Review of Survey Data on the Importance of Energy Efficiency to New Home Buyers

P. L. Hendrickson

October 1984

**Prepared for the
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Richland, Washington 99352

SUMMARY

The principal objective of this report was to review available survey information on the importance of energy efficiency to buyers of newly constructed homes. The importance of energy efficiency to buyers of existing homes was of secondary importance. Highlights of documents reviewed for the study are included in the appendix. A companion report to this document prepared by the Portland, Oregon, firm of Bardsley and Haslacher, Inc., reviews the results of six focus groups convened in the Northwest to obtain energy efficiency preference information from recent buyers of newly constructed homes.

The report was prepared for the Office of Conservation, Bonneville Power Administration (BPA). The information will be used by BPA to encourage implementation of the model conservation standards adopted by the Northwest Power Planning Council and to facilitate marketing of demonstration homes built to the standards. It will also be used to aid in marketing the "Super Good Cents" program, a program that will be operated by utilities. New homes built to the model standards will be certified and marketed as "Super Good Cents" homes.

Overall, the surveys reviewed for this report support the notion that the Council's model conservation standards will be received reasonably well and can be successfully marketed. The standards principally affect new building construction. Survey results show that prospective buyers of newly constructed homes are highly interested in energy efficiency.

A number of subtopics are addressed in the report. These include the home purchase process and the role of energy efficiency considerations in the process, the importance of energy efficiency considerations in the decision to purchase a new home, the relative importance of energy efficiency in comparison to other home selection attributes, homeowner preferences for particular energy efficiency features, and measures of the willingness to pay for energy efficiency improvements.

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1.0 OVERVIEW

The principal objective of this report was to review available survey information on the importance of energy efficiency to buyers of newly constructed homes. The importance of energy efficiency to buyers of existing homes was of secondary importance. Sixteen documents were reviewed for the study. Highlights from these studies are included in Appendix A. The reports are arranged in approximate order of significance to the study. A companion report to this document prepared by the firm of Bardsley and Haslacher, Inc., reviews the results of six focus groups held in the Northwest to obtain information on the same subjects.⁽¹⁾

The report was prepared for the Office of Conservation, Bonneville Power Administration (BPA). The information will be used by BPA in encouraging implementation of the model conservation standards adopted by the Northwest Power Planning Council and in facilitating the marketing of demonstration homes built to the standards. It will also be used to aid in marketing the "Super Good Cents" program, a program that will be operated by utilities. New homes built to the model standards will be certified and marketed as "Super Good Cents" homes.

A number of subtopics are addressed in the report. These include the home purchase process and the role of energy efficiency considerations in the process, the importance of energy efficiency considerations in the decision to purchase a new home, the relative importance of energy efficiency in comparison to other home selection attributes, homeowner preferences for particular energy efficiency features, and measures of the willingness to pay for energy efficiency improvements.

Energy efficiency considerations affect the home purchase process in several important ways. Theory suggests that other things being equal, an energy efficient home should sell for more than an inefficient home. Empirical studies (e.g., p. A.36) confirm this expectation. For buyers who are at a financial institution's debt margin, there is a possibility of borrowing additional funds for an energy efficient home beyond normal loan/income guidelines because of lower expected utility costs. Buyers also perceive certain risks

associated with the extra costs of purchasing an energy efficient home. These risks relate to the possible use of new, unproven technology and installation/construction by contractors and builders who are still learning how to construct energy efficient homes. At the same time, buyers recognize that it is more efficient to initially construct an energy efficient home than to retrofit an existing home with energy saving features. When couples are purchasing a home, there is evidence that husbands exert the greatest influence over the energy efficiency attribute of the selection process.

A complicating factor in assessing the relative importance of energy efficiency to home buyers is that the importance is impacted by a number of variables that are difficult to account for. These variables include household income, the relative severity of the local climate, and expectations of future energy price increases. For example, a high-income household living in a temperate climate is likely to weight efficiency lower as a selection attribute than a medium-income household in a severe climate. The available literature rarely examines the correlation between energy efficiency survey data and these variables, and consequently no attempt is made to do so in this report.

The reader can make some assessment of the impact of rising energy prices by noting when a particular survey was taken. The surveys reviewed for this report were taken during the period 1977-1983. National average residential natural gas and electricity prices for this period are shown in Table 1.1.

TABLE 1.1. National Average Retail Residential Fuel Prices Delivered by Investor-Owned Utilities⁽²⁾

Year	Electricity (cents/kWhr)	% Increase from Previous Year	Natural Gas (dollars/ thousand cu. ft)	% Increase from Previous Year
1977	4.05¢	8.6%	\$2.35	18.7%
1978	4.31	6.4	2.56	8.9
1979	4.64	7.7	2.98	16.4
1980	5.36	15.5	3.68	23.5
1981	6.20	15.7	4.29	16.6
1982	6.86	10.6	5.17	20.5
1983	7.18	4.7	5.99	15.9

One would expect, for example, that the relative importance of energy efficiency to home buyers nationally, other factors being equal, might be greater in 1980-1981 when both electricity and natural gas prices were rapidly increasing than in 1983 when price increases, especially for electricity, were moderating. Evidence to support this hypothesis includes a decreasing percentage of potential buyers of newly constructed homes who are willing to spend \$1000 initially to save \$100/yr on fuel costs (see below). An NAHB official also cites a "lull in interest in increasing energy efficiency among both builders and consumers," and a greater emphasis on affordability.⁽³⁾

The survey data on reasons to buy a different home suggest an interesting distinction. Individuals who are principally in the market for a newly constructed home apparently place much greater emphasis on improved energy efficiency as a reason to buy than do prospective buyers in general. Prospective buyers of newly constructed homes appear to rank improved energy efficiency as high or higher than any other reason to buy. Prospective buyers of homes in general cite other reasons, such as more room or a preferred location, as more important.

As one would expect, the survey data on the relative importance of energy efficiency as a home selection attribute are not completely consistent, but they do suggest that energy efficiency follows price, location, home size, design/style, and construction quality in importance. There is some evidence that its relative importance may be increasing. A 1980 survey by the National Association of Home Builders (p. A.13) of individuals who bought newly constructed homes in 1977 and 1978 found that the buyers would place much greater emphasis on energy efficiency when purchasing their next home.

Survey data suggest that the most important energy efficiency features in decreasing order of importance are insulation (with ceiling most important followed by wall and floor), extra window glazing, and appropriate weatherstripping and caulking.

Approximately 64% of respondents to one 1983 survey (p. A.1) would be willing to spend an additional \$1000 for a new home with energy efficiency

features that would save them \$100/yr. This percentage had dropped from 78% in 1981, suggesting a possible moderating interest in energy efficiency.

Overall, the surveys reviewed for this report support the notion that the Northwest Power Planning Council's model conservation standards will be received reasonably well and can be successfully marketed. The standards principally affect new building construction. Survey results show that prospective buyers of newly constructed homes are highly interested in energy efficiency. Further evidence that buyers of newly constructed homes will support the standards is found in a report that surveyed the energy conservation attitudes and behavior of individuals living in western states. Approximately 80% of residents in Idaho, Montana, Oregon, and Washington supported the idea of stronger building codes to encourage energy saving housing.⁽⁴⁾ Moreover, in a recent telephone survey of 603 Oregon residents, 87% of respondents favored requiring new buildings to be energy efficient and 77% favored enforcement of energy efficient building codes.⁽⁵⁾

REFERENCES AND NOTES FOR SECTION 1.0

1. Bardsley and Haslacher, Inc., Portland, Oregon, Northwest New Home Buyers Discuss the Home Purchase Decision, October 1984.
2. Energy Information Administration, U.S. Department of Energy. Monthly Energy Review, DOE/EIA-0035(84/01), pp. 93, 94, April 1984.
3. Builder, The Magazine of the National Association of Home Builders, Washington, D.C., p. 73, August, 1984.
4. Western Rural Development Center, Oregon State University, Energy Directions for the United States: A Western Perspective, WRDC Publication No. 13, August 1982, p. 21.
5. H. M. Berg, P. K. Bodenroeder, Survey Research Center, Oregon State University, Attitudes, Opinions and Concerns About Energy - A Survey of Oregon Residents, prepared for the Oregon Department of Energy, Tables 5.1, 6.1, May 1984.

2.0 INTRODUCTION

This report is one in a series of reports on marketing energy conservation in the Northwest prepared by the Pacific Northwest Laboratory (PNL) and its subcontractors for the Office of Conservation, Bonneville Power Administration (BPA). Other reports are:

1. RMH Research, Inc., River Edge, New Jersey, Marketing Environment for Energy Conservation in the Pacific Northwest, May 1984.
2. RMH Research, Inc., Marketing Environment for Solar and Heat Pump Water Heaters, May 1984.
3. Bardsley and Haslacher, Inc., Portland, Oregon, Northwest New Home Buyers Discuss the Home Purchase Decision, October 1984.
4. J. M. Fang, Attitudes Toward Residential Energy Conservation in the Pacific Northwest: Overview and Comparisons, Pacific Northwest Laboratory, Richland, Washington, 1984.

An additional report is in progress on the environment for marketing energy conservation to owners of multifamily residential buildings.

The principal topic of this report is the relative importance of energy efficiency to buyers of newly constructed homes in the Pacific Northwest. The investigation has been divided into two documents. This document reviews and evaluates the publicly available literature on the importance of energy efficiency to home buyers. The Bardsley and Haslacher report cited above is a companion report that contains the results of six focus groups convened in June and July 1984 at several Northwest cities to investigate attitudes toward energy efficiency in the home purchase process. Five of the focus groups included people who had either recently purchased a newly constructed home or who were actively seeking a home. One of the groups was composed of real estate brokers and agents.

BPA's programmatic interest in the area of energy conservation was enhanced by Congressional passage of the Pacific Northwest Electric Power Planning and Conservation Act (the "Act") in 1980.⁽¹⁾ The Act established the Northwest Power Planning Council⁽²⁾ (the "Council") and required the Council to

prepare and issue a regional conservation and electric power plan (the "Plan").⁽³⁾ The Plan was subsequently issued in April 1983.⁽⁴⁾ Under the Act, BPA is to acquire electric power resources through conservation and otherwise, consistent with the Plan.⁽⁵⁾ The Act places the highest priority on the acquisition of conservation resources.⁽⁶⁾ Additionally, BPA is to make the maximum practicable use of its customers and local entities in implementing conservation programs that require direct arrangements with retail consumers.⁽⁷⁾

The Act required the Council to prepare model conservation standards for new buildings.⁽⁸⁾ These standards appear in Appendix J of the Plan. The Council also prepared energy efficiency standards for conversion of an existing building to electric space conditioning; these appear as Appendix L in the Plan. The Plan requests Northwest regional state governments (Idaho, Montana, Oregon, and Washington), local governments, or utilities to adopt and enforce the model standards by January 1, 1986.⁽⁹⁾ Utilities that serve areas that are not implementing the model standards are potentially subject to a surcharge on power purchased from BPA.⁽¹⁰⁾

Several BPA programs relate to the implementation of the model conservation standards.⁽¹¹⁾ Action item 2.10 in Chapter 10 of the Plan requests BPA to conduct a demonstration program in which builders constructing homes to the model standards prior to January 1, 1986, will receive a subsidy equal to the incremental cost incurred above present energy code requirements. This program, the Residential Standards Demonstration Program, is in place and functioning in the four Northwest states. Action items 2.3, 3.3, 6.4, and 7.3 direct BPA to develop a consistent procedure for certifying compliance with the model standards.⁽¹²⁾ Action item 12.1 directs BPA to develop and implement a program to reimburse state and local governments for the incremental cost of adopting and enforcing the model standards. Later this year BPA also plans to market the "Super Good Cents" program with utilities that choose to participate. Under this program a home built to the model standards, or equivalent code, will be certified and marketed as a "Super Good Cents" home. Participating utilities will inspect the building plans and the installation of energy efficiency features prior to their award of the Super Good Cents certification.

BPA also plans to offer the Model Standards Consumer Incentive Program through selected utilities. Under this program, builders or those who buy newly constructed homes may receive an incentive averaging about \$1000 for meeting the model standards.

This report was prepared to support and provide background information for BPA activities related to implementation of the model conservation standards and the Super Good Cents program. Section 3.0 discusses the new home purchase process including the role of energy efficiency in the process. Section 4.0 reviews survey data on the relative importance of reasons to seek a different home and the importance of particular attributes in the home selection process. The role of energy efficiency is emphasized in this discussion. Section 5.0 addresses the relative importance of particular home energy efficiency features and willingness to pay for them. Section 1.0 is an overview of the report. Appendix A contains synopses of the studies reviewed for this report; findings related to the importance of energy efficiency in the home purchase process are summarized.

REFERENCES AND NOTES FOR SECTION 2.0

1. Public Law 96-501, enacted December 5, 1980.
2. 16 U.S.C.A. 839b(a)(2). Section 4.(a)(2) of the Act.
3. 16 U.S.C.A. 839b(d). Section 4.(d) of the Act.
4. Northwest Power Planning Council, Portland, Oregon, Northwest Conservation and Electric Power Plan, Vol. 1 and 2, April 27, 1983.
5. 16 U.S.C.A. 839(d)(b)(1). Section 6.(b)(1) of the Act.
6. 16 U.S.C.A. 839(b)(e). Section 4.(3) of the Act.
7. 16 U.S.C.A. 839d(e)(2). Section 6.(e)(2) of the Act.
8. 16 U.S.C.A. 839b(f). Section 4.(f) of the Act.
9. Action item 2.1 in Chapter 10 of the Plan requests implementation for residential buildings; action item 6.1 requests implementation for commercial buildings.
10. 16 U.S.C.A. 839b(f)(2). Section 4.(f)(2) of the Act.

The surcharge issue is briefly discussed in Section 2.2 of P. L. Hendrickson, Pacific Northwest Laboratory, Development of a Procedure to Certify Compliance with the Northwest Power Planning Council's Model Standards for Energy Conservation in Buildings, prepared for the Office of Conservation, Bonneville Power Administration, August 1984.
11. The programs are further described in BPA Office of Conservation, 1984 Conservation Sourcebook, DOE/BP-261, June 1984.
12. See: P. L. Hendrickson, Ref. 10.

3.0 ENERGY EFFICIENCY AND THE NEW HOME PURCHASE PROCESS

The purchase of a new home is an important transaction for most home-buyers. Frequently, the selection of a home constitutes one of the most important purchase decisions that an individual makes in his lifetime. This chapter briefly addresses some of the many elements that play a part in the home purchase decision process. The impact of energy efficiency considerations on each element is discussed. Elements discussed in the following sections include 1) the fact that many selection attributes affect the decision process, 2) risk factors in the purchase process, 3) the impact of energy efficiency on financing, 4) the decision whether to buy a newly constructed home or an existing home, 5) use of real estate brokers and agents, 6) husband-wife interactions when a home is purchased by a married couple, and 7) sources of energy efficiency information.

3.1 SELECTION ATTRIBUTES AND THE DECISION PROCESS

Purchasing a home is a complex process involving many uncertainties and risks. The number of measurable attributes affecting the decision process may be as many as 50 or more. These include obvious concerns such as location, size, and price, and not so obvious concerns such as whether or not the home has a wet bar and access to public transportation. Attributes have different relative importance for each individual. When there are two decision makers in purchasing a home, there must be tradeoffs and compromises that reflect these differences (see Section 3.6 for husband-wife interactions). The relative importance of various selection attributes is discussed in Section 4.2.

Park (p. A.32) concludes that the home purchase process is a "muddling through process" characterized by limited knowledge and, in the case of couples, limited awareness of each spouse's decision strategies. He further concludes, though, that by relying on conflict avoiding techniques and following paths of least resistance, an effective decision can still be made.

The actual techniques and heuristics that are used in the home purchase decision process are difficult to model. Chan, Park, and Yu asked prospective home purchasers about their decision attributes and the relative importance of

each and used this information to construct an individual decision network.⁽¹⁾ Subjects were asked to score each home considered for each decision attribute. The authors then compared the home actually purchased to the subject's weighted attributes. The predictability of the actual home purchased based on the decision attribute network was only fair. The actual house purchased, however, was nearly always the preferred or second most preferred of at least one of the individual purchasers.

3.2 RISK FACTORS IN THE PURCHASE PROCESS

There are many elements of risk in the home purchase process. This section focuses on particular risks associated with the purchase of an energy efficient home and on financial risks.

3.2.1 Special Risks Associated with Energy Efficient Homes

There are many uncertainties and risks involved in the new home purchase process. The purchase of an energy efficient house may be viewed as especially risky in several respects. One element of perceived risk may be indoor air quality concerns attributable to low air infiltration.⁽²⁾ Two other elements relate to the relative newness of highly energy efficient homes. First, the buyer may not be confident that the energy saving features will produce sufficient fuel savings to justify the incremental increase in the initial cost of the home. Second, the buyer may be concerned that the builder did not have sufficient experience to properly install the energy saving features. Both of these concerns related to the newness of the technology, were expressed by homeowners in California who were asked about their perceptions and attitudes toward solar energy.⁽³⁾

Housing consumers have a variety of ways to reduce the perceived risks associated with the purchase of energy efficient homes. One study (p. A.3) found that techniques preferred by buyers, in decreasing order of importance, were: asking for equipment warranties, visual inspection, requesting literature, obtaining an independent evaluation, and asking others who purchased

homes from the builder. In order to counter perceived risks, it may be necessary to increase the amount of consumer information available on energy efficient homes.

In spite of the special risks associated with energy efficient homes, investment theory suggests that buyers should still be willing to pay more for an efficient home, other factors being equal. Empirical research has confirmed that buyers do, in fact, pay more for energy efficient homes.⁽⁴⁾

3.2.2 Financial Risks

Two of the elements of the home purchase process that make the process especially important and even risky are price negotiation and the terms associated with financing the unpaid balance of the purchase price. The purchaser will naturally be concerned that he obtain the home for the best possible price. The obvious reason is to minimize his initial cost and his periodic payment on any unpaid balance. In addition, the buyer does not want to overpay for a house and face the possibility of taking a loss when the house is subsequently sold in the future.

The financing terms of the sale are also important to the buyer. The buyer must be capable of meeting the periodic loan payment and, in addition, making all his other payments including payments for energy consumption. Until recently, it was difficult for a buyer to overextend on his financing commitments. Banks have very definite guidelines on how much money borrowers can qualify for. The typical guideline is the one included in the Underwriting Guidelines of the Federal Home Loan Mortgage Corporation (FHLMC). This guideline states that the total of interest, principal, insurance, and property taxes should not exceed 28% of the borrower's stable monthly income and that the borrower's total monthly debt payments should not exceed 36% of monthly income. However, with the introduction of such features as adjustable interest rate mortgage financing and balloon payments, which are especially common in conjunction with seller financing, the financing risks facing the home buyer are much greater than previously.

The percentage of new loans with adjustable interest rates has been rapidly increasing. The national figures compiled by the Federal Home Loan Bank Board shown in Table 3.1 indicate the extent of the increase.⁽⁵⁾ Many adjustable rate loans have a maximum interest rate, but this rate is typically 5-7% higher than the initial rate. When the interest rate is raised, the initial qualifying guidelines can be exceeded.

TABLE 3.1. Percent of New Loans with an Adjustable Interest Rate

	September 1983	September 1984
Newly constructed homes	42%	63%
Previously occupied homes	46%	67%

A balloon payment provision in a promissory note or real estate contract typically requires the buyer to pay the entire principal balance outstanding at a specific date, usually within five years of purchase of the home. The buyer is then faced with refinancing the outstanding balance at prevailing interest rates, which may be considerably higher than the existing rate.

3.3 IMPACT OF ENERGY EFFICIENCY ON HOME FINANCING

The individual who is near the margin of qualifying for a home loan based on the loan/income guidelines referred to in Section 3.2.2 can potentially receive preferential treatment when purchasing an energy efficient home. Such preferential treatment will not be needed by purchasers who can qualify for the home purchase under the normal guidelines or when the home seller is financing the sale. Both the FHLMC⁽⁶⁾ and the Federal National Mortgage Association (FNMA)⁽⁷⁾ permit their normal loan/income guidelines to be exceeded for energy efficient properties. For example, if the purchaser has an energy rating, a certification, or can otherwise substantiate that he is buying an energy efficient home, the real estate appraiser can attach an energy addendum (FHLMC Form 70A) to his appraisal report. The lender can then exceed the normal FHLMC income guidelines at its discretion and still be reasonably confident that the loan can be sold to FHLMC as long as the loan remains "investment quality."

FNMA will allow buyers of energy efficient homes to apply up to 30% of their income to their house payment instead of the normal 28% limit. In addition, the Department of Housing and Urban Development and the Veterans Administration will insure a higher loan for energy efficient properties.⁽⁸⁾

Nationally, only a limited number of lending institutions currently give preferential loan underwriting treatment to buyers of energy efficient homes. A 1984 study found that only 10% of lenders offer preferential treatment.⁽⁹⁾ Nearly 60% of lenders, however, reported plans to give preferential treatment. One lender that will give preferential treatment in the state of Washington is Rainier Financial Services. It will increase the normal 36% total debt limit (Section 3.2.2) to 42% for homes that have a "very efficient" energy rating.⁽¹⁰⁾ Eighteen other lenders in Washington and Oregon either currently give preferential loan treatment for energy efficient homes or plan to begin such treatment soon.⁽¹¹⁾

Interviewers conducting a study in the Puget Sound area (p. A.8) asked 196 recent home buyers what influence a higher loan/income ratio for an energy efficient house would have on their home selection process. Twenty percent of the respondents said this possibility would be very influential in their selection process, 37% indicated it would be somewhat influential, 23% not very influential, 15% not at all influential, and 5% did not answer.

3.4 NEWLY CONSTRUCTED VERSUS EXISTING HOMES

Home buyers must also decide whether to purchase a newly constructed home or an existing home. The main interest of this investigation is newly constructed homes because these are the homes that will be principally affected by the Council's model conservation standards. Data on the importance to buyers of energy efficiency are rarely segregated by buyers of newly constructed homes versus buyers of existing homes, though. In part, this lack of segregation is because many and probably most home buyers are willing to select the optimal house for them from among all options, and are not firmly committed to a newly constructed or an existing home. Generally, studies reviewed for this investigation covered the topic of the importance of energy efficiency to all home buyers.

The issue of a newly constructed home versus an existing home cuts across most all home selection decision attributes. For most buyers it is not an attribute itself. To illustrate how it affects other attributes, consider a buyer who wants a detached single-family home, but also wants to be close to the central business district. Such a buyer may find that purchase of a newly constructed home is not possible given his decision attributes. On the other hand, a buyer with a strong preference for contemporary design characteristics and product features may find that purchase of an existing home is not possible.

The impact of a newly constructed home versus an existing home on the energy efficiency decision attribute is relevant to this study.⁽¹²⁾ Newly constructed homes presumably meet the existing building energy code for the jurisdiction. Additional energy features beyond code requirements can also be added, although this is generally only done for custom built homes. The prospective buyer of a newly constructed home who has confidence that the energy code is cost-effective, that additional features beyond code requirements are not cost-effective, and that the home is constructed to code, need not be too concerned about the energy efficiency attribute. The statements of the focus group participants confirm this observation.⁽¹³⁾ Buyers of existing homes, however, need to be concerned about energy efficiency, although energy efficiency may still be weighted lower than other decision attributes, such as location. An existing home will generally have lower energy efficiency than a new home. Energy efficiency features can be retrofitted to the existing home; however, this process generally will be more expensive and less effective than incorporating the features directly into a newly constructed home.

3.5 USE OF REAL ESTATE AGENTS

Another decision that the prospective home buyer must make is whether to use a real estate agent in his home search. A knowledgeable agent can potentially be a great help in screening available homes.

Real estate agents will often have access to a multiple listing service (MLS) that will facilitate home screening. This service has traditionally produced a paper catalog of homes listed for sale with real estate firms that are

local MLS members. More recently, data on MLS homes have been computerized in some geographic areas to facilitate home screening. A very recent innovation is a computer system that enables the buyer to view prospective homes in black and white or color from a variety of angles on a video screen in an agent's office.⁽¹⁴⁾ This type of system should facilitate even further the buyer's process of screening prospective homes.

Sellers rather than buyers typically engage the real estate broker. The broker thus becomes the agent of the seller for the sale transaction. The commission to the broker is payable when the broker or a real estate agent employed by him finds a buyer willing to purchase the property at the price and terms in the listing agreement. Most sellers presumably reflect the commission, at least in part, in their asking price. If a home for sale is listed with a real estate broker other than the broker/agent working with the buyer, the commission will generally be divided between the two brokers and appropriate real estate agents. Buyers who deal directly with a homeowner can perhaps obtain a reduced price because the equivalent of a full real estate commission will ordinarily not be included in the sale price.

A 1981 survey by the National Association of Realtors (p. A.16) found that 85% of all home sales were handled by licensed real estate agents. The percentage ranged from a high of 96% agent sales in Baltimore to a low of 73% agent sales in Miami. In Seattle, 84% of home sales were handled by a real estate agent.

A real estate agent may be helpful in obtaining past utility cost data for the prospective buyer and in providing some information on a home's energy efficiency. Publications and courses to give agents training on residential energy efficiency have appeared in recent years.⁽¹⁵⁾

3.6 HUSBAND-WIFE INTERACTIONS

At least two researchers (p. A.32 and A.34) have studied the relative importance of particular home purchase decision attributes to husbands and wives. Some generalizations from the studies can be made. In particular, it appears that husbands believe they will have and then actually do have the greatest influence on the home selection attribute of energy efficiency. One

author (p. A.34) therefore concludes that marketing efforts for a home's energy saving features should be concentrated on husbands. Other attributes, such as home style and interior features and design, tend to be more dominated by the wife.

A recent survey report by RMH Research, Inc., for BPA (p. 2.1) found consistent results. In this survey, the family member most responsible for energy conservation improvements to an existing home was the male (43% of the time) followed by both male and female (40%) and the female family member (15%).⁽¹⁶⁾ Perhaps what occurs is that each spouse tries to exert their respective influence over attributes that they are most interested in and about which they believe they have the most knowledge. For energy efficiency considerations, it appears that husbands exert the greater influence.

3.7 SOURCES OF ENERGY EFFICIENCY INFORMATION

The prospective buyer of a newly constructed or an existing home can benefit from information on a home's energy efficiency. General information on what energy features to look for is available in public libraries and from electric and natural gas utilities, the energy extension service, state energy offices, vendors of energy-conserving products, and, in some cases, real estate agents.

Buyers also need specific energy efficiency information on the particular house in which they are interested. This information can be used to determine how much money to offer for a house, to assess likely monthly energy costs and their affordability, and perhaps to obtain additional funds that would not otherwise be granted by a lending institution (see Section 3.3).

Obtaining reliable information on the energy efficiency of a particular house is not straightforward. One possibility is to simply ask the seller or real estate agent for copies of prior utility bills, preferably for the previous two years. This information can be helpful because it provides "hard" data on what energy costs are likely to be. There are problems with using this data, however. The principal difficulty involves the impact of lifestyle on energy consumption. The existing owner may have a different space conditioning comfort level than the buyer and, thus, may have correspondingly different

space conditioning costs. In addition, family size and living habits may differ. For example, whether or not the existing family has someone home all day and heats or cools a zone as opposed to the entire home will affect energy costs. Obtaining the past energy consumption data may also be a problem in some cases. The seller may not have the desired data or may not wish to disclose it. In either case, the data can usually, but not always, be obtained from the local utility. The buyer will also want to consider whether the weather during the period covered by the utility bills was significantly different than normal.

Another obvious source of information is the buyer's own observations on the energy efficiency of the home of interest. Questions can be asked to obtain as much information as possible. The potential buyer can also utilize knowledgeable acquaintances to help assess a home's energy efficiency or retain a consultant or appraiser to make such an assessment. Builders sometimes include a display of energy efficiency features for newly constructed homes. Surveys have shown (p. A.2) that most buyers desire to have this information in model homes.

A third source of information is the results of an energy audit. Thousands of home energy audits have been conducted in the Northwest in recent years. Most have been conducted by employees of utilities. The National Energy Conservation Policy Act⁽¹⁷⁾ requires utilities with annual natural gas sales of 10 billion cubic feet or more, or 750 million kilowatt-hours of electricity or more to offer home energy audits to their customers on request.⁽¹⁸⁾ The audits are to provide an estimate of installation cost and energy savings available from alternative energy conservation measures.⁽¹⁹⁾ The utility is not required to provide the homeowner with an estimate of the total energy load or consumption for the home. The requirements are administered under the Residential Conservation Service (RCS) program within the U.S. Department of Energy. In addition to the RCS energy audits, many audits have been conducted in the Northwest as part of the BPA Residential Weatherization program. In 1982 and 1983, 209,000 audits were performed under this program.⁽²⁰⁾ Prospective home purchasers should routinely ask whether an energy audit has been conducted and request a copy of available results. Some

utilities and local energy conservation offices may disclose the results of any prior audit to prospective home purchasers. The purchaser should also ask which energy conservation measures, if any, were installed subsequently to the audit.

A fourth source of energy efficiency information is the results of a home energy rating or certification program. A home energy rating program funded by BPA has been operating in the Puget Sound area since 1983.⁽²¹⁾ The program is being expanded to other cities in the Northwest. The rating provides information on the relative energy efficiency of a particular home. Although the percentage of the housing stock that has been rated is low, purchasers should still inquire whether a rating has been performed. Certain electric utilities in the Northwest will also soon be adopting the "Good Cents" or "Super Good Cents" program (see Sections 1.0 and 2.0) for newly constructed homes. Portland General Electric and PacifiCorp (formerly Pacific Power and Light Co.) will use the Good Cents designation for new homes built to their own predetermined energy standard. BPA will soon be encouraging its customers to adopt the Super Good Cents program. Homes designated "Super Good Cents" must meet the Council's model conservation standard.

One survey (p. A.6) found that home buyers in the Puget Sound area do not aggressively seek energy efficiency information on prospective homes. Of 196 individuals who had recently purchased a home, 38% had asked to see fuel bills for the previous year, 11% asked if there had been a home energy audit, and 3% requested the seller to have an audit performed. The authors of the same study (p. A.10) queried 25 real estate agents about how often home buyers ask to see fuel bills. Their response was that 20% always ask, 48% sometimes ask, and 32% seldom, if ever, ask to see prior fuel bills. These survey results suggest that energy efficiency, at least in the Puget Sound area, either is not an overriding concern or that home buyers need more information on the availability of energy efficiency information and how to get it.

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4.0 ROLE OF ENERGY EFFICIENCY IN DECISIONS TO SEEK AND SELECT NEW HOUSING

This chapter is divided into two parts. In Section 4.1, the results of surveys discussing reasons why individuals seek new housing are reviewed. The relative importance of particular housing selection attributes once a decision to purchase a new home has been made is discussed in Section 4.2. Both sections are largely drawn from the studies highlighted in Appendix A, and both include information on the relative importance of energy efficiency.

4.1 RELATIVE IMPORTANCE OF REASONS TO SEEK NEW HOUSING

This section discusses the results of surveys on the relative importance of various reasons for buying a different house. Buyers can be in the home market in their existing geographic location or at a new location. The discussion primarily addresses reasons to buy a new home within a given geographic location. The underlying reasons for moving to a new location, e.g., job change, different climate preference, etc., are mentioned briefly.

The most recent data found on reasons for buying a new home are from surveys undertaken by Professional Builder and Builder magazines. The Professional Builder survey (pp. A.1-A.3) is conducted annually. The most recent survey was conducted in August 1983 and covered 475 households that indicated their intention to purchase a home in the immediate future. The most significant reason for buying was to obtain a larger home. This reason was even more pronounced on the Pacific coast. A better geographic location was the second most cited reason. A desire for a more energy efficient home ranked as the fifth most cited reason (8.4%) nationally for buying a new home, but was rated considerably lower (2.6%) by households on the Pacific coast. The Pacific coast region in the survey included California, Oregon, and Washington. Responses were presumably affected by California's mild climate.

The Builder survey (pp. A.4-A.5) was conducted during the latter half of 1983 and covered 2,176 prospective home buyers who visited model homes in newly constructed home complexes. These individuals were thus more likely to be interested in the purchase of a newly constructed home than the Professional Builder sample, which represented a general sample of individuals who expected

to purchase a home. The results of the Builder survey were quite different from the Professional Builder survey. In the Builder sample, acquiring a more energy efficient home was the most often cited motivating factor for buying a new home for current homeowners. For respondents that currently rent, a desire to cease renting and tax advantages were cited first and second, respectively. Purchase of a more energy efficient home was the third most cited reason for purchasing a new home.

The results of the two surveys are puzzling in the widely differing importance of energy efficiency as a reason to buy a different home. A possible explanation is that the respondents in the Builder survey were asked to check all applicable items that would encourage them to purchase a new home. Since most potential buyers are at least interested in energy efficiency, it was frequently cited. In any case, comparison of the two survey results suggests that buyers who are interested in newly constructed homes, weigh greater energy efficiency higher as a reason to buy than do home buyers in general.

A 1981 survey (p. A.15) found that 45% of individuals who visited model home complexes were only considering newly constructed homes; 55% were also considering the purchase of an existing home. Compared to the Builder survey, the same study found a lower, but still significant percentage (25%) of respondents who listed improved energy efficiency as a reason to buy a new home.

A 1981 study involving two focus groups (p. A.18) also found that prospective buyers of newly constructed homes are more interested in energy efficiency than buyers of existing homes.

4.2 RELATIVE IMPORTANCE OF PARTICULAR ATTRIBUTES IN HOME SELECTION

This section discusses survey results that address the relative importance of particular attributes in the home selection process once a decision to buy has been made. The topic is closely related to the issue of reasons for purchasing a new home discussed in Section 4.1, and the literature is sometimes confusing on which topic is being surveyed.

The two attributes that appear to be the most important in selecting a new home are price and location. Common sense suggests this result, and survey

results confirm it. A 1983 survey of home buyers in the Puget Sound area (p. A.6) for example, found that most buyers listed location first and price second as the most important considerations in selecting a new home. A 1980 survey by the National Association of Home Builders (NAHB) found that among those who purchased newly constructed homes in 1977 or 1978 neighborhood was cited most frequently as the most important attribute in home selection (p. A.12). A 1980 survey in eastern Oregon and Washington (p. A.29) found price and neighborhood to be the two most important attributes in the home selection process.

After price and location, the attributes of size, design, and construction quality appear to be most important. In the Puget Sound study (p. A.6) design was ranked as the third most important attribute and size as fourth. In the NAHB study (p. A.12) quality of workmanship was listed after neighborhood as the most important feature among those who had purchased a newly constructed home. A related attribute, the builder's reputation, was ranked third. In the eastern Oregon and Washington study, floor plan was ranked fourth, quality of construction fifth, and house size eighth among selection attributes. Another study (p. A.30) led to the ranking of 17 selection attributes by 150 individuals who had purchased a home. Safety from crime, an attribute related to location, was listed as the most important attribute followed by construction quality. The amount of living space was the fourth most important attribute. This was the only study reviewed where safety from crime was used as a specific selection attribute.

After the five preceding attributes, energy efficiency appears to be at least as important as any other attribute. In the eastern Oregon and Washington study (p. A.29) the level of insulation was the third most important selection attribute. In the Puget Sound study (p. A.6) energy efficiency was the sixth most important consideration in home selection. Finally, in the NAHB study (p. A.12) energy saving features were the fifth most important consideration nationally and were seventh in the Pacific region (Alaska, California, Hawaii, Oregon, and Washington) among the sample who had purchased newly constructed homes in 1977 or 1978. The ranking of selection attributes in the surveys discussed above are summarized in Table 4.1.

TABLE 4.1. Relative Importance of Selection Attributes to Individuals Who had Purchased a New Home

	NAHB	NAHB	State of Washington	PNL	Freder/Bible
Page	A.12	A.12	A.6	A.28	A.30
Survey date:	1980	1980	1983	1980	1977
Sample size:	1249	89	196	35	150
Location:	National	Pacific states	Puget Sound	Eastern Oregon, Washington	Midwest
Home type:	Newly constructed	Newly constructed	All types	Newly constructed	All types
Selection Attributes Listed in Order of Importance	<ul style="list-style-type: none"> - Neighborhood - Quality of workmanship - Warranty - Reputation of builder - Energy-saving features - Proximity to work - School district 	<ul style="list-style-type: none"> - Neighborhood - Quality of workmanship - Warranty - Reputation of builder - Proximity to work - School district - Energy-saving features 	<ul style="list-style-type: none"> - Location - Price - Design - Size - Neighborhood - Energy efficiency 	<ul style="list-style-type: none"> - Price - Neighborhood - Insulation - Floor plan - Construction quality - Garage - Location 	<ul style="list-style-type: none"> - Safety from crime - Construction quality - School quality - Living space - Storage space - Property values - Yard size

The NAHB respondents were also asked what the most important considerations would be if they were to move to a different (not necessarily newly constructed) home. Greater energy efficiency was listed as the most important consideration both nationally and among the Pacific region respondents. Note that this result does not imply that increased energy efficiency is a reason to move, but that if the respondents were to move, greater energy efficiency would be the most important consideration in home selection. When the same respondents in the NAHB study were asked what features would be important if they were to buy another newly constructed home, energy saving features were ranked third in the Pacific region states and, nationally, were virtually tied for second (after quality of workmanship) with neighborhood and builder reputation. Energy efficiency was thus much more highly weighted as a selection attribute for the respondent's next home than for the home they had purchased in 1977 or 1978.

Finally, the results in Section 4.1 on reasons to seek new housing relate indirectly to the relative importance of selection attributes. Thus the respondents and the Builder survey (p. A.4) who rated a more energy efficient home very highly as a reason to purchase a different home could probably be expected to weight energy efficiency high among selection attributes once a decision was made to purchase.

5.0 IMPORTANCE OF PARTICULAR ENERGY EFFICIENCY FEATURES AND WILLINGNESS TO PAY FOR THEM

This section discusses two topics. Section 5.1 discusses survey results on the relative importance of particular home energy efficiency features. Section 5.2 discusses the willingness of home owners and home buyers to pay for energy efficiency improvements.

5.1 RELATIVE IMPORTANCE OF PARTICULAR ENERGY EFFICIENCY FEATURES

Survey results indicate that the energy efficiency features home buyers are most interested in are insulation (ceiling, wall, and floor, in decreasing order of importance) followed by extra window glazing, and appropriate weatherstripping and caulking. In the Puget Sound study (p. A.8) of individuals who had purchased a home in 1983, the 4 most important energy conservation features in decreasing order were ceiling insulation, storm windows, and wall and floor insulation. In a 1979 North Carolina study (p. A.26) respondents were asked what energy saving features they would most likely look for in their next home. Fifty-one percent of prospective home buyers would be most interested in insulation and extra glazing. Nineteen percent would be most interested in energy efficient appliances. In another 1979 study involving 1000 homeowners (p. A.22) insulation, storm windows and doors, and weather stripping were cited as the most desired energy saving features. The 1983 Professional Builder survey (p. A.2) asked respondents about optional energy saving features that would be selected for a newly constructed home. Nationally, an energy saving water heater was named first by most respondents, followed by storm windows, storm doors, zoned heating/cooling, double glazing, and insulated basement walls. Ceiling and wall insulation and weatherstripping were not offered as choices to respondents, presumably under the assumption that they would be adequately included as part of the standard package of a newly constructed home. Finally, in a 1981 survey (p. A.15) upgraded insulation and double-pane windows were the energy efficiency improvements that buyers of newly constructed homes were most likely to spend extra for.

5.2 WILLINGNESS TO PAY FOR ENERGY EFFICIENCY IMPROVEMENTS

A number of surveys have asked respondents about their willingness to invest in energy efficiency improvements to an existing home or a newly constructed home. The survey data are summarized in Table 5.1.

It is difficult to draw specific conclusions from the data. The Professional Builder data (p. A.1) are interesting, though, and suggest a pattern. In the 1981 Professional Builder survey, 78% of respondents indicated they would be willing to spend \$1000 initially to save \$100/yr on fuel bills. The question was apparently worded to apply only to newly constructed homes. The percentage dropped to 71% in the 1982 survey and 64% in the 1983 survey. The 1983 number for the Pacific states of California, Oregon, and Washington was 63%. A \$100 annual saving for 20 years implies an approximate 8% nominal discount rate with an initial \$1000 investment. The decreasing percentage can be interpreted several ways including: 1) consumers are expecting higher future interest rates; 2) consumers are expecting moderating future energy prices; 3) both 1) and 2); or 4) consumers are increasingly interested in other housing attributes besides energy efficiency.

TABLE 5.1. Willingness to Spend on Energy Efficiency Improvements

<u>Reference Page</u>	<u>Survey Date</u>	<u>Sample Size</u>	<u>Estimated Annual Saving (\$)</u>	<u>Capital Investment (\$)</u>	<u>% Willing to Invest</u>
A.29	1980	35	\$100	\$600	94%
A.26	1979	79	50	200	90
A.26	1979	79	100	600	85
A.26	1979	79	33% of space conditioning costs	1200	80
A.22	1979	1000	25% of space conditioning costs	1362	\$1362 is average of responses
A.1	1981	780	100	1000	78
A.1	1982	527	100	1000	71
A.1	1983	475	100	1000	64

In a recent telephone survey of 603 Oregon residents, 76% of respondents indicated they would be willing to pay an additional \$75/yr for four years for a very energy efficient house.⁽¹⁾ No estimate of fuel savings was included in the question.

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ABBREVIATIONS

Act	Pacific Northwest Electric Power Planning and Conservation Act
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
Council	Northwest Power Planning Council
FHLMC	Federal Home Loan Mortgage Corporation
NAHB	National Association of Home Builders
PNL	Pacific Northwest Laboratory
Plan	Northwest Conservation and Electric Power Plan
U.S.C.A.	United States Code Annotated

APPENDIX

HIGHLIGHTS OF SURVEYS AND DOCUMENTS
REVIEWED FOR THE REPORT

1. Title: National Consumer/Builder Survey on Housing

Author: Professional Builder Magazine

Cahners Publishing

Des Plaines, Illinois

Date: Annual survey conducted in August and published in the December issue of the magazine.

Sample: Households that expect to buy a home in the immediate future.

Sample size: 1981 780

1982 527

1983 475 (78 from Pacific Coast - California,
Oregon, and Washington)

Objectives: Gather information on preferences of individuals planning to buy a home.

Approach: Consumers completed and mailed a written questionnaire.

Relevant Findings:

1. Willingness to spend \$1000 initially to save \$100/yr on energy costs:

	1981 (%)	1982 (%)	1983 (%)	
			All Regions	Pacific Coast
Yes	64.8	49.7	49.3	47.4
Yes - more than \$1000	<u>13.2</u>	<u>21.3</u>	<u>14.9</u>	<u>15.4</u>
Subtotal	78.0	71.0	64.2	62.8
No - recovery period too long	17.6	21.3	22.7	24.4
No - energy savings claims not believable	7.9	7.7	11.2	12.8

2. Optional energy saving features that would definitely be selected as part of a newly constructed home:

	1981 (%)	1982 (%)	1983 (%)	
			All Regions	Pacific Coast
Triple glazing	13.7	15.6	15.2	7.7
Double glazing	24.6	35.7	34.6	34.7
Storm windows	59.8	48.2	48.6	10.3
Storm doors	55.0	46.7	47.6	10.3
Window sunshades	7.8	8.0	6.7	6.4
Insulated basement walls	35.0	29.8	28.2	10.3
Solar water heating	21.1	25.8	18.7	32.1
Energy saving water heater	45.1	62.6	54.7	51.3
Clock thermostat	19.1	21.6	19.8	10.3
Zoned heating/cooling	35.3	48.4	40.8	35.9
Power attic vent	29.5	27.7	24.4	14.1

3. Percent desiring display of energy saving features in model homes:

1981 = 59.8%

1983 = 55.6%.

4. Existing homeowner's primary reason for buying a different home:

	1983	
	All Regions (%)	Pacific Coast (%)
Larger home	23.8	32.1
Better location	21.5	23.1
More amenities/features	11.6	9.0
To realize profit on existing home	10.3	11.5
More energy efficient home	8.4	2.6
Less maintenance	8.0	7.7
New home	6.9	2.6
Smaller home	6.7	3.8
More prestigious neighborhood	3.2	2.6
More community features	1.9	2.6

5. Ways used to determine credibility of energy-efficiency claims:

	1983 %
Ask for guarantees/warranties	51
Visual inspection	45
Ask for literature	38
Get independent evaluation	33
Ask others who bought from builder	33
Look at product brand names	27
Compare to other homes	27
Rely on builder's word	8

2. Title: What Buyers Want: A 1984 Survey of Prospective New Home Buyers
adapted from the Builder Magazine 1984 National Home Shoppers
Survey, Reports 1-14.

Authors: Builder Magazine,
The magazine of the National Association of Home Builders
Washington, D.C.
George A. Fulton Research and Consulting, Fairfax, Virginia.

Date: April 1984 issue of Builder

Objectives: Analyze the feature preferences in newly constructed homes
for three buying categories:

1. Prospective buyers who currently rent their residence
2. Prospective buyers who currently own their residence
3. "Empty-nesters"--home shoppers 45 years or older with
no children at home.

Breakdowns of the survey data by household income for
categories 1 and 2 can be purchased from the authors.

Sample: Prospective home buyers who visited model homes in complexes
of newly constructed homes during the second half of 1983.
The six markets surveyed were: Boston; St. Louis; Houston;
Portland, Oregon; Washington, D.C. suburbs; and southern
California.

Sample Distribution:

Renters	674 (including 37 empty-nesters)
Owners	1,477 (including 272 empty-nesters)
Empty-Nesters	309

Relevant Findings: Items that would most encourage respondents to purchase a new home. Respondents were asked to check all applicable items.

	<u>Renters</u>	<u>Owners</u>	<u>Empty- Nesters</u>
A more energy-efficient home	52%	53%	54%
Larger home	42	50	17
New design features	32	37	38
Tax advantages	63%	35%	31%
Better neighborhood	34	30	19
Less yard maintenance	19	30	51
Investment potential	43	31	23
New product features	22	26	30
Larger yard	28	25	8
Growing family	22	17	1
Change of scene	11	15	15
Fewer people living at home	4	18	44
Better schools	18	16	1
Closer to work	17	14	9
Community recreation facilities	12	12	9
Tired of renting	58	2	10
Smaller home	6	14	38
Community security system	10	8	14
Job transfer	7	8	6
Recent or future marriage	17	5	2
Recent divorce/separation	4	2	2
To use as rental property	2	3	3

3. Title: Surveys in Support of the Residential Energy Evaluation Program

Authors: Kurt Wehbring, David Dornbusch & Co., Portland, Oregon
Adam Davis, Northwest Attitudes, Portland, Oregon

Publications: The surveys are included as Appendix G in A. M. Patton and J. F. Parker, Washington State Energy Office, Olympia, Washington, Residential Energy Evaluation Program: Summary and Evaluation, WAOENG 84-09, March 1984.

Date: The surveys were conducted in the summer of 1983.

Objective: The principal objective of the surveys was to determine the impact on the shelter industry of a pilot program on home energy ratings, and to obtain information to improve and strengthen the program.

Sample: The surveys involved telephone interviews with real estate appraisers, loan offices, real estate agents, home sellers, and home buyers in the Puget Sound area. 25 real estate agents and 196 home buyers who had purchased a home within the last year were interviewed.

Relevant Findings: HOME BUYERS

1. What were the most important considerations in selecting your home?

<u>Consideration</u>	<u>Rank</u>	<u>Percent of Times Mentioned by Respondents</u>
Location (near family, friends, job, shopping	1	60%
Price	2	54
Building design, aesthetics	3	48
Amount of space	4	33
Quality of neighborhood	5	31
Energy efficiency	6	22
Financing	7	11
Schools	7	11
Landscaping, yard	8	10

2. When you were looking for a house to buy, was the energy efficiency of the house very important, somewhat important, not very important or not at all important?

Very important	31%
Somewhat important	49
Not very important	13
Not at all important	<u>7</u>
Total	100%

3. Did you ask the seller to provide you with the fuel bills for the last year?

Yes	38%
No	60
Don't know	<u>2</u>
Total	100%

4. Did you ask the seller if there had been a home energy audit?

Yes	11%
No	86
Don't know	<u>3</u>
Total	100%

5. Did you ask the seller to have a home energy audit conducted?

Yes	3%
No	86
Don't know	<u>11</u>
Total	100%

6. What energy conservation features of the house you bought did you feel were important?

Feature	Rank	Percent of Times Improvement Was Mentioned
Ceiling insulation	1	38%
Storm windows	2	36
Wall insulation	3	31
Floor insulation	4	21
Hot-water heater wrap	5	17
Type of furnace	6	13
Weatherstripping/caulking	7	12
Woodstove	8	5
Clock thermostat	9	6
Solar space heating	10	4
Insulated ducts, pipe	10	4
Solar water heating	11	2

7. If you could get a larger mortgage for an energy-efficient house, how influential would the larger mortgage be in selecting a house to buy?

Very influential	20%
Somewhat influential	37
Not very influential	23
Not at all influential	15
Don't know, refused	<u>5</u>
Total	100%

REAL ESTATE AGENTS

1. When establishing the offering sale price of a house, do you think that the energy efficiency of the house is very important, somewhat important, not very important, or not at all important?

Very important	44%
Somewhat important	48
Not important	<u>8</u>
Total	100%

2. When selling a house, do you think a house that is energy efficient is definitely easier to sell, somewhat easier to sell, or doesn't make much difference?

Easier	48%
Somewhat easier	32
No difference	<u>20</u>
Total	100%

3. Do you ever encourage or recommend a seller to make energy efficiency improvements to a house prior to selling the home, such as adding storm windows or insulation?

Yes	44%
No	<u>56</u>
Total	100%

4. (For those who answered yes in question 3.) Why do you recommend energy efficiency improvements?

(N = 11)

	<u>Mention</u>	<u>Not Mention</u>	<u>Don't Know or Refused</u>
Increases resale value	55%	18%	27%
Improves appearance	9	55	36
Increases loan amount	9	55	36

5. Which do you think are the three most important energy efficiency selling features?

	<u>Frequency Mentioned</u>
Storm windows	36%
Attic insulation	32
Heat pump	12

6. When a homebuyer evaluates a house, to what extent do you think energy use and efficiency is a factor in the purchase decision?

Very important	40%
Somewhat important	44
Not very important	12
Not at all important	<u>4</u>
Total	100%

7. In your experience, how often do potential homebuyers ask to see the annual fuel bills: always, sometimes, seldom if ever?

Always	20%
Sometimes	48
Seldom, if ever	<u>32</u>
Total	100%

8. In estimating their monthly carrying charges, how often do homebuyers presently include the fuel costs in their calculations: always, sometimes, seldom if ever?

Always	20%
Sometimes	48
Seldom, if ever	<u>32</u>
Total	100%

4. Title: Decisions for the 1980s

Author: Economics Division, National Association of Home Builders,
Washington, D.C.

Sample: Approximately 1250 individuals including 89 in the Pacific
region who purchased a newly constructed home in 1977 or 1978.
The survey was administered in the fall of 1980.

Objective: Survey the attitudes, preferences, interests, and outlook of
new home buyers.

Relevant Findings: A number of energy related questions were asked during
the survey. The survey results were broken out by
census region. Tables A.1 and A.2 present the results
for the Pacific region (California, Oregon, Washing-
ton, Alaska, and Hawaii) and the total results for the
entire United States. The tables are also reproduced
with complete regional information at pages 150-153 of
A. Downs, editor, Energy Costs, Urban Development, and
Housing, The Brookings Institution, Washington, D.C.,
1984.

TABLE A.1. What Consumers Seek in the Purchase of a Home
(percent of respondents)

<u>Question and Response</u>	<u>Pacific</u>	<u>Total</u>
If you were going to move, what would be the most important considerations in your selection of a home?		
Greater energy efficiency	68.2%	79.5%
Larger lot	50.0	39.8
Larger house	42.0	42.7
Better neighborhood	31.8	25.1
New house	30.7	34.9
Smaller house	14.8	9.9
Smaller lot	2.3	4.6
Old home to rehabilitate	5.7	5.2
Older home	1.7	3.1
More luxury features	30.7	31.2
Low-tax neighborhood	9.1	20.4
Condominium or cooperative	1.1	3.7
Town house	2.3	3.4
Mobile home	1.1	0.5
Inter-city location	4.5	2.1
Other	11.4	8.2
Number of respondents	88	1,218

What features were important to you when you bought a new home?

Reputation of builder	58.4%	66.3%
Neighborhood	89.9	89.1
Quality of workmanship	77.5	78.0
Warranty	73.0	71.0
Proximity to shopping area	43.8	38.1
Proximity to work	57.3	50.8
School district	52.8	47.1
Energy-saving features	51.7	60.3
Recommendation of another buyer	7.9	7.7
Other	11.2	11.8
Number of respondents	89	1,249

TABLE A.1. (contd)

<u>Question and Response</u>	<u>Pacific</u>	<u>Total</u>
What features would be important to you if you were buying another new home?		
Reputation of builder	67.9%	79.9%
Neighborhood	78.2	80.1
Quality of workmanship	84.6	85.4
Warranty	62.8	66.5
Proximity to shopping area	50.0	44.9
Proximity to work	65.4	58.9
School district	47.4	51.7
Energy-saving features	75.6	78.7
Recommendation of another buyer	10.3	14.5
Other	10.3	11.7
Number of respondents	78	1,107
Was your new home advertised as energy-efficient?		
Yes	28.7%	45.8%
No	66.7	42.8
Do not remember	4.6	11.3
Total	100.0	100.0
Number of respondents	87	1,226
What type of house would you prefer to buy?		
Single-family detached	95.5%	92.8%
Single-family, attached	3.4	3.6
Duplex	0.0	1.2
Low-rise condominium	0.0	1.6
Mid-rise condominium	0.0	0.5
High-rise condominium	1.1	0.3
Mobile home	0.0	0.0
Total	100.0	100.0
Number of respondents	89	1,252

TABLE A.2. Willingness of Homeowners to Add Energy-Saving Features to Their Homes and the Types of Heating System under Consideration (percent of respondents)

<u>Item</u>	<u>Pacific</u>	<u>Total</u>
Willingness to pay \$500 for extra insulation		
Quite willing	55.1%	61.6%
Somewhat willing	37.1	31.6
Not at all willing	7.9	6.8
Total	100.0	100.0
Number of respondents	89	1,246
Willingness to pay \$1,200-1,500 for storm windows or windows with thermal panes		
Quite willing	46.1%	45.2%
Somewhat willing	33.7	39.3
Not at all willing	20.2	15.5
Total	100.0	100.0
Number of respondents	89	1,243
Homeowners considering installation of another type of heating system		
Yes	25.9%	19.2%
No	74.1	80.8
Total	100.0	100.0
Number of Respondents	85	1,217
Homeowners converting or supplementing their heating systems		
Converting primary system	5.6%	17.8%
Adding supplemental system	94.4	82.2
Total	100.0	100.0
Type of heating system under consideration		
Electric resistance system	0.0%	2.2%
Electric heat pump	11.5	15.1
Gas-fueled furnace	0.0	9.2
Oil-fueled furnace	0.0	1.1
Liquid petroleum system	0.0	0.0
Wood-burning system	69.2	51.5
Solar-powered system	11.5	12.9
Other	7.7	8.1
Total	100.0	100.0
Number of respondents	26	272

5. Title: Fourth Annual Home-Shopper Survey: Buyer Preferences 1982

Author: Housing Magazine (McGraw-Hill)

Date: December 1981

Sample: 2237 prospective homeowners who visited model homes in complexes of newly constructed homes

Relevant Findings:

1. 25% of those surveyed listed improved energy efficiency as a reason to buy a new home. The responses ranged from 15% in Los Angeles to 38% in Kansas City. No Northwest cities were included in the survey.
2. On average, the following percentages of those surveyed would be willing to spend the amount shown for specific energy efficiency improvements in a newly constructed home:

<u>Item</u>	<u>Estimated Cost (\$)</u>	<u>% Willing to Spend</u>
Double pane windows	500	73
Upgraded insulation	1500	87
Heat pump	2000	39
Solar water heating	2800	42
Solar water and space heating	8000	32

There was significant regional variation in the responses.

3. 45% of those surveyed were looking only at newly constructed homes; 55% were also considering existing homes.

6. Title: National Homebuying Survey

Author: Economics and Research Division, National Association of Realtors, Chicago, Illinois.

Date: 1981

Objective: Survey recent home buyers to give an understanding of the home buying and selling process.

Sample: 5200 individuals who had recently purchased homes, including 2,000 who had also recently sold a home. The survey was administered between March and May 1981 in 14 cities. The only Northwest city included was Seattle.

Relevant Findings:

The survey contains a variety of data including information on:

1. household composition
2. household income
3. number of prior homes
4. price range of past home vs. current home
5. whether move was local or long distance
6. type of home purchased by household, age, income and composition
7. reason for moving
8. energy considerations
9. median price by home type
10. use of Realtors

Importance of home attributes related to energy:

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>	<u>Total</u>
Size of home	39%	40	21	100%
Type of heating used	32%	41	27	100%
Location closer to work	32%	31	37	100%
Energy efficiency of home	31%	41	28	100%
Design of home	30%	42	28	100%
Availability of public transport	20%	23	57	100%
Location closer to shopping	18%	38	44	100%

Stated reasons for purchasing the home:

<u>Reason</u>	<u>Local Movers</u>	<u>Long Distance Movers</u>	<u>All Movers</u>
Tax advantage	28%	19%	27%
Rising home prices	23	12	21
Larger home	16	8	15
Prior neighborhood dissatisfaction	15	8	14
Employer change	3	20	5
Job transfer	2	20	5
Smaller home	4	3	4
Condominium conversion	1	(a)	1
Other			
Personal--divorce, health death of spouse	3	1	3
Desire to own, pride of ownership	2	1	2
Location near water, relatives, etc.	2	4	2
Marriage	1	1	1
Retirement	<u>(a)</u>	<u>1</u>	<u>(a)</u>
Total	100%	100%	100%

(a) Less than 1%.

7. Title: None (Job No. 6463)

Author: Market Facts, Inc.
Arlington, Virginia

Sponsor: U.S. Department of Energy

Date: September 1981

Objectives: The principal objective of this study was to gather information on the usefulness of home energy ratings to home purchasers. A secondary objective was to gain information on the role of energy efficiency considerations in the home purchase process.

Approach: The authors conducted their work in two phases. Phase one involved a literature review and a review of prior related studies conducted by Market Facts. Copies of their summary of studies that are related to this report are included as Titles 7A, 7B, and 7C. The authors also conducted and summarized the result of focus groups held in Chicago and Richmond, Virginia.

Relevant Focus Group Findings:

1. Housing consumers assign greater value to homes with energy efficient features than to those without them.
2. Buyers of new homes appear more interested in energy efficiency than buyers of existing homes. The latter group is more interested in such features as location, established landscaping, and hardwood floors.
3. Focus group participants in Richmond would use energy efficiency as one of the five most important criteria in the home selection process. The Chicago participants ranked it lower.

7A. Title: Study of Potential Home Buyers

Author: Market Facts, Inc.

Date: Fall 1980

Sample: 611 potential home buyers screened from consumer mail panel.
National sample with approximately equal numbers from the South,
Northeast, North Central and West.

Objectives: To describe potential home buyer awareness and attitudes
toward passive solar energy and evaluate the potential of
passive solar energy features.

Relevant Findings:

1. Reasons to buy another house:

	<u>% Respondents</u>
Need more room	29%
Want more room	29
Want a more energy efficient house	28
Job related	18

2. Likelihood of including energy saving features in new
house if offered at an extra cost.

Scale: 3 = very likely
2 = somewhat likely
1 = not at all likely

	<u>Mean</u>
Extra insulation	2.7
Automatic thermostat	2.6
Energy efficient appliances	2.6
Storm windows	2.5

3. Average cost/month for heating \$88. 37% of the
respondents used actual bills to estimate their
monthly heating bills, 50% used rough estimate, 13%
used a budgeted heating plan figure.

4. Average cost/month for cooling \$55. 36% of respondents estimated cooling costs based on actual bills, 64% used a rough estimate.
5. Knowledge about how to save energy:
 - 26% of the respondents say they know a lot about how to save energy
 - 57% say they know some
 - 16% say they know a little
 - 21% say they know nothing
6. Sources used to get information about conserving energy in home:

	<u>% Respondents</u>
Magazines	87%
Utility company	76
Newspapers	72
Books	68
Government publications	63
7. 95% of respondents stated they needed reliable and accurate information about the initial cost of adding passive solar features to their home. 90% would need information on how much of their energy requirements passive solar could provide.

7B. Title: Perspective on Energy

Author: Market Facts, Inc.

Sponsor: Dow Chemical Co.

Date: September 1979

Sample: 1000 single-family homeowners throughout the country reached by telephone.

Objectives: To determine homeowners' attitudes about home energy costs and home energy efficiency.

Relevant Findings:

1. 63% of respondents agree that mortgage rates should be lower on energy efficient homes.
2. 83% of respondents recognize that well insulated, energy efficient homes will be worth more at resale than homes lacking such features.
3. Energy costs and energy efficiency were reported by homeowners as follows:
 - 94% are affected by rising energy costs
 - 94% are trying to reduce energy costs through conservation
 - 63% feel their home could be more energy efficient
 - 41% are more concerned about energy cost than availability.
4. Past energy conservation activity (12 months prior to survey):

	<u>% Respondents</u>
Lower winter thermostat	79%
Add weather stripping	55
Insulate water heater/lower temp.	51
Raise summer thermostat	40
Install storm windows/doors	39
Add attic insulation	31

Replace major appliance with energy efficient model	23
Add wall insulation	21
Add basement insulation	21

5. Desired energy saving features:

	<u>% Respondents</u>
Attic insulation	92%
Wall insulation	90
Weather stripping and caulking	84
Storm doors and windows	84
Basement insulation	70

6. When asked how much extra they would spend for an optional comprehensive insulation package that would save 25% on home heating and cooling costs, respondents said they would pay an average of \$1362.

7. Only 48% believe that new homes are more energy efficient than existing homes.

7C. Title: Professional Builder's 1980 Consumer/Builder Survey on Housing

Author: Professional Builder Magazine

Date: Fall 1979 (See p. A.1 for 1981-1983 surveys)

Objectives: To describe the design features, motivations, products and amenities that today's potential home buyers are looking for.

Relevant Findings:

	<u>% Respondents</u>
1. Housing preferences:	
Detached single-family	94.3%
Attached single-family	3.8
Low-rise condominium	1.7
High-rise condominium	0.3
2. Buying motivations:	
Investment	43%
Inflation hedge	33
Privacy	31
Security	26
Raise family	26
Provides better way of life	21
3. Factors influencing buying decision:	
Good appreciation	70%
Size of house	49
Style and appearance	29
Close to work	14
Warranties	10
Prestigious neighborhood	9
Near public transportation	8
4. Reasons why homeowners are in the buying market:	
Location	36%
Larger home	28
Profit on present home	17

Newer home	10
Smaller home	9
Less maintenance	8
Energy conservation	6
Community features	2
5. 67% of potential homeowners want information about home operating costs with future cost estimates.
 6. 57% would like displays showing energy conservation features of house.
 7. 91% of buyers said they would pay \$600 for energy conservation packages.
 8. Four out of the top five most popular options for newly constructed homes were energy saving features

	<u>% Respondents</u>
Storm windows	64%
Storm doors	60
Air-conditioning	45
Water saving showerheads	38

8. Title: Energy and Housing: Consumer and Builder Perspectives
- Editors: R. J. Burby
M. E. Marsden
University of North Carolina at Chapel Hill
- Sponsor: North Carolina Energy Institute, North Carolina Department
of Commerce
- Date: Publication: November 1979
Survey Conducted: Fall 1978
- Sample: Seventy-nine North Carolina households randomly chosen in
proportion to county population.
- Objective: Document current status of energy efficiency in new and
existing housing in North Carolina.
- Relevant Findings: Tables A.3 and A.4 are adapted from the text.

TABLE A.3. Prospective Home Buyers' Interest in
Energy Efficient Housing

Indicator	Percent of Prospective Buyers (N=79)
<u>Energy Saving Features Would Most Likely Look for in Next Home</u>	
Insulation, storm windows, storm doors	51%
Energy saving appliances	19
Wood stove/fireplace	7
Heat pump	6
Solar space or hot water heating	6
Design of house	3
Don't know	8
Total	100
<u>Thought About Adding Solar Hot Water Heating</u>	
Yes	25
No	75
Total	100
<u>Willingness to Spend More to Save on Heating Bills</u>	
<u>Spend \$200 More to Save \$50 per Year</u>	
Yes	90
No	10
Total	100
<u>Spend \$600 More to Save \$100 per Year</u>	
Yes	85
No	15
Total	100
<u>Spend \$1200 More for Heat Pump to Save One Third on Heating Bills</u>	
Yes	80
No	20
Total	100

TABLE A.4. Types of Households Most Likely to Demand Energy Efficient New Homes

<u>Type of Household</u>	<u>Percent of Prospective Buyers Who Would:</u>		
	<u>Think About Energy Saving Features of Next Home</u>	<u>Pay \$600 More to Save \$100 Annually</u>	<u>Think About Adding Solar Hot Water Heating</u>
<u>Total Sample (N=79)</u>	87%	85%	25%
<u>Location</u>			
Mountains	79	86	29
Piedmont	85	85	23
Coastal Plain/Tidewater	92	81	27
Metropolitan area	87	87	18
Nonmetropolitan area	85	81	32
Urban	83	83	27
Rural	95	85	20
<u>Current Residence</u>			
Single-family-detached	86	75	27
Multiple-family	89	100	28
Mobile home	82	100	9
<u>Income</u>			
Less than \$10,000	76	76	14
\$10,000 - \$14,999	95	86	23
\$15,000 - \$24,999	91	95	33
\$25,000 or more	80	73	27
<u>Age</u>			
Under 35	87	87	22
35 - 64	82	77	32
75 or older	100	67	33
<u>Education</u>			
High school or less	83	85	20
Some college or more	91	82	32
<u>Race</u>			
White	86	83	24
Nonwhite	89	89	33

9. Title: Building and Occupant Characteristics as Determinants of Residential Energy Consumption

Report No.: PNL-4012

Authors: L. A. Nieves

A. L. Nieves

Pacific Northwest Laboratory, Richland, Washington

Sponsor: U.S. Department of Energy

Date: Publication: October 1981

Survey Conducted: February 1980

Sample: 35 households who had recently purchased newly constructed homes. 18 owners had purchased homes in Hermiston, Oregon, with energy efficiency features corresponding to code requirements (R-11 walls and R-22 ceiling insulation). 17 owners had purchased otherwise comparable homes in Hermiston or Kennewick, Washington, except that an energy package consisting of R-19 walls and R-38 ceilings was included.

- Objectives:
1. Observe actual energy consumption and compare to predicted consumption.
 2. Investigate homeowners' conservation investments and home purchase decisions through a questionnaire.

Relevant Findings:

1. Surprisingly, energy consumption in the more energy efficient homes exceeded consumption in the less efficient homes. Possible reasons for the result include the small sample size, generally higher electricity prices for the less efficient home owners, higher household income for owners of more efficient homes, and the uncertain impact of wood heating.

2. Factors reported to affect home purchase decision
(listed in order of importance)

1. Purchase price
2. Neighborhood
3. Insulation
4. Floor plan
5. Quality of construction
6. Garage
7. Location
8. House size
9. Heating and cooling system
10. Number of rooms
11. Expected fuel bills
12. Size of lot
13. Exterior appearance
14. Sizes of rooms
15. Window placement
16. Style
17. Adequate natural lighting
18. Number and type of appliances
19. Effective cross ventilation
20. View.

3. The homeowners were also asked if they would be willing to spend an additional \$600 for a home to realize a \$100 annual saving in fuel costs. Forty-four percent of the sample answered yes, 50% indicated a willingness to spend more than \$600, and 6% had no response.

10. Title: The Home Purchase Process: Measurement of Evaluative Criteria Through Pairwise Measures

Publication: Journal of the Academy of Marketing Science, Fall 1982, p. 359.

Authors: J. B. Freiden
 D. S. Bible

Approach: The authors interviewed 150 homeowners in a large mid-western city in 1977 who had recently purchased their home. Approximately 10% of the homes in the sample were newly constructed. The homeowners were asked to compare the relative importance of 17 housing and neighborhood attributes using the pairwise comparison technique.

Relevant Findings:

Attribute	Approximate Weighted Importance (0-4 Scale)
1. Safety from crime	3.4
2. Construction quality	3.1
3. Quality of schools	2.4
4. Living space	2.1
5. Storage space	1.9
6. Property values	1.7
7. Yard size	1.6
8. Traffic noise	1.6
9. Nearness to work	1.4
10. Nearby parks	1.3
11. Age of house	1.2
12. Neighborhood shopping quality	1.2
13. Neighbor backgrounds	1.1
14. Property taxes	0.9

15. Nearness to friends	0.7
16. Nearness to shopping	0.6
17. Bus service	0.0

Energy efficiency considerations were not explicitly included as an attribute, however they could be construed as being included in the construction quality attribute.

11. Title: Joint Decisions in Home Purchasing: A Muddling Through Process

Author: C. W. Park

Publication: Journal of Consumer Research, September 1982, p. 151.

Sample: 48 couples who had recently purchased a home or who were actively searching. Only 15 couples were used to test Objective 2. All couples were in a Midwest university town and were interviewed in 1977.

Objectives:

1. Test the conceptualization that:
 - a. A joint decision (in this case purchase of a home) by a husband and wife is a muddling through process characterized by limited knowledge and awareness of each spouse's decision strategies.
 - b. The spouses can reach an effective choice by relying on conflict avoiding heuristics.
2. Test mutual relative influence of spouses for 24 home purchase dimensions (attributes).

Relevant Findings:

1. The research supported the conceptualization in Objective 1 above.
2. The relative influence for the 24 attributes are shown in Table A.5. The attribute of most interest to the present study, insulation, has significantly greater husband influence than wife influence. The greater husband influence is consistent with the finding in the Qualls dissertation (p. A.34).

TABLE A.5. Couple's Relative Influence Responses

Dimension	Agreement ^(a)			Disagreement ^(b)	Don't Know Response
	Husband Influence	Wife Influence	Sub total		
Age of home	2	7	(9)	3	16
Attractiveness	1	11	(12)	4	10
Central air conditioning	4	3	(7)	0	18
Basement	9	5	(14)	3	13
Builder's reputation	1	0	(1)	1	4
Fireplace	4	4	(8)	1	18
Fenced yard	3	4	(7)	2	10
Humidifier	0	0	(0)	0	1
Insulation	11	3	(14)	1	10
Interior design	0	13	(13)	6	8
Landscaping	3	1	(4)	1	13
Location	3	13	(16)	7	19
Neighborhood	2	6	(8)	4	18
Bedroom	3	9	(12)	7	26
Bathroom	3	5	(8)	2	17
Garage	10	1	(11)	0	20
Patio	0	0	(0)	0	7
Price	17	3	(20)	8	16
Recreation facilities	1	1	(2)	0	3
Resale value	13	2	(15)	2	7
Size of home	1	8	(9)	7	9
Style of home	2	11	(13)	1	10
Tax amount	7	0	(7)	3	10
Wet bar	0	0	(0)	0	0

(a) A dyad's response reveals an agreement about who influenced more on the dimension.

(b) A dyad's response reveals a disagreement about who influenced more on the dimension (i.e., each spouse indicated that s/he influenced the other more).

(c) Either one or both of a dyad revealed a "don't know" response about who influenced more on the dimension.

12. Title: A Study of Joint Decision Making Between Husbands and Wives in a Housing Purchase Decision

Author: W. J. Qualls
Doctor of Business Administration Dissertation
Indiana University

Date: 1982

Sample: 108 couples

Relevant Findings:

1. For the housing decision attributes of floor plan, style, location, and optional built-ins, both husbands and wives believed that there should be approximately equal influence between them.
2. For the housing decision attributes of price, optional exterior, and optional energy saving features, wives perceived that these decisions should be made with joint and approximately equal husband and wife influence. Husbands, however, viewed these areas as principally their decision responsibility.
3. The author suggests that real estate marketing practitioners should concentrate their efforts for housing subdecisions on price, optional exterior, and energy saving features on the husband. Marketing efforts for the master suite, home style, floor plan, and optional built-in product features should be concentrated on the wife.

13. Title: The Use of Home Energy Audits and Home Energy Rating Systems in the Home Selection Process

Author: Decision Research Corp.
Lexington, Massachusetts

Sponsors: Energyworks, Inc.
Pacific Northwest Laboratory
U.S. Department of Energy

Date: July 1982

Sample: Nineteen homeowners who participated in two focus groups in Lexington, Massachusetts, on June 16, 1982.

Objectives: The primary objective of the focus groups was to gather information on the use of home energy rating systems in the home selection process. A secondary objective was to gather information on the role of energy efficiency in the home selection process.

Publication: The results of the focus groups are summarized in Section 2.4 of A. D. Ackerman, et al., The Massachusetts Home Energy Rating System Project, PNL-4763, Pacific Northwest Laboratory, Richland, Washington, August 1983.

Relevant Findings: The focus group participants generally indicated that price and location were the most important criteria in the home selection process. Energy efficiency considerations were considered relevant, but not determining unless the projected cost to heat a home is exorbitant or the houses under consideration are otherwise equal. A major reason for this view was that participants believed that a desired home with poor energy efficiency could be effectively retrofitted with energy conservation features.

14. Title: Conservation Characteristics Among Determinants of Residential Property Value

Authors: M. Longstreth, A. R. Coveney, J. S. Bowers

Publication: Journal of Consumer Research, June 1984, p. 564.

Objective: Decompose housing prices using regression analysis into the implicit prices of the components of housing including features affecting energy use and actual use.

Sample: 615 homes in the Columbus, Ohio, SMSA. All homes were owner occupied, single-family, detached, previously owned and heated with natural gas. Sale price data was collected for the period 1973-1980. All prices are in 1980 dollars.

Relevant Findings:

<u>Independent Variable</u>	<u>Effect on Sales Price of Two Otherwise Identical Houses</u>
1. one extra inch of wall insulation	\$528
2. one extra inch of ceiling insulation	\$508
3. additional 115 ccf annual natural gas consumption	(\$548)
4. additional 150 sq. ft. of living space	\$2,991
5. family room	\$2,347
6. garage	\$2,792
7. each additional bathroom	\$4,350
8. 1% increase in pupil/teacher ratio	(\$1,252)
9. impact of 25 year old house vs. 10 year old	(\$1,287)

15. Title: Tenant-Paid Energy Costs in Multifamily Rental Housing: Effects on Energy Use, Owner Investment, and Market Value of Energy.

Author: Lou McClelland, University of Colorado

Publication No.: DOE/CS-20050-1

Date: December 1983.

Relevant Findings:

This report looks at a number of issues related to energy consumption in apartment units. One survey question addressed is relevant to the present study. The author surveyed 69 apartment managers in Atlanta, Georgia, in June 1982 regarding the level of interest of prospective tenants in the energy efficiency of apartment units. Seventy-six percent of the managers indicated that tenants almost always ask about energy costs, 18% indicated that tenants often ask about the costs, and only 6% of the managers indicated that tenants ask about energy costs half of the time or less. For the Atlanta apartment rental market at least, the results suggest a high level of interest in energy cost and efficiency among prospective tenants.

16. Title: Final Report on the Class C Passive Performance Evaluation Program

Report No.: MASEC-R-81-014

Author: Mid-American Solar Energy Complex
Minneapolis, Minnesota

Sponsor: U.S. Department of Energy

Date: September 1981

Sample: 80 Midwest owners of passive solar home

Objective: Gather information on attitudes and user acceptance from owners of passive solar homes.

Relevant Findings:

1. The owners are generally very satisfied with their home.
2. Savings on fuel cost was the principal reason for buying the home.
3. Books and magazines were the primary passive solar information sources.
4. Most owners felt that their home's passive solar features increased its market value.

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