

Chapter III

THE CONSUMER

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Chapter III

THE CONSUMER

Americans want to own their homes. Few social phenomena have been more influential in shaping present-day American society than this strong and widespread desire for a home — particularly for a detached single-family home— that has swept the country since World War 11. The result has been a profound impact on land use, transportation, community development, family life, and many other areas. Our present concern, however, is with the rapid growth in residential energy consumption that has accompanied the growth in household formation, population, and homeownership.

Energy use in the home accounts for approximately 20 percent of our total energy use, and of that amount, about 60 percent is used for heating and cooling. Residential energy use grew about twice as fast as the number of households between 1950 and 1970, reflecting the increase in use within each household. Household consumption of fossil fuels and electricity grew from 7 quadrillion Btu* in 1950 to 16 quadrillion Btu in 1974; with the number of households increasing from 43 million to 70 million, this represents an increase of 65 MMBtu per household between 1950 and 1974.

The relationships between homeowners and other housing decisionmakers such as lenders, builders, architects, manufacturers of building supplies, and contractors for heating and cooling equipment installation, are very complex. No single group determines the ultimate energy consumption in a home. It is clear, however, that consumers are in control of a significant portion of the decisions that affect consumption directly or indirectly. Homeowners pay the utility and fuel bills and adjust their consuming behavior when prices rise. They maintain the heating and cooling equipment in their homes. They control thermostat settings and window and door openings, and they choose appliances. They make— or fail to make— investments to improve the energy efficiency of their homes, through structural or equipment changes. In short, within the very real limits of finances, technical capabilities, and comfort, they control the operational aspects of home energy consumption.

In a less well-recognized area, home consumers affect residential energy use levels through their influence on the homebuilding industry. There is evidence that builders ignore consumer preferences at their peril, for attempted innovations that have run counter to

consumer tastes have generally failed to catch on and left builders with financial losses. Consumers appear to be conservative in their housing tastes, resisting radical changes in the design, comfort, or space of a home. The major trade associations and publications of the building industry spend considerable time and money surveying the attitudes and preferences of buyers, with the result that builders, too, are often conservative about major innovations that affect buyer perceptions. Efforts to lead, rather than follow, consumer tastes have not always succeeded. For example, the recent movement to build “no frills” housing in an attempt to bring families of modest means into the new home market is now considered a failure by the building industry. It appears that buyers would rather wait a year or two longer, if necessary, to buy the kind of house they really want—one with amenities such as a fireplace, a family room, a garage, and an extra bathroom.

In light of the rapid turnover of houses in the current-day real estate market, some of this buyer conservatism can be attributed to purchasers' concern with resale value. Homeownership represents the single largest financial investment made by most families, and its attendant risks can be minimized by investing in “safe” properties—those with the largest appeal. If the buyer decides to invest in extras, he

*One Btu is equivalent to 1 kW-per-second or 1 kilojoule.

wants to be sure that value will be easily acknowledged by potential future buyers.

This concern about resale values has implications for decisions about energy-conserving features. Until recently, homeowners would undoubtedly have been correct in deciding that extra insulation was not a feature likely to “turn on” later buyers. Now, however, with rising energy prices and occasional spot shortages of some fuels, prospective buyers have begun to demand information about utility costs, and to insist on more efficient houses.

It is important to bear in mind, however, that energy is only one of several items about which consumers are concerned. Efforts to conserve energy through design or construction methods often conflict with other values—for example, the desire to take advantage of a fine view by installing large amounts of north-facing glass. In determining which energy-conserving technologies will be attractive to consumers, builders and policy makers need to keep these conflicting values in mind.

Just as important as consumer attitudes toward housing are their attitudes toward the energy problem generally, and toward its causes, effects, and remedies as these relate to their own lives. Social scientists have carried out considerable research on consumer attitudes and behavior.

Many studies have been collected and analyzed by Sally Cook Lopreato and her colleagues at the University of Texas Center for Energy Studies.¹ Several of these studies indicate that many consumers have serious doubts about the severity of our energy problem, and are more concerned about issues like inflation, crime, and unemployment. Most people do not share the official views of either Government or business regarding the causes of the problem. In fact, it appears that most consumers

¹Compilations and analyses by Lopreato et al. are found in Sally Cook Lopreato and Marian Wossum Meriwether, “Energy Attitudinal Surveys: Summary, Annotations, Research Recommendations” (unpublished: 1976), and in William H. Cunningham and Sally Cook Lopreato, *Energy Use and Conservation Incentives: A Study Of the Southwestern United States* (New York: Praeger Publishers, 1977).

mistrust both Government and industry—especially the oil industry—as sources of information about energy issues.

One major study by Jeffrey S. Milstein, of the Department of Energy’s (DOE) Office of Conservation and Solar Applications, indicates that although a majority of Americans in 1977 did not believe that fuel shortages were real, an even larger majority did believe it was important to conserve energy.² More than one-half of the respondents in Milstein’s national survey believed that fuel shortages were artificial, but 50 percent said the need to conserve energy was “very serious” and another 33 percent believed it was “somewhat serious.” Perhaps consumers find it important to conserve because of high energy costs rather than because energy shortages require it.

Unfortunately, most consumer studies reveal that even when the energy crisis is perceived and accepted as real, this attitude does not necessarily lead to conservation behavior. Marvin E. Olsen of the Battelle Human Affairs Research Center concluded from his surveys that “with only a few minor exceptions, all the research conducted thus far has found little or no relationship between belief in the reality or seriousness of the energy problem and any actual conserving behavior.”³ However, Olsen points out that consumers’ belief in the seriousness of energy problems may make them more accepting of Government policies requiring conservation.

A number of factors appear to contribute to consumer inaction: a lack of practical knowledge about what to do; a lack of sense of personal involvement in the problem, a “them first” approach to potential sacrifices, and a conflict with other personal goals such as comfort and convenience. Not surprisingly, when queried about their willingness to undertake specific conservation measures, consumers indicate their highest levels of support for the

²Jeffrey Milstein, “How Consumers Feel About Energy: Attitudes and Behavior During the Winter and Spring of 1976-1977” (unpublished: 1977).

³Marvin E. Olsen, “Public Acceptance of Energy Conservation,” in Seymour Warkov, *Energy Policy in the United States: Social and Behavioral Dimensions*, pp. 91-109.

easiest measures (like turning out lights), and lowest support for measures that call for major changes in lifestyles. Governmental and media-oriented public relations efforts, using catchy slogans such as "Don't Be Fuelish," appear to result in passive responses ("Something should be done . . .") rather than active ones ("I will do the following . . .").⁴

Studies also show that consumers often deceive themselves (and policy makers) about conservation steps they claim to be taking or be willing to take. For example, the Gallup Organization sampled households nationwide in February 1977 and found that the average temperature at which consumers said they set their home thermostats was 66° F during the day and 64° F at night. But pollsters for Gallup and for Louis Harris who actually measured temperatures of homes 1 month later found average temperatures were 70° F (plus or minus 20, during the day and 69° F (plus or minus 20, at night. Reflecting on this finding, Milstein concludes that the discrepancy "indicates a feeling on the part of people that they ought to have lower temperatures." He also notes that many thermostats may be miscalibrated.⁵

Many consumer studies indicate that the prospect of real cost savings is the most effective factor in moving people to conserve energy in their personal lives. Other motives, such as altruistic concerns about the Nation's future energy supply, independence from OPEC cartel manipulation, or the quality of the environment are less successful in generating conservation action.^b

W. B. Doner, Inc., determined in a study done for the Michigan Department of Commerce that among Michigan consumers the single most powerful motivator for conservation is represented by the statement that

"conserving energy saves money."⁷ The Gallup Organization, in conducting a series of group discussions on energy during 1976 for the Federal Energy Administration (FEA) (now part of DOE), found widespread agreement that monetary incentives are the critical conservation motivator.⁸ A Texas study reached the same conclusion after surveying about 800 households before and after the oil embargo.⁹

Adding insulation is the most widely documented conservation action taken by cost-conscious consumers. About 80 percent of U.S. households were found to be insulated to some extent in Milstein's 1977 survey— up from 70 percent in 1976 and 62 percent in 1975. A Gallup survey conducted in January 1978 found that 17 percent of those surveyed had added some attic or crawl-space insulation and 11 percent had added wall insulation in the previous 12 months; less than one-third of the Gallup respondents had failed to take action to improve the energy efficiency of their houses in 1977.¹⁰

Studies suggest a wide variety of reasons for some consumers' failure to take conservation actions, including: 1) lack of social pressure or reinforcement for conserving behavior; 2) disparity in effects of the energy problem, as well as in opportunities to conserve, among different income groups; 3) conflicts between conservation objectives and other goals such as comfort, convenience, and "fairness;" 4) distrust of information providers and disbelief that shortages are "real;" 5) lack of practical knowledge about how to conserve; 6) complacency caused by faith in a technical solution to future energy supply problems.

⁷W. B. Doner, Inc. and Market Opinion Research, "Consumer Study— Energy Crisis Attitudes and Awareness" (Lansing, Mich.: Michigan Department of Commerce, 1975), cited in Cunningham and Lopreato, op. cit., p. 130.

⁸Gallup Organization, Inc., "Group Discussions Regarding Consumer Energy Conservation" (Washington, D. C.: Federal Energy Administration, 1974), cited in Cunningham and Lopreato, pp. 131-132.

⁹David Gottlieb, *Social Dimensions of the Energy Crisis* (Austin, Tex.: State of Texas Governor's Energy Advisory Council, 1974), cited in Cunningham and Lopreato, pp. 134-135.

¹⁰Gallup Organization, Inc., "A Survey of Homeowners Concerning Home Insulation" (Washington, D. C.: U.S. Department of Energy, 1978).

^aKenneth Novic and Peter Sandman, "How Use of Mass Media Affects Views on Solutions to Environmental Problems," *Journalism Quarterly*, vol. 51, no. 3, pp. 448-452, cited in Cunningham and Lopreato, op. cit., p. 22 and p. 29.

^bMilstein, op. cit., p. 5.

^cCunningham and Lopreato, op. cit., p. 20.

LACK OF REINFORCEMENT

Robert Leik and Anita Kolman of the Minnesota Family Study Center maintain in a 1975 paper that social pressure could serve to reinforce conservation behavior. Without a strong national ethic to conserve energy, little or no social pressure for conservation exists. Consequently, consumers rely almost exclusively on economic reinforcement. However, Leik and Kolman maintain that much of the potential for economic reinforcement is lost because consumers pay for energy not as they use it but monthly or even less often. Also, because bills are usually paid by one member of a household, other members are not aware of economic savings or penalties unless informed by the person who pays the bill.¹

Field studies conducted at Twin Rivers, N. J., revealed that feedback about consumption

¹Robert Leik and Anita Kolman, "Isn't It More Rational to be Wasteful?," in Warkov, op. cit., pp. 148-163.

and conservation can enhance people's efforts to conserve. Summertime electricity consumption among households studied was reduced by 10.5 percent when people were provided with almost daily feedback on their consumption performance and were exhorted to conserve. In a separate study, residents given a goal of a 20-percent reduction in electricity use actually cut back by 13 percent when provided with frequent feedback. In still a third experiment, use of a light that flashed whenever cooling could be achieved through open windows rather than air-conditioners led people to conserve 15.7 percent of their electricity. While these were relatively short-term experiments (3 to 4 weeks), they do suggest that frequent feedback to the consumer could provide substantial savings of energy.²

²Clive Seligman, John M. Darley, and Lawrence J. Becker, "Behavioral Approaches to Residential Energy Conservation," *Energy and Buildings*, April 1978, pp. 325-337.

DISPARITY OF EFFECTS AND OPPORTUNITIES BY INCOME GROUPS

A 1975 Ford Foundation study, since confirmed by several other consumer surveys, found that household energy use (including transportation) rises with income and that the largest gaps in consumption between income groups are accounted for by elective or luxury uses. At the same time, the percentage of household income that is used for energy drops sharply as income rises. While the poor spent 15.2 percent of their household income on direct energy use in 1972-73, the more affluent spent only 4.1 percent. This means that while lower income households have the greatest need to conserve, they also suffer from a lack of opportunities to do so. There is very little fat in the poor family's energy budget.³

An Austin, Tex., study found that short-term response to electricity price increases among

³Dorothy K. Newman and Dawn Day, *The American Energy Consumer: A Report to the Energy Policy Project of the Ford Foundation* (Cambridge, Mass.: Ballinger Publishing Company, 1975), cited in Cunningham and Lopreato, pp. 145-146.

household energy users varied sharply by income group. Upper income households increased consumption despite rising prices; the small impact on total household budgets was not sufficient motivation for most to conserve. Lower income households showed very little change in consumption because, the researchers concluded, they are already at the minimum consumption level they can manage for reasonable comfort in homes that lack adequate insulation and efficient appliances. Only among middle-income families were consumption declines widespread in response to price increases. The authors conclude that the middle-income group offers the greatest potential for conservation, since this group has both a margin for conserving and economic incentive to do so.⁴

⁴Nolan E. Walker and E. Linn Draper, "The Effects of Electricity Price Increases on Residential Usage by Three Economic Groups: A Case Study," *Texas Nuclear Power Policies 5* (Austin, Tex.: University of Texas Center for Energy Studies, 1975), cited in Cunningham and Lopreato, pp. 155-156.

CONFLICTS BETWEEN CONSERVATION AND OTHER GOALS

A number of studies suggest that the energy crisis—at least at recent levels of severity—is not a sufficient incentive to deter consumers from their pursuit of comfortable lifestyles. Participants in the Gallup Organization's 1976 group discussions on energy represented a cross-section of consumers, varying by income, education, place and type of residence, age, and sex. Summarizing the attitudes Gallup discerned regarding lifestyles, values, and conservation, Cunningham and Lopreato wrote:

Participants hear 'Deny yourself' as the implicit theme in most conservation communications and are answering with 'I have earned the right to indulge' . . . Convenience and immediate gratification are primary goals, limited only by financial pressure. Saving energy when it is 'convenient' provides a sense of contributing and helps relieve guilt.¹⁵

This factor of "convenience" does appear to limit personal support for conservation measures and actual conservation behavior. An Illinois survey found that consumers, both before and after the embargo and accompanying price increases, placed "high value emphasis on privacy, autonomy, and mobility." The researchers conclude that conservation campaigns affecting "deeper lifestyles" cannot succeed at present. The fact that consumers value convenience and comfort, plus the fact that energy costs are still a small portion of the cost of operating a home, indicates that prices may need to rise much more dramatically before they will outweigh these competing values.

Family welfare was also mentioned often by consumers as a reason for not conserving. When Milstein asked certain consumers why they had not turned down their thermostats, many mentioned that their families would be uncomfortable or that there were babies or

sick or elderly people in the house. In the Twin Rivers study, concern with health and comfort correlated closely with levels of summer energy consumption; the stronger the respondent's perception that energy conservation led to discomfort and illness, the greater was his energy consumption. The Twin Rivers researchers also found that participants who believed that the effort involved in saving energy was too great for the cost savings achieved—for example, that it was too much trouble to turn off the air-conditioner and open the windows whenever it got cool enough outside—also had higher consumption levels. The third significant predictor of energy consumption found in the Twin Rivers research was the perception that the actions of individual homeowners could have only a negligible effect on national energy consumption.⁷

Milstein's respondents believed strongly that conservation policies must be "fair" to be acceptable. Sometimes, this concern with equity appeared to lead to support for contradictory policies. For example, only 30 percent believed that "consumers have the right to use as much energy as they want to and can afford to," and only 10 percent believed that "people should be allowed to drive their cars and heat their homes as much as they want to even if we all become dependent on foreign countries." While these attitudes might suggest support for a strong regulatory approach, the same respondents overwhelmingly believed that the best way to get people to save energy is by "encouraging voluntary conservation" (70 percent) rather than "passing and enforcing laws" (20 percent). Nor did Milstein's participants favor a free-market approach: 70 percent agreed with the statement that "raising [the] price of fuel is not fair, because rich people will use all they want anyway."⁸

¹⁵Cunningham and Lopreato, p. 132.

¹⁶Stanley E. Hyland, et al., *The East Urbana Energy Study, 1972-1974: Instrument Development, Methodological Assessment, and Base Data* (Champaign, Ill.: University of Illinois College of Engineering, 1975), cited in Cunningham and Lopreato, p. 141.

⁷Milstein, op. cit., p. 5

⁸1 bid., pp. 12-13.

DISTRUST OF INFORMATION PROVIDERS AND DISBELIEF IN REALITY OF SHORTAGES

In February 1977, a month with widespread natural gas shortages, three-fifths of the consumers in Milstein's national sample believed that fuel shortages were "real." By March, however, fewer than half the sampled population thought so; this percentage has been consistent most of the time since the end of the Arab oil embargo. One-third of Milstein's respondents said they believed shortages are contrived by vested interests for economic or political gain.⁹

The National Opinion Research Center at the University of Chicago found in a year-long series of weekly surveys that consumers held a widespread belief that the Federal Government and the oil industry—two major sources of advertising campaigns urging conservation—were actually responsible for the energy crisis through mismanagement and/or design.²⁰

⁹Ibid., p. 5.

²⁰James Murray, et al., "Evolution of Public Response to the Energy Crisis," *Science* 184:257-63, cited in Cunningham and Lopreato, pp. 144-145.

A number of other studies also found that consumers blame the energy problem on oil companies, utilities, "big business," and Government. In one public opinion survey, respondents blamed "oil company actions" and "Government favoritism to the companies" most for fuel shortages, but also placed some blame on "wasteful energy consumption." Very few believed the world was running out of fossil fuel.²¹ Nine out of ten in Milstein's 1977 survey agreed with the statement that the Government should investigate oil and natural gas companies to make sure they do not hold back production.²²

²¹Gordon L. Bultena, *Public Response to the Energy Crisis: A Study of Citizens' Attitudes and Adaptive Behaviors* (Ames, Iowa: Iowa State University, 1976), cited in Cunningham and Lopreato, pp. 124-125.

²²Milstein, op. cit., p. 12.

LACK OF SPECIFIC KNOWLEDGE ABOUT HOW TO CONSERVE

Adding to this general mistrust of governmental and business advocates of conservation is the disincentive created by lack of consumer understanding about how to save energy. Milstein found that 36 percent of the respondents to a 1976 survey did not know that lower wattage light bulbs use less electricity, and 59 percent thought that leaving a light burning used less energy than switching it on and off as needed. Although water-heating is the second largest energy-consuming activity in the home (after heating and cooling), only 42 percent knew where to find their water heater controls or how to set them. Only 13 percent of respondents to the 1976 survey believed their houses needed additional insulation,²³ al-

²³Jeffrey S. Milstein, *Attitudes, Knowledge and Behavior of American Consumers Regarding Energy Conservation With Some Implications for Governmental Action* (Washington, D. C.: Federal Energy Administration, October 1976), p. 6.

though Milstein's 1977 survey found that 20 percent of all homes had no insulation at all and many more were inadequately insulated. Consumers do know that lowering thermostats saves energy and money, but Milstein found in 1977 that half the public believed that thermostats must be turned down 50 or more to save energy.²⁴

Government efforts to help consumers determine savings potential and to provide practical "how to" information have either been too complex or not been made widely available, owing to funding problems. The information problem is particularly challenging because of regional variations in prices, heating requirements, and fuel mixes, as well as infinite variations in the thermal characteristics of the current housing stock.

²⁴Milstein, *How Consumers Feel* (1977), P. 5.

FAITH IN “AMERICAN TECHNOLOGICAL KNOW-HOW” TO SOLVE THE ENERGY PROBLEM

Americans are proud of the Nation’s technological achievements, especially in producing “modern conveniences” and in glamorous accomplishments such as putting men on the moon. A 1975 study by Angell and Associates found respondents optimistic about prospects for solving the energy problem through American technological “know-how.”²⁵ Similarly,

²⁵Angell and Associates, Inc., *A Qualitative Study of Consumer Attitudes Toward Energy Conservation* (Chicago, Ill.: Bee Angell and Associates, 1975), cited in Cunningham and Lopreato, pp. 121-122.

Bultena found consumers favoring “technological solutions” much more strongly than policies to reduce demand or promote efficiency.²⁶ This optimistic view may dampen consumers’ motivation to conserve, as it places the burden of a remedy on others, specifically the U.S. scientific community.

²⁶Bultena, op. cit.

CONSUMERS AND THE BUILDING INDUSTRY

The preceding discussion focused on consumer attitudes and behavior relative to the overall energy problem and to conservation in particular. It is appropriate now to turn to the area of the consumer’s role in the energy conservation aspects of decision making on housing.

As noted earlier in this chapter, families purchasing new homes typically make a series of judgments and comparisons, weighing such factors as attractiveness, size, location, convenience, comfort, and — not insignificantly—affordability. Since very few homes are likely to be regarded as one’s dream house, buyers must weigh the pluses and minuses of each potential choice.

What role does energy conservation play in these choices? Until recently, it would have been safe to say little or none. The presence of a fireplace, a family room, wall-to-wall carpeting, a picture window, a powder room —factors like these, along with external attractions such as convenience to schools, shopping, and transportation dominated the choice of a new home. Indeed, these factors remain very important in buyers’ perceptions. But a 4-year series of surveys conducted by *Professional Builder* magazine suggests that families entering the market for new homes are increasingly

aware of energy considerations as part of the choice process, and are expressing willingness to alter their buying habits somewhat to realize cost savings in energy.²⁷

It has become commonplace to argue that builders and buyers alike tend to look only at first costs and ignore lifecycle costs when determining what features to include in a house. The *Professional Builder* survey suggests that this may no longer be the case when it comes to energy conservation.

In querying families currently in the market for newly constructed homes, *Professional Builder* asked this question in 1975, 1976, 1977, and 1978:

Suppose you were interested in a new home and a builder told you that by spending \$600 more at the time of construction, he could cut your heating and cooling bills by \$100 per year. What would be your reaction?

In answering the question, respondents were given four choices:

1. I would spend the additional \$600.

²⁷“Data from the *Professional Builder* Annual Consumer/Builder Surveys of Housing can be found in the following issues of the magazine: 1975 data, January 1976; 1976 data, January 1977; 1977 data, December 1977; and 1978 data, December 1978.

2. I'd be willing to spend even more to save more.
3. I would not spend the \$600 because the savings take too long to recover.
4. I would not spend the \$600 because the savings are not believable.

Results were tabulated according to type of home sought (detached single-family, attached single-family, or multifamily), economic status (measured by family income and by price range of home to be purchased), and geographic region. The results, described below, suggest that buyer attitudes are not an impediment to energy conservation, even when long-range conservation requires an increased initial investment.

Among 248 potential buyers of single-family homes in 1975, 80.5 percent expressed their willingness to spend \$600 to realize an annual saving of \$100 in energy costs, and another 8.8 percent said they would spend even more if the saving would be increased as well. In 1976, the percentage willing to spend \$600 or more remained nearly constant (89.1 percent), but of that fraction, a larger group than before (15.1 percent of the total sample of 596) expressed a willingness to pay even more than \$600 for a greater annual saving. In 1977, 93.2 percent of respondents were willing to spend \$600 or more to save \$100 or more in annual energy costs. In 1978, the fraction of willing energy savers returned to its 1975-76 level of 89 percent.

It is particularly interesting to note that this willingness on the part of new-home consumers to increase their first costs to save money on energy over the long run can be found in similar percentage of every income group and every house price-range group. This is shown in table 26.

In its 1977 survey, *Professional Builder* asked potential buyers whether they would purchase, or consider purchasing either now or in the future, solar heating and water heating systems in order to reduce their fuel bills. The results indicate that solar is an idea whose time has not yet come, in terms of public acceptability, but that homebuyers are keeping an open mind and might well consider solar more

Table 26.—Percent of Potential Homebuyers Willing to Spend \$600 or More at Outset to Save \$100 or More Annually on Energy, by Family Income and House Price Range

	1975 data	1976 data
By family income		
Less than \$15,000	89.2	87.9
\$15,000-\$19,000.	89.7	89.2
\$20,000 or more.	89.1	92.3
By house price range		
Under \$25,000	90.2	88.8
\$25,000-\$34,999	90.8	90.1
\$35,000-\$44,999!	88.9	85.5
\$45,000-\$54,999	84.6	84.1
\$55,000-\$64,000	90.6 ^a	94.7
\$65,000 or more.	—	95.5

^a1975 data available only as "\$55,000 or more."

SOURCE: Statistical data on *Professional Builder* survey provided to OTA by Cahners Publishing Company. 1977 and 1978 data not available by income group and house price range.

seriously in the future. Told that solar space heating might cost them \$7,000 in additional first costs but could reduce fuel bills by 30 to 70 percent, only 8.4 percent of respondents said they would purchase the solar option; another 35.6 percent indicated they would consider purchasing it; 35.1 percent would not do so now but might in the future; and 20.4 percent said a flat no to solar heat. Consumers were also asked to consider a solar water heating system that would cost \$1,200 and save between 50 and 80 percent of water heating costs. Among those responding, 7.1 percent indicated they would purchase the system; 37.7 percent would consider the option; 39.5 percent might do so later; and 14.0 percent would not be interested, period.

Looking at six major housing markets in mid-1978, *Housing* magazine surveyed buyers to learn what energy-saving options (among other housing choices) they wanted in the homes they would purchase. Costs for the options varied from city to city; in showing the results in table 27, cost ranges are provided.

Given the complex interplay between builders and buyers in determining what features and designs will be included in new homes, it is useful to look not only at buyers' opinions, but also at builders' *perceptions* of buyers' opinions. Builders remain the primary decision-makers in new construction, but their decisions reflect what they find to be the dominant char-

Table 27.—Percent of Homebuyers Desiring Energy-Saving Features in Five* Major Housing Markets, 1978

Energy-saving feature	Cost range	Market area				
		Wash., D.C.	Miami	Chicago	San Fran.	San Diego
Upgraded insulation.	\$500-1,500	97	88	95	95	83
Double-glazed windows.	\$750-2,000	91	70	86	68	34
Solar water heater.	\$1,800-2,000	34	58	25	41	36
Solar space and water	\$7,000-13,000	32	48	21	42	24

*Phoenix, surveyed only with regard to upgraded insulation, is excluded from the table.
SOURCE: "What Home Shoppers Seek in Six Major Markets," *Housing*, October 1978.

acteristics of market demand. In early 1978, Professional Builder asked housing contractors, "How important is energy conservation to your customer?" Ninety-seven percent said it was either "somewhat important" (53 percent)

or "very important, vital to buying decision" (44 percent). Given this overwhelming evidence, it is safe to say that purchasers of new housing are indeed energy-conscious, and that builders are sensitive to this concern.

CONSUMER BEHAVIOR AND ENERGY CONSERVATION IN HOME OPERATION

Does consumer behavior really make a significant difference in energy consumption? If not, consumers will have little incentive to cut back. But if so—and if the answer is measurable in dollars and cents — a residential energy conservation campaign will find a receptive audience.

Data on the direct impact of behavior on energy consumption have only recently become available—and the early returns, based on utility bills and other records, along with the experience of fuel suppliers—indicate that the way a home is used makes a substantial difference in how much energy is used. There are savings to be had — and while they will not, in the long run, compare with the vast savings derived from a house designed to save energy—the savings are real and can play a large role in reducing energy use in existing housing.

Thermostat and air-conditioner settings are an obvious example. The use of hot water can be a major energy drain. Opening or closing shades and curtains, using natural or mechanical ventilation, opening and closing doors, leaving windows open at night—all these and other choices combine to affect the total energy consumption for any given family.

Even more dramatic are certain observations about variable energy use levels in houses of similar or identical design. Wybe observed two houses, built by the same contractor, which were expected to have identical thermal characteristics. One used 2.2 times as much heat and 75 percent more total energy than the other.²⁸ Jay McGrew observed in a related analysis that the occupants' knowledge of proper energy management was generally more important in achieving low energy consumption than the quality of the construction.²⁹

Princeton University researchers found similar evidence in the Twin Rivers Project. In a sample of nine identically constructed townhouses, each with similar orientation, consumption of gas for heating varied by as much as a factor of 2 to 1. When occupants changed, gas consumption also changed. In the nine townhouses where gas consumption was monitored from 1972-76, one house moved from the highest consumer (1975) to the lowest consum-

²⁸Wybe J. van der Meer, "Energy Conservative Housing for New Mexico," report 76-163, prepared for the New Mexico Energy Resources Board, 1977, p. 19.

²⁹Jay McGrew, President, Applied Science and Engineering, Inc., private communication.

er (1976) when occupancy changed, dropping almost 50 percent. When these nine houses were retrofitted, the gas consumption of each fell by an average of approximately 30 percent, but the ranking of the houses remained essentially the same. 30

³⁰R.H.Socolow, "The Twin Rivers program on Energy Conservation in Housing: Highlights and Conclusions," *Energy and Buildings*, vol. 1, no. 3, April 1978, p. 225.

Although it is clear that the way people live is important in residential energy consumption, it is more difficult to determine how much energy could be saved by behavioral change, because the major determinants of use are the number and age of occupants, combined with living and working patterns. Also, large savings reflecting purely behavioral effects should drop as houses are better constructed and more energy sensitive from the beginning.

CONCLUSIONS

Using data from the large number of studies that have been completed in the area of consumer attitudes and behavior with respect to energy conservation, it is possible to state the following general conclusions with policy implications:

1. Consumer decisions on housing are complex, and it would be unrealistic to propose energy conservation options that fail to recognize this. Homebuyers look for many things besides energy efficiency in a home. They are conservative about drastic changes in house design or in home lifestyles. There is, however, great latitude for efficiency improvement in the structure and operation of the home within the confines of consumer tastes and needs.
2. Consumers are becoming more aware of the need for conservation, but this awareness does not necessarily lead to conservation behavior. Many consumers lack practical knowledge about how to accomplish conservation and harbor a degree of mistrust about Government and industry as information sources. Much of the available technical information appears to be too complicated or inaccessible for consumer use.
3. Consumers are most easily motivated by the prospect of monetary savings. Exhortations about the need to reduce imports or prevent energy-related environmental problems do not move most people to take conservation steps,
4. Consumers are undertaking minor adjustments (lights out, thermostats down) to their energy-consuming practices, but are displaying reluctance about major investments or lifestyle changes.
5. There are significant discrepancies in actual conservation opportunities (as well as incentives) among different income groups. Low-income consumers have little latitude to conserve, and upper income families lack the financial incentive, leaving conservation mostly in the hands of the middle-income householders.
6. Impediments to consumer conservation include inadequate information, conflicts with other goals, lack of perceived financial reward, doubts about others' motivations and commitments, and complacency about forthcoming technological solutions