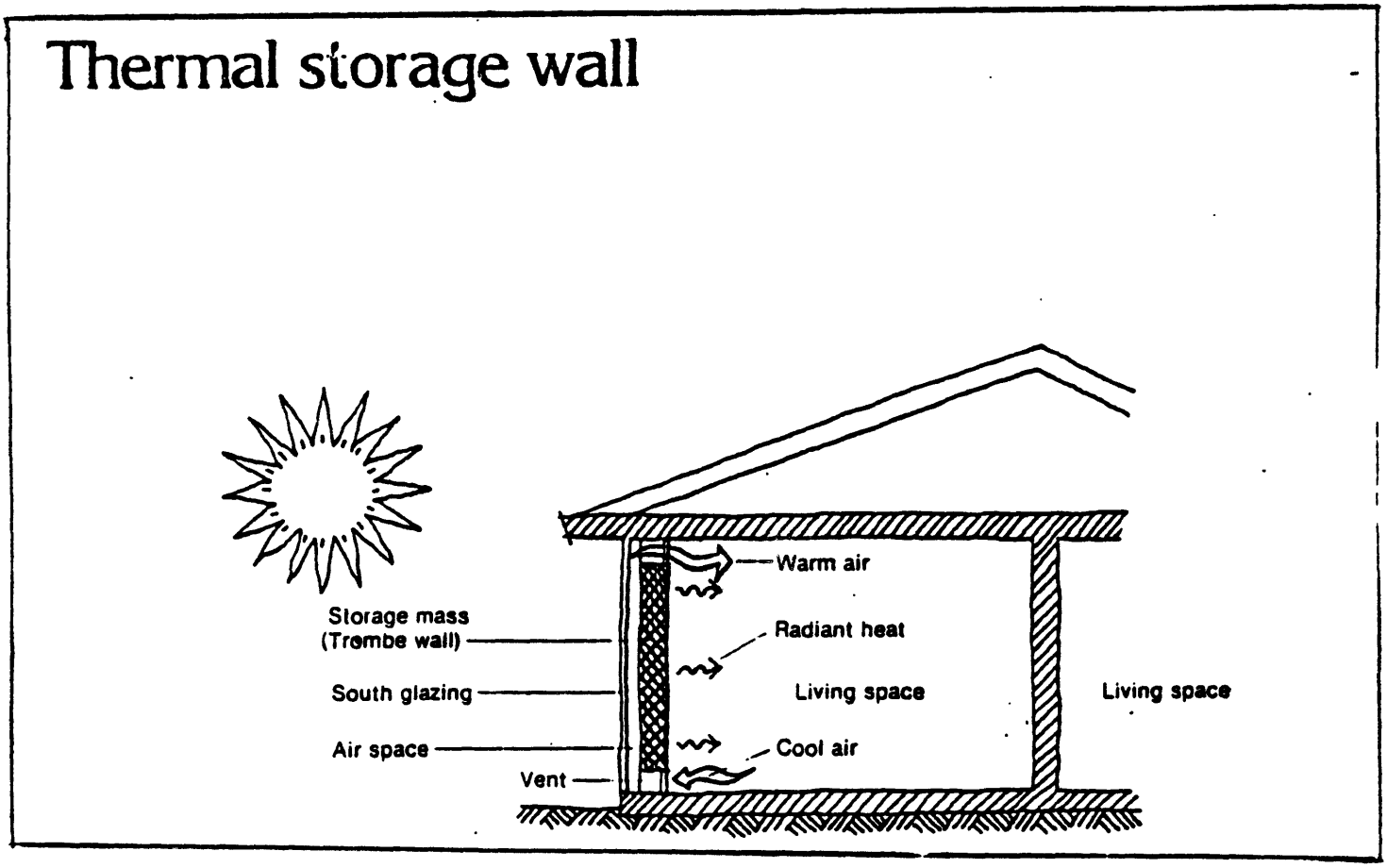


Illustration 2

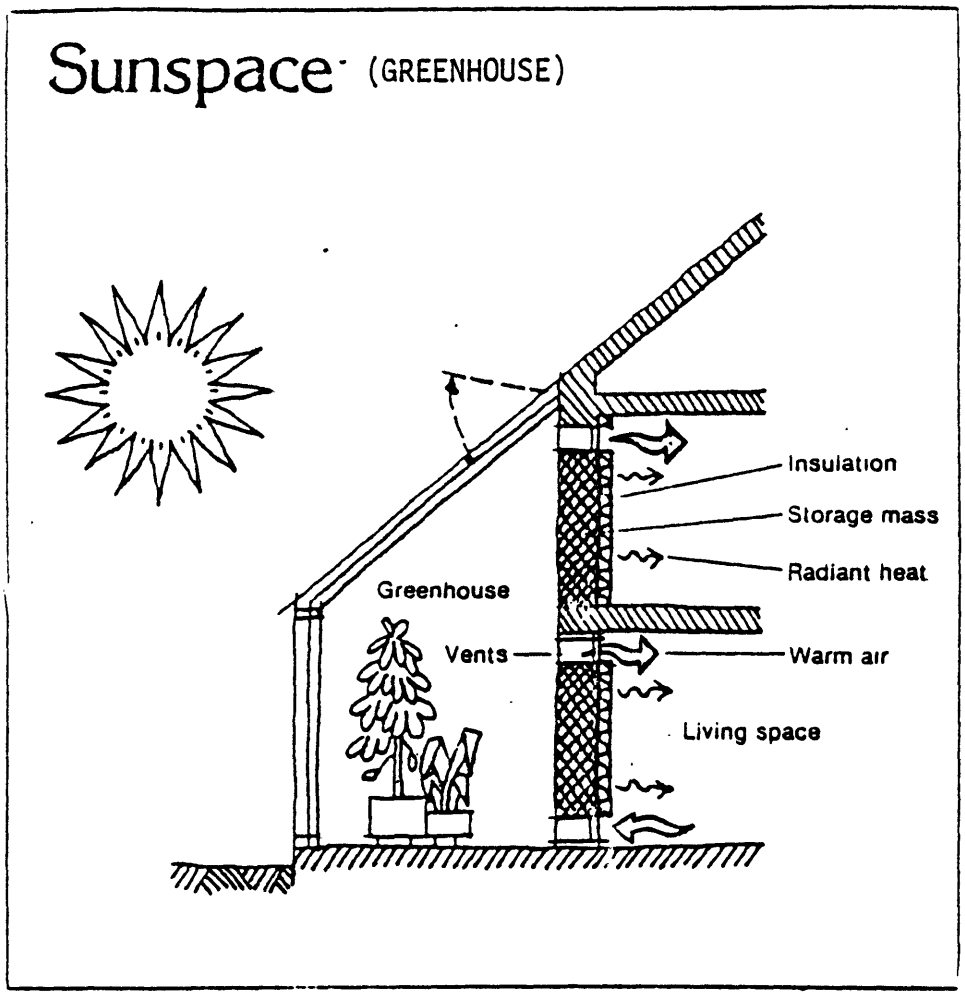


Illustration 3

APPENDIX 2: PASSIVE SOLAR QUESTIONNAIRE

2A: SCREENER

MARKET FACTS, INC., 100 SOUTH WACKER DRIVE, CHICAGO, IL 60606 JOB NO. 6447

Group 1 Qu. No. _____

DENVER METRO PASSIVE SOLAR HOME STUDY
- SCREENER -

INTERVIEWER: _____

FIELD SERVICE NAME: _____

DATE: _____ TIME INT. BEGAN: _____AM/PM TIME ENDED: _____AM/PM

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIPCODE: _____

TELEPHONE NO. (_____) _____
AREA CODE

Hello, I'm _____ from Market Facts, Incorporated, a national opinion research company in Chicago. We are doing a study about solar energy.

1a. Do you currently own a home?

Yes... 1 No.... 2

1b. Within the next 2 years are you thinking about buying or building a single family home? This home could be a duplex or townhouse as well as a house that is not attached to another house.

Yes... 1 No.... 2 → (THANK RESPONDENT AND END INTERVIEW)

2. When are you thinking about buying or building this home? (DO NOT READ RESPONSES)

Less than 12 months.... 1
1 to 1-1/2 years..... 2
1-1/2 to 2 years..... 3

3. Are you more likely to buy a newly constructed house or a house that has had a previous occupant?

New construction... 1 Previously occupied... 2 → (THANK RESPONDENT AND END INTERVIEW)
Unsure, both are equally likely..... 3 → (THANK RESPONDENT AND END INTERVIEW)

4. What is the price range of the home you are thinking about buying or building?

Under $55,000..... 1
$55,000 to less than $65,000..... 2
$65,000 to less than $75,000..... 3
$75,000 to less than $100,000..... 4
$100,000 to less than $125,000.... 5
$125,000 or more..... 6

5. May I please have your age as of your last birthday?

22 years or older... 1 Under 22 years.. 2 → (THANK RESPONDENT AND END INTERVIEW)

6. Based on the information you have just given me, I would like your help in a study about passive solar energy systems. I've been asked to find out about how people plan to use passive solar energy systems in new homes and their concerns about energy costs.

Let me tell you how the survey works. First, I'll ask you a few more questions. That will take about ten minutes.

After viewing this house, would you please take a few minutes to complete this questionnaire and return it to me before you leave. For your help with this questionnaire you will be given $5.00 as a token of my appreciation. Would you like to take part in our survey?

Accepted... 1 Refused... 2 → (THANK RESPONDENT AND END INTERVIEW)

(IF ACCEPTED TO PARTICIPATE, SAY:)

May I please have your name, address and phone number? My supervisor may wish to verify that I conducted this interview. (RECORD ON FRONT.)

(QUESTIONS 7-9 NOT USED IN THIS VERSION)

(RECORD TIME ENDED ON FRONT PAGE AND GO TO GROUP I QUESTIONNAIRE)

(CIRCLE GROUP IN QUOTA BOX)

APPENDIX 2B: PRE-EXPOSURE QUESTIONNAIRE

MARKET FACTS, INC., 100 SOUTH WACKER DRIVE, CHICAGO, IL 60606 JOB NO. 6447

Qu. No. (1-4)

HOUSE SEEN
ALPERT 1
U.S. HOMES 2
UNIQUE 3
KUROWSKI 4

(5)

Quota
Group I 1
Group II 2

(6)

DENVER METRO PASSIVE SOLAR HOME STUDY
-- QUESTIONNAIRE - GROUP I AND II --

INTERVIEWER: _____

FIELD SERVICE NAME: _____

DATE: _____ TIME BEGAN: _____ AM/PM TIME ENDED: _____ AM/PM

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIPCODE: _____

TELEPHONE NO. (_____) _____
AREA CODE

Now, Mr./Ms. _____ I'd like to ask you some questions on solar energy.

10a. Are you planning to use any kind of solar energy system in the home that you will build or buy?

Yes... 1 No ..... 2 → (GO TO QU. 11)
Don't Know.. 8 → (GO TO QU. 11)

(7)

10b. For what purpose will you use this solar energy system? (READ LIST)

Water heating..... 1 → (GO TO QU. 12)
Space heating..... 2
Both water and space heating.... 3
Other (SPECIFY)_____

_____

(8)

9 ☐

10c. Will you have an active or a passive solar energy system?

Active..... 1
Passive..... 2
Both..... 3
Don't know.. 8

(10)

/

11. Other than in a picture, have you ever seen a home equipped with solar collectors or solar panels?

Yes... 1 No.... 2 Don't know... 8 (11)

12. Do you know anyone who is <u>now</u> using solar energy for home or water heating?

Yes... 1 No.... 2 Don't know... 8 (12)

13. Have you actually gone looking for information about solar home or water heating from a solar equipment manufacturer or dealer, a builder or an architect or some place else?

Yes... 1 No.... 2 (13)

LOOK AT QU. 10b, IF "1" CIRCLED OR "OTHER", GO TO QU. 15.

14a. About what percentage of your total heating needs do you expect will be supplied by your solar heating system(s)?

(WRITE IN:) _____% (14-16)

LOOK AT QU. 10c:

IF "3" CIRCLED, ASK QU. 14b
IF "1" CIRCLED, GO TO QU. 15
IF "2" CIRCLED, GO TO QU. 16
IF "8", "DON'T KNOW" CIRCLED, GO TO QU.15

14b. And about what percentage of your total heating needs do you expect will be supplied by only the passive portion of your solar heating system?

(WRITE IN:) _____% (THIS NUMBER MUST BE SMALLER THAN NUMBER GIVEN IN QU. 14a) (17-19)

SKIP TO QU. 16

15. Now, I'd like to ask you a few questions about a particular kind of solar energy. It's called passive solar. Passive solar involves the planned use of building materials and designs to increase the use of the sun's energy in meeting some or all of the heating needs of the home.

Prior to this survey, had you ever seen or heard anything about the use of passive solar energy? (20)

Yes... 1 No.... 2 → (GO TO STATEMENT BEFORE QU. 22 PAGE 3)

16. Have you heard of any kinds of government-sponsored financial incentives to homeowners who include passive solar building designs in their homes?

Yes... 1 No.... 2 Don't know... 8 (21)

17. Would you agree or disagree with the statement, "I understand the financial aspects of passive solar energy designs." (PROBE:) Would that be strongly (agree/disagree)or moderately (agree/disagree)?

Strongly agree..... 1
Moderately agree..... 2
Moderately disagree..... 3 (22)
Strongly disagree..... 4
Unsure, don't know..... 8

18. And would you agree or disagree with the statement, "I understand how passive solar energy designs work." (PROBE:) Would that be strongly (agree/disagree) or moderately (agree/disagree)?

Strongly agree..... 1
Moderately agree..... 2
Moderately disagree..... 3 (23)
Strongly disagree..... 4
Unsure, don't know..... 8

19. Do you believe that passive solar energy heating would or would not be reliable and dependable for home use? (PROBE AND RECORD BELOW:) Is that definitely (would/would not) or probably (would/would not)?

Definitely would..... 1
Probably would..... 2
Probably would not..... 3 (24)
Definitely would not..... 4
Unsure, don't know..... 8

20. Do you believe that passive solar energy heating would or would not make economic sense for home use? (PROBE AND RECORD BELOW:) Is that definitely (would/would not) or probably (would/would not)?

Definitely would..... 1
Probably would..... 2
Probably would not..... 3 (25)
Definitely would not..... 4
Unsure, don't know..... 8

21. Do you believe that passive solar energy designs will or will not be widely used by homeowners in your area within the next five years? (PROBE AND RECORD BELOW:) Is that definitely (will/will not) or probably (will/will not)?

Definitely will..... 1
Probably will..... 2
Probably will not..... 3 (26)
Definitely will not..... 4
Unsure, don't know..... 8

I would like to ask just a few more questions to be sure we are getting a cross section of opinions.

22. Into which of these age groups do you fall? (SHOW CARD #1)

Under 25..... 1
25 - 34..... 2
35 - 44..... 3 (27)
45 - 54..... 4
Over 55..... 5
Refused..... 9

23. What was the last grade of school you completed?

Completed grade school or less (8 years or less)..... 1
Some high school, not completed (9-11 years)..... 2
Completed high school (12 years)..... 3 (28-29)
Some college, not completed (13-15 years)..... 4
Completed college (16 years)..... 5
Post graduate work started or completed (17 years or more) 6
(DON'T READ) Refused..... -9
Other (SPECIFY) _____

24. Including yourself, how many people will live in your new home?

_____ Number of people (30-31)

25. How many are: (READ AND RECORD BELOW)

a. Adults 18 years or older..... _____ (32-33)

b. Children, under 18 years old... _____ (34-35)

26. Which of the following categories best describes the people living in your household at the present time? Please include yourself and any children. (READ AND RECORD ONLY ONE ANSWER BELOW.)

There are children living at home with the youngest under age 6..... 1
There are children living at home with the youngest age 6 to 12..... 2 (36)
There are children living at home with the youngest age 13 to 18.... 3
There are no children living at home under the age of 19..... 4

27. How many members of your household, including yourself, work outside the home for 30 hours or more per week?

_____ Members (37-38)

28. Finally, it would help us a great deal to group peoples answers if we could get some idea about your income level. Was your total household income in 1980, from all sources, under or over $25,000?

Exactly $25,000..... 1 → (GO TO QU. 29)

Under $25,000 ☐ → Was it under or over $15,000?

Under $15,000..... 2
Over $15,000..... 3 → (GO TO QU. 29)
Exactly $15,000..... 4

(39)

Over $25,000 ☐ → Was it under or over $40,000?

Under $40,000..... 5
Over $40,000..... 6
Exactly $40,000..... 7

(DON'T READ:) DON'T KNOW..... 8
REFUSED..... 9

29. (RECORD SEX:) Male..... 1 Female..... 2 (40)

30. (HAND RESPONDENT SELF-ADMINISTERED QUESTIONNAIRE AND SAY) After viewing this house, please take a few minutes to complete this questionnaire and return it to me before you leave.

MARKET FACTS, INC., 100 SOUTH WACKER DRIVE, CHICAGO, IL 60606

JOB NO. 6447
Group I, II

NAME: _____
(PLEASE WRITE IN)

Today we would like your help in a study about solar energy. We have been asked to find out about how people plan to use passive solar energy in new homes, or homes which will be built, and their concerns about energy costs.

Please read each question and the instructions carefully; then place an "X" in the appropriate box(es) next to your response. When you are finished, please return your questionnaire to the interviewer.

Thank you so much for helping with this important study.

31. Have you seriously considered a solar powered or wood system for meeting your new home's heating needs?

Yes... ☐ 1 No.... ☐ 2 (41)

32a. Based on what you know about energy costs and the heating system you plan to install, approximately how much do you expect your fuel bill to be for an average winter month next year? (PLEASE PROVIDE YOUR BEST ESTIMATE IN DOLLARS)

$_____ per month (42-45)
(WRITE IN DOLLAR AMOUNT)

32b. How much do you think you will have to pay per winter month five years from now, that is, in 1986? (PLEASE PROVIDE YOUR BEST ESTIMATE IN DOLLARS)

$_____ per month (46-49)
(WRITE IN DOLLAR AMOUNT)

33a. Assume for a moment that you find a passive solar design, or a home already designed with passive solar heating, that is attractive, and accommodates the needs of your family. You learn that the house, because of the passive solar design costs 10% more or $8,000 more than a conventional home selling for $80,000. You also learn that the passive solar design will cut your expected heating bill by one third. How likely would you be to build or buy this home? (PLEASE "X" ONE BOX ONLY.)

Certain, practically certain (99 in 100)..... ☐ 1
Almost sure (9 in 10)..... ☐ 2
Very probable (8 in 10)..... ☐ 3
Probable (7 in 10)..... ☐ 4
Good possibility (6 in 10)..... ☐ 5 (50-51)
Fairly good possibility (5 in 10)..... ☐ 6
Fair possibility (4 in 10)..... ☐ 7
Some possibility (3 in 10)..... ☐ 8
Slight possibility (2 in 10)..... ☐ 9
Very slight possibility (1 in 10)..... ☐ -1
No chance, almost no chance (0 in 10)..... ☐ -2

33b. What if the additional cost were 5% or $4,000 more on a conventional $80,000 home and that your expected heating bill would still be cut by one third? How likely would you be to build or buy tnis home? (PLEASE "X" ONE BOX ONLY.)

Certain, practically certain (99 in 100).....	☐ 1	
Almost sure (9 in 10).....	☐ 2	
Very probable (8 in 10).....	☐ 3	
Probable (7 in 10).....	☐ 4	
Good possibility (6 in 10).....	☐ 5	(52-53)
Fairly good possibility (5 in 10).....	☐ 6	
Fair possibility (4 in 10).....	☐ 7	
Some possibility (3 in 10).....	☐ 8	
Slight possibility (2 in 10).....	☐ 9	
Very slight possibility (1 in 10).....	☐ -1	
No chance, almost no chance (0 in 10).....	☐ -2	

33c. What if the additional cost were 10% or $8,000 more on a conventional $80,000 home but this time the passive solar heating system would cut your expected heating bill by two-thirds? How likely would you be to build or buy this home? (PLEASE "X" ONE BOX ONLY.)

Certain, practically certain (99 in 100).....	☐ 1	
Almost sure (9 in 10).....	☐ 2	
Very probable (8 in 10).....	☐ 3	
Probable (7 in 10).....	☐ 4	
Good possibility (6 in 10).....	☐ 5	(54-55)
Fairly good possibility (5 in 10).....	☐ 6	
Fair possibility (4 in 10).....	☐ 7	
Some possibility (3 in 10).....	☐ 8	
Slight possibility (2 in 10).....	☐ 9	
Very slight possibility (1 in 10).....	☐ -1	
No chance, almost no chance (0 in 10).....	☐ -2	

33d. What if the additional cost were 5% or $4,000 more on a conventional $80,000 home again your expected heating bill would be cut by two-thirds. How likely would you be to build or buy this home? (PLEASE "X" ONE BOX ONLY.)

Certain, practically certain (99 in 100)..... ☐ 1
Almost sure (9 in 10)..... ☐ 2
Very probable (8 in 10)..... ☐ 3
Probable (7 in 10)..... ☐ 4
Good possibility (6 in 10)..... ☐ 5 (56-57)
Fairly good possibility (5 in 10)..... ☐ 6
Fair possibility (4 in 10)..... ☐ 7
Some possibility (3 in 10)..... ☐ 8
Slight possibility (2 in 10)..... ☐ 9
Very slight possibility (1 in 10)..... ☐ -1
No chance, almost no chance (0 in 10)..... ☐ -2

34. Do you believe that passive solar energy heating would or would not be reliable and dependable for home use? (PLEASE "X" ONE BOX ONLY.)

Definitely would..... ☐ 1
Probably would..... ☐ 2
Unsure..... ☐ 3 (58)
Probably would not..... ☐ 4
Definitely would not.... ☐ 5
Don't know..... ☐ 8

35. Do you believe that passive solar energy heating would or would not make economic sense for home use? (PLEASE "X" ONE BOX ONLY.)

Definitely would..... ☐ 1
Probably would..... ☐ 2
Unsure..... ☐ 3
Probably would not..... ☐ 4 (59)
Definitely would not.... ☐ 5
Don't know..... ☐ 8

36. Do you believe that passive solar energy designs will or will not be widely used by homeowners in your area within the next five years? (PLEASE "X" ONE BOX ONLY.)

Definitely will..... ☐ 1
Probably will..... ☐ 2
Unsure..... ☐ 3 (60)
Probably will not..... ☐ 4
Definitely will not..... ☐ 5
Don't know..... ☐ 8

37. Please tell me how strongly you agree or disagree with each of the following statements about passive solar energy designs. For each statement, a-r, please "X" the box that best describes to what extent you agree or disagree with the statement.

Statements	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Don't Know	
a. I understand the financial aspects of passive solar energy designs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(61)
b. I understand how passive solar energy designs work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(62)
c. A passive solar home can provide protection from future energy shortages	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(63)
d. A passive solar energy design will increase the resale value of my home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(64)
e. If a passive solar design that I had installed failed and needed major repairs or replacement, it would mean a financial hardship for my family.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(65)
f. Passive solar design would make my home less attractive	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(66)
g. It is very easy to include the extra cost of a passive solar energy design in the mortgage	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(67)
h. To me, initial cost is much more important than expected savings in deciding whether to design my home with passive solar features	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(68)
i. If a passive design that I have installed gave less savings than I had expected, it would mean a financial hardship for my family	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(69)
j. A passive solar home will protect me from increasing energy costs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(70)
k. I would vote for zoning restrictions to ban passive solar homes from my neighborhood	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(71)
l. Builders don't really know how to construct a passive solar home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(72)
m. A passive solar home will need more attention and maintenance than a conventional home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(73)
n I would admire a neighbor who built a passive solar home	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(74)
o. I'm not interested in passive solar designs because in a few years there will be other, cheaper ways to heat my house	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(75)
p. To me, expected savings is much more important than initial cost in deciding whether to design my home with passive solar system features	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(76)
q. Heat is too small a part of my total energy usage for me to consider a passive solar energy design	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(77)
r. A passive solar energy design that malfunctioned might damage my home, or cause danger to my family	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 8	(78)

38. How likely are you to look for more information about passive solar energy designs within the next few months? ("X" ONE BOX ONLY.)

Very likely..... ☐ 1
Somewhat likely..... ☐ 2
Somewhat unlikely... ☐ 3
Very unlikely..... ☐ 4
Unsure, don't know.. ☐ 8

79 [0] [1] 80
Card 2
Dup 1-6

(7)

(8-9 open)

39. How likely are you to design your home to incorporate passive solar building design, or to look for a home that already incorporates passive design?

Definitely will..... ☐ 1
Very likely..... ☐ 2
Somewhat likely..... ☐ 3
Somewhat unlikely..... ☐ 4 (10)
Very unlikely..... ☐ 5
Definitely will not.... ☐ 6
Unsure, don't know..... ☐ 8

40. Please read each of the following statements. Then place an "X" in the box that shows how much more likely you would be to design your home or purchase a home with passive solar heating under the conditions of each statement.

Statements	Almost Certain	Much More Likely	A Little More Likely	No More Likely	
a. If a passive solar energy design would protect me from future energy shortages, I'd be _____ to install one.....	☐ 1	☐ 2	☐ 3	☐ 4	(11)
b. If a passive solar energy design would increase the resale value of my home, I'd be _____ to install one..	☐ 1	☐ 2	☐ 3	☐ 4	(12)
c. If it were easy to include the cost of the passive solar energy design in the mortgage, I'd be _____ to install one.....	☐ 1	☐ 2	☐ 3	☐ 4	(13)
d. If a passive solar energy design would protect me from increasing energy costs, I'd be _____ to install one..	☐ 1	☐ 2	☐ 3	☐ 4	(14)
e. If passive solar energy designs had a proven record, I'd be _____ to install one.....	☐ 1	☐ 2	☐ 3	☐ 4	(15)

41. Note that the scale changes for the next few statements. Please place an "X" in the box that shows how much less likely you would be to design your home or purchase a home with a passive solar heating under the conditions of the statement.

Statements	Almost Certain Not To	Much Less Likely To	A Little Likely To	No Less Likely To	
a. If a passive solar energy system would make my home less attractive, I'd be _____ install one	☐ 1	☐ 2	☐ 3	☐ 4	(16)
b. If my builder were inexperienced in building passive solar homes, I'd be _____ install one	☐ 1	☐ 2	☐ 3	☐ 4	(17)
c. If a passive solar energy design needed lost of attention and maintenance, I'd be _____ install one.....	☐ 1	☐ 2	☐ 3	☐ 4	(18)
d. If other, cheaper ways to heat homes were likely to become available in a few years, I'd be _____ to install a passive solar energy heating design	☐ 1	☐ 2	☐ 3	☐ 4	(19)

42. If you were to include, at extra cost, a passive solar design in your new home, how would you be most likely to pay for this extra cost?

Personal savings..... ☐ 1
Included in mortgage..... ☐ 2
Second mortgage..... ☐ 3 (20)
Separate bank or credit union loan.... ☐ 4
Other (PLEASE WRITE IN) _____
_____

21 ☐

43. Approximately how much does a gallon of unleaded, regular gasoline cost in your area?

$1.20 or less..... ☐ 1
$1.25 to $1.29..... ☐ 2
$1.30 to $1.34..... ☐ 3 (22)
$1.35 to $1.39..... ☐ 4
$1.40 to $1.44..... ☐ 5
$1.45 or more..... ☐ 6

44. How much do you think a gallon of unleaded, regular gasoline will cost five years from now, that is, in 1986? (PLEASE PROVIDE YOUR BEST ESTIMATE IN DOLLARS AND CENTS)

$____.___/gallon (23-26)
(WRITE IN DOLLARS AND CENTS)

45. Which of the following products have you bought for your own or your family's use?

Microwave oven..... ☐ 1
Home table-top computer..... ☐ 2
Videotape player/recorder..... ☐ 3
Food processor..... ☐ 4
Waterbed..... ☐ 5 (27)
Quartz room heater..... ☐ 6
Digital watch..... ☐ 7
Whirlpool bath, spa or hot tub.... ☐ 8
None..... ☐ 9