Background Information for Programs to Improve the Energy Efficiency of Northwest Residential Rental Property

P. L. Hendrickson

February 1986

**Prepared for
the Bonneville Power Administration
under a Related Services Agreement
with the U.S. Department of Energy
Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute**

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

PACIFIC NORTHWEST LABORATORY
operated by
BATTELLE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC06-76RLO 1830

Printed in the United States of America
Available from
National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

NTIS Price Codes
Microfiche A01

Printed Copy

Pages	Price Codes
001-025	A02
026-050	A03
051-075	A04
076-100	A05
101-125	A06
126-150	A07
151-175	A08
176-200	A09
201-225	A010
226-250	A011
251-275	A012
276-300	A013

BACKGROUND INFORMATION FOR
PROGRAMS TO IMPROVE THE
ENERGY EFFICIENCY OF NORTHWEST
RESIDENTIAL RENTAL PROPERTY

Paul L. Hendrickson

February 1986

Prepared for the
Office of Conservation
Bonneville Power Administration
under a Related Services Agreement
with the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Richland, Washington 99352

SUMMARY

This report was prepared for the Office of Conservation, Bonneville Power Administration. The report will be used by the Office as background information to support future analysis and implementation of electricity conservation programs for owners of residential rental housing in the Northwest.

The principal objective of the study was to review market research information relating to attitudes and actions of Northwest rental housing owners and, to a lesser extent, tenants toward energy conservation and energy-efficiency improvements. Available market research data on these subjects were found to be quite limited. The most useful data were two surveys of Seattle rental housing owners conducted in late 1984 for Seattle City Light. Several other surveys provided supplemental market research information in selected areas. In addition to market research information, the report also includes background information on rental housing characteristics in the Northwest.

Significant findings from the study are listed below. The section of the report where the point is discussed is shown in parenthesis.

- Approximately 34% of Northwest housing units are occupied by renters. Most renters are in single-family homes or large complexes with five or more rental housing units. (2.1)
- Approximately 15% of the Northwest housing units weatherized to date under a utility-sponsored program have been rental units. Rental units have thus been underrepresented in weatherization programs in proportion to their share of the housing stock. (1.2)
- Individuals are the largest group of residential rental property owners, followed by partnerships. (2.3)
- Renters are more likely than homeowners to use electricity as their principal heating fuel. (2.5)
- Renters are much less likely than homeowners to use a secondary fuel source for space heating. (2.5)

- On average, rental housing units contain less insulation and double glazing, and their occupants consume more electricity per sq. ft. of living space than owner-occupied housing. (2.6, 2.7)
- A high percentage of Northwest tenants pay their utility bills directly rather than through their rent. This tendency is especially pronounced for tenants in buildings with electric space heating. Over 90% of tenants in these buildings pay their electricity bill directly to their utility. (2.8)
- Although available data are limited, it appears that energy-efficient rental units rent for more money than comparable, less efficient units. (4.2)
- Approximately half of rental property owners have made some energy conservation improvements to their property in the last three years. (3.1)
- Seattle rental housing owners who have made energy-efficiency improvements have generally based their decision on the importance of energy conservation rather than net economic benefit. (5.1, 5.2)
- Most Seattle owners making improvements have used their own funds rather than borrowed money. (5.2)
- Seattle owners who have not made improvements most often cited the need to use available funds for other purposes as their principal reason for not making improvements. Few cited a need for additional conservation information. (5.1)
- The types of assistance most desired by owners appear to be energy audits and partial reimbursement for the capital cost of energy conservation improvements. (6.0)
- Direct contact with owners appears to be the most effective way of communicating energy conservation program information. Media advertising and presentations at trade groups are other options. (7.0)

In its 1986 Draft Northwest Conservation and Electric Power Plan, the Northwest Power Planning Council takes special note of the importance of electricity conservation in rental housing. The Council indicates that there does not appear to be any current need for additional ratepayer funded programs to weatherize existing housing. Nevertheless, it states that it may be desirable to continue existing programs at a low level and to continue to refine them. The Council notes the underrepresentation of rental housing among units weatherized to date and includes several items in the Action Plan chapter of the Draft 1985 Plan designed to improve their participation rate.

CONTENTS

SUMMARY	iii
ABBREVIATIONS	xi
1.0 INTRODUCTION	1.1
1.1 APPLICATION OF NORTHWEST POWER PLANS	1.2
1.2 EXISTING RENTAL HOUSING WEATHERIZATION PROGRAMS	1.5
1.3 RENTAL HOUSING PARTICIPATION IN EXISTING WEATHERIZATION PROGRAMS	1.7
2.0 CHARACTERISTICS OF NORTHWEST RENTAL PROPERTY	2.1
2.1 DISTRIBUTION OF UNITS BY HOUSING TYPE	2.2
2.2 AGE OF HOUSING UNITS	2.3
2.3 RENTAL PROPERTY OWNERSHIP	2.4
2.4 OCCUPANT TENURE	2.8
2.5 HEATING AND COOLING FUELS.....	2.9
2.6 ELECTRICITY CONSUMPTION	2.11
2.7 THERMAL INTEGRITY	2.13
2.8 TENANT VERSUS OWNER PAYMENT OF UTILITY COSTS	2.16
3.0 PAST CONSERVATION IMPROVEMENTS	3.1
3.1 ENERGY CONSERVATION IMPROVEMENTS MADE BY OWNERS	3.1
3.2 ENERGY CONSERVING ACTIONS AND IMPROVEMENTS BY TENANTS	3.4
4.0 IMPACT OF CONSERVATION IMPROVEMENTS	4.1
4.1 IMPACT ON ENERGY SAVINGS	4.1
4.2 IMPACT ON RENTS AND ADVERTISING	4.2
4.3 ENERGY-EFFICIENCY RATING/CERTIFICATION PROGRAMS	4.4
5.0 OWNERS' DECISION PROCESS FOR CONSERVATION INVESTMENTS	5.1

5.1 REASONS FOR MAKING AND NOT MAKING CONSERVATION IMPROVEMENTS	5.1
5.2 DECISION CRITERIA USED FOR CONSERVATION IMPROVEMENTS	5.4
5.3 SOURCE OF FUNDS FOR CONSERVATION IMPROVEMENTS	5.5
6.0 PREFERENCES OF OWNERS FOR ASSISTANCE	6.1
7.0 TECHNIQUES FOR CONVEYING INFORMATION TO OWNERS	7.1
REPORT ABBREVIATIONS	R.1
ACKNOWLEDGMENTS	A.1

TABLES

1.1	Percent of Year-Round, Northwest Housing Units Occupied by Owners and Renters in 1980	1.8
2.1	Distribution of Renter- and Owner-Occupied Housing by Housing Type	2.2
2.2	Number and Percent of Housing Units in Idaho, Oregon, and Washington Built in Each Decade	2.3
2.3	Rental Property Ownership in Seattle	2.5
2.4	Total Units Owned in Seattle By Owners of One Complex with Five or More Units	2.6
2.5	Number of Housing Units Subsidized by HUD in Idaho, Oregon, and Washington	2.7
2.6	Owners and Renters Occupancy Tenure	2.8
2.7	Principal Space Heating Fuel in Northwest Renter- and Owner- Occupied Housing Units	2.9
2.8	Secondary Space Heating Fuels	2.10
2.9	Principal Water Heating Fuel	2.10
2.10	Type of Air Conditioning System	2.11
2.11	Electricity Consumption Between April 1981 and March 1983 in Households Where Electricity is Main Heating Fuel, West Census Region	2.12
2.12	Feelings About Housing Unit Energy Efficiency, Northwest Data.....	2.13
2.13	Feelings of Seattle Rental Housing Owners About Their Properties' Energy Efficiency	2.14
2.14	Extent of Ceiling Insulation in Northwest Housing Units as Reported by Occupants	2.15
2.15	Thermal Integrity of Owner- and Renter-Occupied Housing, National Data	2.16
2.16	Percent of Northwest Tenants Who Individually Pay Their Utility Bills	2.17

3.1	Conservation Improvements Made by Seattle Rental Housing Owners in the Three Previous Years	3.2
3.2	Conservation Improvements Made by Northwest Rental Housing Owners as Reported by Tenants	3.3
3.3	Energy Conservation Actions Taken by Homeowners and Tenants	3.4
3.4	Insulation Additions During Previous 12 Months by Homeowners and Tenants	3.5
4.1	Period of Time Seattle Rental Property Owners Expect to Hold Property	4.2
5.1	Reasons Seattle Rental Housing Owners Made Energy-Efficiency Improvements	5.2
5.2	Reasons Seattle Rental Housing Owners Did Not Make Energy- Efficiency Improvements	5.3
5.3	Type of Economic Analysis Used for Conservation Investment by Seattle Rental Housing Owners	5.4
5.4	Source of Funds Used for Conservation Improvements by Seattle Rental Housing Owners	5.6
6.1	Types of Conservation Improvement Assistance Desired by Seattle Rental Housing Owners	6.1
7.1	Energy Conservation Information Sources for Seattle Rental Property Owners	7.3

ABBREVIATIONS

BPA	Bonneville Power Administration
CACS	Commercial and Apartment Conservation Service
C.F.R.	Code of Federal Regulations
Council	Northwest Power Planning Council
EIA	U.S. Energy Information Administration
HUD	U.S. Department of Housing and Urban Development
IOU	Investor-owned utility
kWh	Kilowatt hour
LPG	Liquid propane gas
manufactured home	A home built to the Manufactured Home Construction and Safety Standards issued by HUD
Northwest	The Pacific Northwest region as defined in the Pacific Northwest Electric Power Planning and Conservation Act
NTIS	National Technical Information Service
ODOE	Oregon Department of Energy
Plan	Northwest Conservation and Electric Power Plan
PNL	Pacific Northwest Laboratory
PUD	Public Utility District
TVA	Tennessee Valley Authority
U.S.C.A.	United States Code Annotated

1.0 INTRODUCTION

This report was prepared for the Office of Conservation, Bonneville Power Administration (BPA). The principal objective of the report is to review market research data on energy conservation improvements to existing residential rental buildings in the Northwest.^(a) Secondary objectives are to review selected characteristics of rental and owner-occupied housing, past conservation improvements to rental housing and their impact, the decision process for conservation improvements, and the preferences and attitudes of building owners toward assistance options to encourage installation of conservation measures.

Several indicators suggest that rental housing in the Northwest deserves special attention to improve its energy efficiency and thereby conserve electricity. In the western U.S., electricity consumption per square foot in electrically heated housing units is approximately 29% higher in rental housing than in owner-occupied housing (see Table 2.11). Rental housing in the Northwest has less ceiling insulation than owner-occupied housing (see Table 2.14). National data also show that rental housing has less insulation and double glazing than owner-occupied housing (see Table 2.15). Northwest renters are much more likely than homeowners to believe that substantial energy efficiency improvements can be made to their home (see Table 2.12). Northwest renters are much more likely than homeowners to use electricity as their principal heating fuel (see Table 2.7) and much less likely to use a secondary heating fuel (see Table 2.8). Finally, in proportion to its share of the Northwest housing stock, rental housing has been underrepresented among units weatherized under utility-sponsored weatherization programs (Section 1.3).

(a) The term "Northwest" in this report refers to the region designated as the Pacific Northwest in the Pacific Northwest Electric Power Planning and Conservation Act. This region includes "(A) the area consisting of the States of Oregon, Washington, and Idaho, the portion of the State of Montana west of the Continental Divide, and such portions of the States of Nevada, Utah and Wyoming as are within the Columbia River drainage basin; and (B) any contiguous areas, not in excess of seventy-five air miles from the area referred to in subparagraph (A), which are a part of the service area of a rural electric cooperative customer served by the (BPA) Administrator on December 5, 1980 which has a distribution system from which it serves both within and without such region. 16 U.S.C.A. 839a(14).

The body of this report is divided into seven chapters. The remainder of Chapter 1 discusses the effect of the Northwest Power Plans on rental housing conservation, the existing rental housing conservation programs, and the market penetration of these programs. Chapter 2 contains selected statistical data on residential rental buildings in the Northwest, on building owners, and on tenants. Chapter 3 discusses past conservation improvements made to rental buildings. Chapter 4 examines the impact of past improvements on such factors as rents and advertising. Chapter 5 reviews investment decision processes and criteria used by residential rental property owners. Chapter 6 discusses available information on the preferences of owners regarding assistance and incentives for conservation improvements. Chapter 7 reviews existing market research on techniques for reaching rental property owners and encouraging them to invest in energy conservation improvements.

1.1 APPLICATION OF NORTHWEST POWER PLANS

BPA is interested in energy conservation in residential rental property as part of its broader activities to encourage electric energy conservation and to acquire conservation resources in the Northwest. 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.^(a) The Act established the Northwest Power Planning Council^(b) (the "Council") and required the Council to prepare and issue a regional conservation and electric power plan (the "Plan").^(c) The Plan was subsequently issued in April 1983.^(d) A revised draft of the Plan was released for public comment in August 1985.^(e) The final 1986 Plan was adopted by the Council on January 23, 1986. It is scheduled to be released to the public in March 1986. Under the Act, BPA is to acquire electric power resources through conservation

(a) Public law 96-501, enacted December 5, 1980.

(b) 16 U.S.C.A. 839b(a)(2). Section 4.(a)(2) of the Act.

(c) 16 U.S.C.A. 839b(d). Section 4.(d) of the Act.

(d) Northwest Power Planning Council, Portland, Oregon, Northwest Conservation and Electric Power Plan, Vol. 1 and 2, April 27, 1983.

(e) Northwest Power Planning Council, Draft Northwest Conservation and Electric Power Plan, Vol. 1 and 2, August 7, 1985.

and otherwise, consistent with the Plan.^(a) The Act places the highest priority on the acquisition of conservation resources.^(b) 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.^(c)

The Act required the Council to prepare model conservation standards (MCS) to conserve electrical energy in new residential and commercial buildings.^(d) These standards appear in Appendix J of the 1983 Plan. The standards apply to all new residential buildings including multifamily buildings. The 1983 Plan requested Northwest regional state governments (Idaho, Montana, Oregon, and Washington), local governments, or utilities to adopt and enforce the model conservation standards by January 1, 1986.^(e) The Council has recently extended this date. Utilities that serve geographic areas that are not implementing the model standards are potentially subject to a surcharge on power purchased from BPA and consumed in these areas.^(f)

The 1983 Plan contains several guidelines related to energy conservation in rental housing. Guideline 1A (page 10-7) requests BPA to include both owner-occupied and rental buildings in its conservation program for existing residential buildings. Guideline 1D (page 10-7) requests BPA to provide financial assistance to building owners that "will achieve penetration rates for low income and tenant occupied electrically heated households at least proportionate to their respective shares of all electrically heated households in a reasonably defined geographic area." Guideline 1J (page 10-8) requests BPA to provide for certification "of energy efficient electrically heated rental property units."

(a) 16 U.S.C.A. 839(d)(b)(1). Section 6.(b)(1) of the Act.

(b) 16 U.S.C.A. 839(b)(e)(1). Section 4.(3) of the Act.

(c) 16 U.S.C.A. 839d(e)(2). Section 6.(e)(2) of the Act.

(d) 16 U.S.C.A. 839b(f). Section 4.(f) of the Act.

(e) Action item 2.1 in Chapter 10 of the 1983 Plan requests implementation for residential buildings; action item 6.1 requests implementation for commercial buildings.

(f) 16 U.S.C.A. 839b(f). Section 4.(f) of the Act.

The 1986 Draft Power Plan takes a more restrained view than the 1983 Plan of the need for additional conservation programs directed at existing residential buildings. The Council found that current projected electrical loads and resources "do not indicate any current need to acquire resources from the existing residential building sector."^(a) Nevertheless, the Council states that it may be desirable to continue weatherization programs for existing residential buildings at a low funding level while refining the programs so that conservation savings are not lost through partial weatherization.

In the 1986 Draft Power Plan (p. 9-8,9), the Council observes that utility-sponsored weatherization programs in the region are not reaching rental (and low income) housing in proportion to its share of the housing market.^(b) To alleviate this underrepresentation, the Council makes a recommendation and requests BPA to take several actions. The recommendation (p. 9-33) for the region's public utility commissions and investor-owned utilities (IOUs) is that weatherization programs for existing residential buildings should seek to achieve participation by a substantial proportion of owners of rental buildings.

The Action Plan for BPA included in Section 1 of Chapter 9 of the 1986 Draft Power Plan includes several activities (p. 9-9,10) related to existing rental housing. BPA is requested to:

- Revise its weatherization program so that participating utilities achieve penetration of rental housing in proportion to its share of the housing stock in the utility's service area
- Conduct research on the number of rental housing units in the region and the extent to which they have been weatherized
- Conduct demonstration programs to test the feasibility, effect on market penetration, and cost-effectiveness of various financing, marketing, and delivery programs for rental housing weatherization

(a) 1986 Draft Power Plan, Vol. 1, p. 9-7.

(b) Data that support this observation are discussed in Section 1.3.

- Provide an energy rating or certification program that will indicate the relative energy efficiency of rental units that have been weatherized to regionally cost-effective levels^(a)
- Monitor weatherization in rental units in the region, keeping information on participation, measures installed, costs, and appropriate demographic information on participants and nonparticipants
- Determine whether state or local governments can help increase the participation share of rental housing in the residential weatherization program
- Monitor and evaluate incentive and regulatory approaches to rental weatherization being used throughout the United States
- Continue evaluating the ongoing BPA-sponsored weatherization program, including the portion of rental housing that is being weatherized.

1.2 EXISTING RENTAL HOUSING WEATHERIZATION PROGRAMS

A number of programs have been and continue to be offered for conservation improvements to residential rental buildings in the Northwest. The largest programs have been the weatherization programs sponsored by BPA and weatherization programs conducted by IOUs in the region.

BPA has been sponsoring weatherization programs for residential property since 1981. The current long-term program began in October 1983.^(b) Owners of single family homes and residential buildings of three stories or less located within the service area of a participating utility and constructed prior to April 15, 1983, are eligible for the program. Multifamily buildings exceeding three stories are included in the separate commercial sector purchase of energy

(a) BPA has contracted with Yates Associates, Inc., Portland, Oregon, to develop an energy rating system for multifamily buildings.

(b) The program is described in BPA, Division of Residential Programs, DOE/BP-439, p. 5, May 1985.

savings program. In 1984, 100 BPA utility customers weatherized 30,000 Northwest housing units under the long-term program.^(a)

Northwest IOUs are not participating in the BPA long-term weatherization program. All of the IOUs, however, are conducting some type of weatherization program with the concurrence of the four state public utility commissions. The programs generally include rental housing.^(b) The Montana Power Company weatherization program, however, currently applies only to structures containing no more than four units. The utility is conducting a pilot program in Missoula County for structures containing up to 10 units.^(c)

In Oregon, IOUs are required to offer loans or cash payments to their residential customers for installation of energy conservation measures.^(d) The following IOUs serving Oregon residents offer this assistance: Cascade Natural Gas, CP National Corp., Idaho Power, Northwest Natural Gas, Pacific Power and Light, and Portland General Electric.

Seattle City Light has a proposal before the City Council for a weatherization retrofit program for multifamily housing.^(e) The proposed program would provide 100% funding for retrofitting qualifying buildings with low income tenants. Owners without low income tenants would be eligible for zero interest, deferred payment loans. In developing the proposal, Seattle City Light conducted a variety of background studies.^(f)

(a) BPA, 1984 Annual Report.

(b) An inventory of the IOU programs is in Pacific Northwest Utilities Conference Committee, Portland, Oregon, Inventory of Northwest Conservation Programs, August 1985, (hereafter cited as "PNUCC").

(c) PNUCC, p. 56.

(d) Oregon Administrative Rules 860-30-015.

(e) Seattle City Light Conservation and Solar Division, Multifamily Conservation Program Proposal, June 20, 1985.

(f) The background studies include the two surveys of rental housing owners cited in Section 2.3 and the following reports:

1. Jean Culjak Shaffer. March 1984. Evaluation of the Apartment Conservation Pilot Project. Seattle City Light, Seattle, Washington.
2. D. Baylon and M. J. DeLaHunt. March 15, 1985. Conservation Potential for the Multifamily Sector. Ecotope Inc., Seattle, Washington.
3. M. J. DeLaHunt, et al. October 9, 1984. Consumption in the Multifamily Sector. Ecotope Inc., Seattle, Washington.

The Eugene Water and Electric Board is designing a program to offer energy audits and retrofit financing for multifamily buildings that are not eligible for the BPA weatherization program.^(a)

The Commercial and Apartment Conservation Service (CACS) program, administered by the U.S. Department of Energy (DOE), is not likely to have a significant impact on multifamily housing in the Northwest. This program requires large natural gas and electric utilities to perform energy audits for owners of small commercial buildings and apartment buildings. To qualify, an apartment building must have five or more units and central heating or cooling or a central meter for the heating or cooling system.^(b) Most units in Northwest multifamily buildings would not qualify for this audit because they have individual heating/cooling units and are individually metered for space conditioning costs (see Section 2.8). Montana, Oregon, and Washington have submitted plans to DOE to operate the CACS program within their respective states, and the plans have been approved. Idaho did not submit a plan and will become subject to the CACS federal standby plan regulations that were recently issued by DOE.^(c) Several Northwest utilities including Chelan County PUD, Grant County PUD, and Snohomish County PUD have operating CACS programs.^(d)

1.3 RENTAL HOUSING PARTICIPATION IN EXISTING WEATHERIZATION PROGRAMS

Precise figures on the proportion of Northwest rental housing that has been weatherized under one of the utility incentive conservation programs are not available. However, it appears that rental housing has not been weatherized in proportion to its share of the total housing stock. The proportion of rental housing in each of the four Northwest states, according to 1980 Census of Housing data, is shown in Table 1.1. The data in Table 1.1 do not include vacant units. Since the vacancy rate of rental units exceeded that of owner-occupied units in 1980 (and probably does today also), the total proportion of rental units in each state's housing stock will slightly exceed the

(a) PNUCC, p. 53.

(b) 10 C.F.R. 458.102.

(c) 50 Federal Register 37818, September 17, 1985. 10 C.F.R. 458, Subpart G.

(d) PNUCC.

TABLE 1.1. Percent of Year-Round, Northwest Housing Units Occupied by Owners and Renters in 1980

<u>State</u>	<u>Total Housing Units</u>	<u>Percent Owner-Occupied</u>	<u>Percent Renter-Occupied</u>
Idaho ^(a)	324,107	72.0%	28.0%
Montana ^(b)	283,742	68.6%	31.4%
Oregon ^(c)	991,593	65.1%	34.9%
Washington ^(d)	<u>1,540,510</u>	<u>65.6%</u>	<u>34.4%</u>
Total	3,139,952	66.4%	33.6%

(a) U.S. Bureau of the Census, General Housing Characteristics Idaho, HC80-1-A14, Table 5, May 1982.

(b) U.S. Bureau of the Census, General Housing Characteristics Montana, HC80-1-A28, Table 5, May 1982.

(c) U.S. Bureau of the Census, General Housing Characteristics Oregon, HC80-1-A39, Table 5, August 1982.

(d) U.S. Bureau of the Census, General Housing Characteristics Washington, HC80-1-A49, Table 5, August 1982.

percentages shown in Table 1.1. For the region as a whole, approximately 34% of housing units are rental units.

There is some evidence that the percentage of rental units in the Northwest housing stock is increasing. In Washington, for example, 1984 data^(a) show that 26.6% of total housing units in the state (excluding manufactured homes)^(b) were multifamily buildings containing two or more units. The comparable percentage from the 1980 Census of Housing was 25.9%.^(c) In the 1980 Census of Housing, approximately 87% of Northwest occupied housing units in buildings of two or more units were occupied by renters. In Oregon, 24.3% of housing units in the 1980 Census of Housing were in buildings containing 2 or

(a) Washington State Office of Financial Management, 1984 Population Trends for Washington State, p. 11.

(b) In this report, the term "manufactured homes" refers to homes built to the U.S. Housing and Urban Development's Manufactured Home Construction and Safety Standards (24 C.F.R. 3280), but not modular, sectional, panelized, or pre-cut homes. Homes built to the HUD standards are also commonly referred to as mobile homes.

(c) U.S. Bureau of the Census, Detailed Housing Characteristics Washington, HC80-1-B49, Table 60, July 1983.

more units.^(a) Building permit data from 1984, indicated that 23.7% of housing units were to be constructed in multiunit buildings, a percentage just slightly less than the overall 1980 percentage.^(b) During the first 11 months of 1985, however, 42% of housing units authorized in Oregon were to be constructed in multiunit buildings.^(c)

Available data suggests that overall, only about 15% of the Northwest housing units that have been weatherized to date under utility-sponsored weatherization programs have been rental units. The Oregon Department of Energy (ODOE) estimated that between 1977 and 1984, 157,000 housing units were weatherized in Oregon under state- and utility-sponsored programs, of which 25,000 or 16% were rental units.^(d) Under the BPA-sponsored weatherization program, the Eugene Water and Electric Board weatherized 5339 non-low income units in 1983 and 1984; of these, 807 or 15% were rental units.^(e) Puget Sound Power and Light Co. weatherized 41,927 single and multifamily housing units between 1978 and September 30, 1985. Of these, 14% were in multifamily buildings, including 4185 units in multifamily buildings of three stories or less and 1665 units in multifamily buildings over three stories.^(f) BPA does not have exact numbers for the percentage of rental units weatherized under its residential weatherization programs.^(g)

(a) U.S. Bureau of the Census, Detailed Housing Characteristics Oregon, HC80-1-B39, Table 60, August 1983.

(b) Housing Division, Oregon Department of Commerce, "Oregon 1984 Year-End Building Permit Report."

(c) Housing Division, Oregon Department of Commerce, "Monthly Year-to-Date Building Permit Report," December 1985.

(d) Oregon Department of Energy, State of Oregon First Biennial Energy Plan 1985-1987, p. 70. These numbers exclude low income housing units. Thirteen percent of housing units weatherized between 1977 and 1984 are estimated in the report to have been low income units, but there is no estimate of the fraction of low income units that are rental units.

(e) Eugene Water and Electric Board, "Conservation Program Accomplishments," April 1985.

(f) Reidun Crowley, Puget Sound Power and Light Co., Third Quarter 1985 Conservation Report. This report does not contain a breakdown to indicate if weatherized units were owner-occupied or rental.

(g) Mike Weedal, BPA, "Fact Sheet BPA Energy Efficiency Programs for Multifamily Housing," presented at a conference on "Energy Conservation in Rental Housing: What Works," sponsored by the California Energy Commission, Sacramento, CA, May 2,3, 1985.

There are a number of administrative and economic reasons contributing to the underrepresentation (i.e., in comparison to rental housing's share of the total housing stock) of rental units in weatherization programs. One reason is that the BPA residential weatherization program does not apply to multifamily buildings over three stories. Moreover, no multifamily buildings over three stories had been weatherized as of May 1985 under the commercial conservation program.^(a) A second reason is that the estimates of weatherized rental housing may be somewhat low. Single family rental houses, for example, may not always be broken out in the data as rental units.^(b) In addition, weatherized single-family, owner-occupied units that later become rental units may not necessarily be counted as a weatherized rental unit. Finally, low income units are often broken out separately. A higher percentage of these units are likely to be rental units than non-low income housing units.

In addition to the possible administrative reasons above, there are economic reasons that may contribute to the underrepresentation of rental units. The principal reason is that there may not be a sufficiently strong incentive for building owners to install conservation measures when utility costs are paid by tenants. In the Northwest, a large majority of tenants pay their own space conditioning costs (Section 2.8). Moreover, tenants have limited incentive to make permanent conservation improvements when the benefits of such improvements will accrue to the building owner when the tenant leaves.^(c) A second economic reason is that many rental properties are operated with little or no excess cash flow after operating expenses and debt service are paid. Consequently, capital for conservation measures often must be borrowed or come from funds the building owner derives from other sources. Rental property owners are often reluctant to borrow money for conservation improvements,

(a) Mike Weedal, BPA, ibid.

(b) Single-family homes make up a surprisingly large proportion of rental housing. In the Northwest, approximately 39% of rental units are detached single-family homes (Table 2.1).

(c) The relatively short tenure of most tenants in their housing unit contributes to this reluctance (see Table 2.4).

especially if the lender seeks to secure repayment through a lien on the property (see Section 5.3). Finally, the federal income tax credit for conservation improvements has not been available to owners of rental housing.

Several Oregon state agencies have recently expressed interest in assuring that rental housing receives sufficient attention under weatherization programs. The ODOE has called for the setting of specific program goals and targets for energy conservation in rental housing and for development of a marketing plan to encourage the owners of rental housing to use tax credits and loan programs to upgrade energy efficiency.^(a) The Oregon Public Utility Commissioner has directed his staff to study ways to increase the penetration of weatherization programs to low-income and rental housing.^(b) The ODOE and staff at the Oregon Public Utility Commissioner will conduct a survey to determine the weatherization status of rental housing in Oregon.^(c) The target date to complete the survey is June 1986.

(a) ODOE, State of Oregon First Biennial Energy Plan 1985-1987, p. 69. In a 1984 telephone survey of 603 Oregon residents conducted for ODOE, 46% of respondents approved of the state providing special financing for renters to improve their home's energy efficiency, 43% did not approve, and 11% had no opinion. Survey Research Center, Oregon State University, Attitudes, Opinions, and Concerns About Energy: A Survey of Oregon Residents, May 1984.

(b) Order No. 85-010, p. 36, January 8, 1985.

(c) "Report to the Chairman of the Oregon House of Representatives Environment and Energy Committee from Representative Tom Throop Regarding Improvements to Oregon IOU Weatherization Programs," May 30, 1985.

2.0 CHARACTERISTICS OF NORTHWEST RENTAL PROPERTY

This section contains background information on a number of characteristics of residential rental property in the Northwest. The data are presented in a series of tables. For many of the characteristics, data for rental property units are compared to data for owner-occupied units. Characteristics that are included are distribution by building type and age, ownership entity, resident tenure, type of fuels used, electricity consumption, owner versus tenant payment of utility costs, and energy-efficiency indicators. A recent report prepared for BPA contains other information on Northwest rental property including data on types of space and water heating arranged by residential building size, type, and age, and the extent of master metering of utilities arranged by building size and type and the space heating fuel.^(a)

Much of the data in this section is drawn from three surveys. One survey is the 1980 Census of Housing conducted by the U.S. Bureau of the Census. The second survey is the 1983 Pacific Northwest Residential Energy Survey (PNWRES) conducted for BPA by Louis Harris and Associates.^(b) This survey was administered to 4703 respondents by in-person interviews conducted between May 27 and September 4, 1983. The third survey, The Marketing Environment for Energy Conservation in the Pacific Northwest, was conducted by RMH Research, Inc. for PNL and BPA.^(c) It was administered to 2000 respondents by telephone between October 30 and November 13, 1983.^(d) The PNWRES and RMH surveys were administered to residents in the Pacific Northwest region as this term is defined in the Pacific Northwest Electric Power Planning and Conservation Act.

-
- (a) Columbia Research Center. April 1985. Multifamily Housing Database BPA Region. Portland, Oregon.
 - (b) Louis Harris and Associates. Pacific Northwest Residential Energy Consumption Survey. DOE/BP-329, 331, 333, 334, and 336, 1983-1984. New York, New York. This survey is hereafter cited as "PNWRES."
 - (c) RMH Research, Inc. May 1984. The Marketing Environment for Energy Conservation in the Northwest. Prepared for PNL and BPA by RMH Research, River Edge, New Jersey. This survey is hereafter cited as "RMH."
 - (d) The "Marketing Environment" survey was repeated in November 1985 by Columbia Research Center for PNL and BPA. It was administered to 1,058 Northwest respondents by telephone. The 1985 survey questions were similar to the questions used in the 1983 RMH survey. The results of the 1985 survey will be available later in 1986.

Both the PNWRES and RMH surveys have one difficulty in that renters were underrepresented. In the Northwest as a whole, about 34% of residential housing units are rental units (Table 1.1). In the PNWRES survey, 22.9% of the respondents identified themselves as renters and 1.4% as nonowners who occupied their unit without payment of rent. In the RMH survey, 23.6% of respondents identified themselves as renters. The PNWRES and RMH surveys are, however, the most recent survey data available with a reasonably large proportion of tenants, and they have the advantage that the survey samples were drawn from the entire Northwest. In this section, the difficulty of underrepresentation is mitigated because survey responses are presented by percentage within the categories of renter and owner-occupied housing. Actual numbers of rental and owner-occupied units with particular characteristics are not compared.

2.1 DISTRIBUTION OF UNITS BY HOUSING TYPE

The largest categories of rental housing units in the Northwest are single-family detached homes and units in large buildings containing five or more units. The percentage of renter and owner-occupied units within each building type category is shown in Table 2.1. The 1983 PNWRES and RMH survey

TABLE 2.1. Distribution of Renter- and Owner-Occupied Housing by Housing Type

Building Type	Renter-Occupied			Owner-Occupied		
	PNWRES	RMH	1980 Census ^(a)	PNWRES	RMH	1980 Census ^(a)
1. Manufactured home or trailer	6%	6%	4%	16%	8%	9%
2. Single-family detached home other than manufactured home	56%	44%	35%	82%	87%	86%
3. Building with 2-4 units	17%	21%	22%	1%	4%	3%
4. Building with 5 or more units	21%	29%	39%	1%	1%	2%
	100%	100%	100%	100%	100%	100%

(a) Census data are for Idaho, Oregon, and Washington only. The Census category "single family attached" is included under buildings with 2-4 units. U.S. Bureau of the Census, Detailed Housing Characteristics Idaho, HC80-1-B14, Table 60, June 1983. U.S. Bureau of the Census, Detailed Housing Characteristics Oregon, HC80-1-B39, Table 60, August 1983. U.S. Bureau of the Census, Detailed Housing Characteristics Washington, HC80-1-B49, Table 60, July 1983.

data agree reasonably well with the 1980 Census of Housing data for owner-occupied housing. For renter-occupied units, the PNWRES and RMH data have single-family detached home renters overrepresented and renters in buildings of five or more units underrepresented. One possible partial explanation is that renters in large buildings are more difficult to reach and survey than renters in single-family detached homes.

An important point to note from the Table 2.1 data is that over 60% of Northwest renters are not in large apartment complexes. Programs designed to improve the energy efficiency of rental property must be designed with this distribution in mind.

2.2 AGE OF HOUSING UNITS

Data on the construction period of rental and owner-occupied housing units from the 1980 Census of Housing for Idaho, Oregon, and Washington are shown in Table 2.2. On the whole, there is little difference in the age of units in the two categories. Consequently, both owner-occupied and rental units built to the

TABLE 2.2. Number and Percent of Housing Units in Idaho, Oregon, and Washington Built in Each Decade

<u>Construction Period</u>	<u>Renter-Occupied Units</u>		<u>Owner-Occupied Units</u>	
1970 - March 1980	302,476	(31%)	633,155	(33%)
1960 - 1969	191,171	(20%)	347,705	(18%)
1950 - 1959	132,790	(14%)	296,111	(16%)
1940 - 1949	128,927	(13%)	220,033	(12%)
1939 or earlier	<u>210,184</u>	<u>(22%)</u>	<u>393,658</u>	<u>(21%)</u>
	965,548	(100%)	1,890,662	(100%)

Sources: U.S. Bureau of the Census, Detailed Housing Characteristics Idaho, HC80-1-B14, Table 60, June 1983.
U.S. Bureau of the Census, Detailed Housing Characteristics Oregon, HC80-1-B39, Table 60, August 1983.
U.S. Bureau of the Census, Detailed Housing Characteristics Washington, HC80-1-B49, Table 60, July 1983.

minimum building code requirements at the time of construction should have approximately the same energy-efficiency features.

2.3 RENTAL PROPERTY OWNERSHIP

Information about the ownership of residential rental property relates to the objectives of this study in several ways. First, knowing the types of owners and their extent of ownership is useful in designing programs to improve energy efficiency and in planning strategies to reach owners. Knowing the prevalence of each type of owner, for example, can help in the design of appropriate incentives. Second, knowledge about ownership can suggest propensity to invest in energy efficiency. Unfortunately, there is little published information on characteristics of rental property owners, probably because it is difficult and expensive to locate owners.

In a 1982 report the Congressional Office of Technology Assessment investigated the correlation between ownership and the likelihood of energy-efficiency retrofits.^(a) Large owners such as institutions, corporations, national real estate limited partnerships, and development companies who manage their own properties were found to be most likely to make energy-efficiency improvements to existing residential rental property. Individuals and local partnerships were viewed as less likely to make retrofit expenditures because of poor operating cash flow from their properties and limited access to capital and professional advice. More recent studies provide some support for this view. A 1983 report that used empirical data found that residential rental buildings owned or managed by full-time professional landlords used less energy than buildings owned or operated by part-time "mom-and-pop" landlords. The author suggests that access to information on energy-efficiency techniques is a probable reason for the difference.^(b) The author of another 1983 report found that multifamily properties in Portland, Oregon, owned by developers,

(a) U.S. Office of Technology Assessment. March 1982. Energy Efficiency of Buildings in Cities, Chapter 4. PB82-200346, National Technical Information Service, Springfield, Virginia.

(b) Kevin Neels. March 1983. Energy Use in Housing, p. 80. R-3030-DOE, The Rand Corporation, Santa Monica, California.

partnerships, or institutions were more likely to have had energy-efficiency improvements than properties with other type of owners.^(a)

The available information on ownership of residential rental property in the Northwest is limited. The only information sources found for this study were two recent surveys conducted for Seattle City Light, information on 1983 multifamily building sales in the Puget Sound area, and information on publicly assisted housing collected by the Department of Housing and Urban Development (HUD).

The ownership data from the two surveys conducted for Seattle City Light are shown in Table 2.3. The large percentages of individual ownership are surprising. Two aspects of the sampling procedure may have impacted these high percentages. First, the survey of rental complexes with 1-4 housing units was conducted with a quota to ensure that one-half of the respondents were owners of single-family rental units.^(b) Single-family rental units are more likely to have individual owners than larger rental properties. Second, the survey of

TABLE 2.3. Rental Property Ownership in Seattle

Rental Units in Complex	Percent of Structures Owned By		
	Individual or Couple	Partnership	Other
1 - 4 ^(a)	90%	9%	1%
5+ ^(b)	86%	12%	2%

(a) SRC report for Seattle City Light, question 10.

(b) Hall report for Seattle City Light, question 12.

-
- (a) Lou McClelland. December 1983. Tenant-Paid Energy Costs in Multifamily Rental Housing: Effects on Energy Use, Owner Investment, and the Market Value of Energy, p. 42. DOE/CS-20050-1, University of Colorado, Boulder, Colorado. This report is hereafter cited as "McClelland."
- (b) G. Cullen, Synergic Resources Corp., Seattle, and W. Wilcox, Market Trends, Inc., A Financing Survey of Multifamily (2-4) and Single Family Rental Units, prepared for Seattle City Light, p. II-1, October 1984. This report is hereafter cited as the "SRC report for Seattle City Light."

complexes with 5 or more housing units was a random survey of 100 owners; however, owners who did not have Seattle area telephone numbers or who could not be readily identified were excluded.^(a) Partnerships were probably more likely than individuals to be excluded by application of these criteria.

The 100 respondents to the survey of owners of complexes with five or more units were also asked the total number of rental housing units they own in Seattle. The results are shown in Table 2.4. The results indicate that ownership of rental housing units in Seattle is quite dispersed. There appears to be a large number of owners with only one rental complex.

A survey of sales of multifamily buildings in 1983 in the Puget Sound area shows a higher prevalence of partnership ownership than do the surveys for Seattle City Light. The 1983 survey covered all sales of \$250,000 or more in King, Snohomish, and Pierce counties where the transaction included 5 or more units at the same location in King and Snohomish counties and 10 or more units

TABLE 2.4. Total Units Owned in Seattle By Owners of One Complex with Five or More Units

<u>Total Number of Units</u>	<u>Percent of Respondents</u>
5-10	41%
11-20	18%
21-30	17%
31-40	7%
41-50	5%
>50	9%
No response	3%

Source: Hall report for Seattle City Light, question 5.

(a) Hall & Associates. December 1984. Multifamily Survey Five Units and Above, p. 3. Prepared for Seattle City Light. This report is hereafter cited as the "Hall report for Seattle City Light."

in Pierce county. The survey showed that approximately 55% of the multifamily properties meeting these criteria and sold in 1983 were purchased by partnerships.^(a)

Data on the number of HUD-subsidized housing units in Idaho, Oregon, and Washington as of May 1985 are shown in Table 2.5. Most of the HUD-assisted housing is publicly owned rental housing. However, a substantial portion is privately owned rental housing and owner-occupied housing. Under the Section 8 program, for example, low income families can receive a subsidy to live in rental housing units of their choice. For the Northwest as a whole, approximately 2% of the rental housing units are publicly owned.^(b)

McClelland found that in Portland, most rental properties where the owner paid for space and/or water heating were either publicly owned or publicly subsidized.^(c) In spite of this finding, the energy efficiency of publicly owned housing is important to tenants and to taxpayers. Tenants are usually

TABLE 2.5. Number of Housing Units Subsidized by HUD in Idaho, Oregon, and Washington

HUD Program	Number of Housing Units		
	Idaho	Oregon	Washington
Low-rent public housing	768	5,586	17,112
Section 8	6,123	23,468	26,348
Other programs	<u>3,761</u>	<u>4,923</u>	<u>15,219</u>
Total	10,652	33,977	58,679
HUD-subsidized housing as a percent of total housing inventory	2.8%	3.1%	3.5%

Source: U.S. Department of Housing and Urban Development, Region X, Seattle, Washington.

(a) Cain and Scott, Inc. 1984. Apartment Market Study, p. 10. Seattle, Washington.

(b) Personal communication with Ko Shih, regional economist, U.S. Department of Housing and Urban Development, Seattle, Washington, August 2, 1985.

(c) McClelland, p. 37.

unable to afford high utility costs themselves or high utility costs that are reflected in rents. To the extent the public pays for or subsidizes energy costs, taxpayers are impacted.

Corporations do not own large amounts of rental housing in the Northwest or nationwide. The principal reason is that the federal income tax shelter benefits largely resulting from depreciation are more valuable to individuals and partnerships. These groups can use a taxable loss incurred on rental property to shelter unrelated income.

Generalizing from the limited data that are available, it appears safe to say that 1) individuals own a substantial fraction of rental housing in the Northwest, probably over one-half of all units, 2) the larger the apartment complex, the more likely it is owned by a partnership, and 3) publicly owned housing is a small but important portion of the rental housing stock.

2.4 OCCUPANT TENURE

Data from the PNWRES survey on the approximate length of time renters and owners have occupied their current residence are shown in Table 2.6. As might be expected, the tenure of tenants in their housing unit is clearly much

TABLE 2.6. Owners and Renters Occupancy Tenure

<u>Length of Time in Current Residence</u>	<u>Renter-Occupied</u>	<u>Owner-Occupied</u>
1 year or less	28%	3%
1 - 2 years	32%	6%
2 - 3 years	12%	7%
3 - 4 years	8%	7%
4 - 5 years	5%	8%
5 - 6 years	3%	7%
More than 6 years	<u>12%</u>	<u>62%</u>
	100%	100%

Source: PNWRES.

shorter than that of owners. This short tenure is one of the principal reasons that tenants are often unwilling to make energy-efficiency improvement investments or to schedule their unit for an energy audit.

2.5 HEATING AND COOLING FUELS

This section contains information on space heating and cooling fuels and water heating fuels for rental and owner-occupied housing. Data on the principal space heating fuel that tenants and owners said they use in the PNWRES and RMH surveys are shown in Table 2.7. The most striking difference in the data is that tenants are considerably more likely than owners to use electricity and less likely to use wood as their principal heating fuel. This fact makes rental housing especially attractive as a target for efforts to conserve electrical energy.

Tenants are also much less likely than owners to use a secondary space heating source as the data in Table 2.8 show. This tendency is consistent with the greater likelihood of owners to use wood as a primary space heating fuel, since wood users often need a secondary backup heating fuel.

A high percentage (approximately 85%) of renters and owners report that they use electricity as their principal water heating fuel. Supporting data are shown in Table 2.9.

TABLE 2.7. Principal Space Heating Fuel in Northwest
Renter- and Owner-Occupied Housing Units

	<u>Renter-Occupied</u>		<u>Owner-Occupied</u>	
	<u>PNWRES</u>	<u>RMH</u>	<u>PNWRES</u>	<u>RMH</u>
Wood	16%	16%	34%	34%
Electricity	57%	53%	38%	30%
Natural Gas	19%	21%	15%	20%
Fuel Oil	6%	7%	9%	12%
LPG	1%	3%	2%	3%
Coal			1%	1%
Other	<u>1%</u>	<u> </u>	<u>1%</u>	<u><1%</u>
	100%	100%	100%	100%

TABLE 2.8. Secondary Space Heating Fuels^(a)

	<u>Renter-Occupied</u>	<u>Owner-Occupied</u>
Percent of respondents using a secondary source of space heating	32%	60%
<u>Fuel Used by Those Using a Secondary Fuel</u>		
Wood	44%	48%
Electricity	47%	42%
Natural Gas	6%	5%
Fuel Oil	4%	7%
LPG	1%	2%
Kerosene	1%	1%
Coal	1%	<1%
Solar		1%

Source: PNWRES.

(a) Totals do not add to 100% because of rounding.

TABLE 2.9. Principal Water Heating Fuel

	<u>Renter-Occupied</u>		<u>Owner-Occupied</u>	
	<u>PNWRES</u>	<u>RMH</u>	<u>PNWRES</u>	<u>RMH</u>
Electricity	87%	84%	86%	81%
Natural Gas	11%	12%	11%	13%
Fuel Oil	<1%		<1%	1%
Wood	<1%		1%	1%
Solar			<1%	1%
Coal		1%		1%
LPG	<u>1%</u>	<u>3%</u>	<u>2%</u>	<u>2%</u>
	100%	100%	100%	100%

Nearly three-fourths of Northwest housing units do not have air conditioning. For those that do, electrically operated systems predominate. Individual window units are most common, followed by central electric systems. Supporting data are shown in Table 2.10.

2.6 ELECTRICITY CONSUMPTION

Data on electricity consumption in renter- and owner-occupied housing units are shown in Table 2.11. Note that data are for housing units in the West Census Region^(a) where electricity is the main heating fuel. For the period measured, electricity consumption per square foot was approximately 29% higher in renter-occupied housing units than in owner-occupied units.

One very likely reason for higher percentage electricity consumption in rental units is lower thermal integrity. Both Northwest and national data indicate that rental housing units are less energy efficient than owner-occupied units (see Section 2.7).

A second possible reason is that in the Northwest, owners are much more likely than tenants to use a secondary fuel source (Table 2.8). One would therefore expect owners with electric space heating to consume less electricity

TABLE 2.10. Type of Air Conditioning System

	<u>Renter-Occupied</u>	<u>Owner-Occupied</u>
Central electric system	5%	9%
Central gas system	<1%	1%
Evaporative swamp cooler	4%	5%
Heat pump	1%	3%
Individual window unit	15%	12%
None	<u>75%</u>	<u>70%</u>
	100%	100%

Source: PNWRES.

(a) Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

TABLE 2.11. Electricity Consumption Between April 1981 and March 1983 in Households Where Electricity is Main Heating Fuel, West Census Region

	<u>Renter-Occupied</u>	<u>Owner-Occupied</u>
Average heated sq ft/ housing unit ^(a)	839	1,549
Average electricity consumption/house- hold (kWh) ^(b)	23,400	33,600
Average electricity con- sumption/sq ft/yr (kWh)	13.9	10.8

(a) Adapted from Table 5 in U.S. Energy Information Administration (EIA), Housing Characteristics 1982, DOE/EIA-0314(82), August 1984.

(b) EIA, Consumption and Expenditures, April 1982 - March 1983, DOE/EIA-0321/2(82), Table 5, December 1984. EIA, Consumption and Expenditures, April 1981 - March 1982, DOE/EIA-0321/2(81), Table 5, November 1983.

per square foot than tenants. National figures on wood consumption support the Northwest data on the greater likelihood of owners to use secondary fuels. Nationally, the median annual consumption of wood per household between April 1982 and March 1983 was 1.0 cords for owner occupants and 0.7 cords for renters.^(a)

Finally, some of the higher electricity consumption/sq ft in rental units may also be attributable to occupant behavior. Tenants in units where the owner pays for space conditioning, for example, may adopt a higher comfort level and be less conserving than tenants who individually pay their utility bills. In the Northwest, however, approximately 90% of tenants with electric space heating pay their own electricity bill (Section 2.8). The disincentive to conserve caused by master metering is thus not likely to be too significant. In any case, the higher percentage electricity consumption by tenants,

(a) U.S. Energy Information Administration. November 1984. Consumption and Expenditures, April 1982 - March 1983, Table 18. DOE/EIA-0321/1(82).

as indicated by the data in Table 2.11, is an additional reason to focus on conserving electricity in rental housing.

2.7 THERMAL INTEGRITY

Tables 2.12, 2.13, and 2.14 contain survey data that suggest the level of thermal integrity, i.e., the level of installed energy-efficiency features, in Northwest rental and owner-occupied housing. Table 2.12 contains the responses to qualitative questions on relative energy efficiency in the PNWRES survey (covering respondents from throughout the Northwest). Table 2.13 contains the responses of Seattle rental property owners to similar questions. The sharpest difference of opinion is between the tenants' and the landlords' views of the level of energy efficiency of their rental housing units. The Seattle owners believe their rental units are basically quite energy efficient. Owners of electrically heated buildings with five or more units were particularly confident of their properties' energy efficiency. Ninety-one percent of these owners said their rental property needed at most only some minor energy-efficiency improvements. Tenants in the Northwest have a contrasting view; they generally consider their housing units to need energy-efficiency improvements. Data shown in Table 2.14 on the extent of ceiling insulation support

TABLE 2.12. Feelings About Housing Unit Energy Efficiency, Northwest Data

<u>Statement</u>	<u>Percent of Respondents Agreeing with Statement</u>	
	<u>Renters</u>	<u>Homeowners</u>
1. The home is about as energy efficient as it can be	20%	34%
2. A little improvement can be made	24%	31%
3. Moderate improvement can be made	21%	21%
4. A lot of improvement can be made	32%	13%

Source: PNWRES.

TABLE 2.13. Feelings of Seattle Rental Housing Owners About Their Properties' Energy Efficiency

Statement	Percent of Respondents Agreeing with Statement		
	Owners of Properties with 1-4 Units ^(a)	Owners of Properties with 5 or More Units ^(b)	
		Electric Space Heating	Non-Electric Space Heating
1. Property is very energy efficient--needs no improvements	45%	41%	35%
2. Property needs some relatively minor improvements	44%	50%	38%
3. Property needs major improvements	11%	7%	27%
Number of Respondents	151	74	26

(a) SRC report for Seattle City Light, question 27.

(b) Hall report for Seattle City Light, question 29.

the tenants' view. If the Seattle owners are representative of owners throughout the Northwest, their responses suggest that marketing energy-efficiency improvements to owners of residential rental property in the region may be difficult. The responses in Table 2.12 also show that homeowners are considerably more likely than tenants to believe their homes are already energy efficient.

Renters and homeowners were asked to indicate the percentage of their ceiling containing insulation and the R value; survey data are shown in Table 2.14. Tenants are understandably less knowledgeable about the insulation characteristics than owners. The level of ceiling insulation indicated by those tenants who do profess knowledge, however, is considerably lower than the level indicated by homeowners. The R value data are from a 1979 survey. Note that the percentage of both renter- and owner-occupied housing units with no insulation dropped significantly from 1979 to 1983 (the PNWRES survey was administered in 1983).

TABLE 2.14. Extent of Ceiling Insulation in Northwest Housing Units
as Reported by Occupants

	<u>Renter-Occupied</u>	<u>Owner-Occupied</u>
<u>Percent of Ceiling Containing Insulation(a)</u>		
No insulation	10%	4%
<10%	2%	1%
10 - 39%	5%	2%
40 - 59%	3%	3%
60 - 89%	3%	4%
90 - 100%	37%	78%
Don't know	<u>39%</u>	<u>7%</u>
	100%	100%
<u>R Value of Ceiling Insulation(b)</u>		
No insulation	20%	12%
R-1 - R-8	7%	7%
R-9 - R-14	15%	22%
R-15 - R-20	6%	15%
R-21 - R-26	7%	18%
R-27 - R-33	1%	6%
>R-34	2%	8%
Don't know	<u>42%</u>	<u>13%</u>
	100%	100%

(a) PNWRES.

(b) Elrick and Lavidge, Inc., San Francisco. July 1980. The Pacific Northwest Residential Energy Survey, prepared for BPA and the Pacific Northwest Utilities Conference Committee.

National survey data on the extent of energy-efficiency features in owner- and renter-occupied housing as of November 1982 are shown in Table 2.15. The data in line 3 of Table 2.15 on ceiling insulation are quite consistent with the Northwest data shown at the top of Table 2.14. Overall, the data in Tables 2.14 and 2.15 strongly suggest that the thermal integrity of rental housing is lower than that of owner-occupied housing.

TABLE 2.15. Thermal Integrity of Owner- and Renter-Occupied Housing, National Data

Feature	Percent of Households with Feature					
	Single-Family Homes (including manufac- tured homes)		Buildings with 2-4 Units		Buildings with ≥5 Units	
	Owner- Occupied	Renter- Occupied	Owner- Occupied	Renter- Occupied	Owner- Occupied	Renter- Occupied
1. 100% of windows have storm windows	49%	27%	59%	36%	29%	31%
2. All outside doors have storm doors	43%	18%	44%	21%	20%	15%
3. 100% of ceiling is insulated	73%	35%				
4. 100% of walls surrounding heated space are insulated	57%	26%				

Source: EIA, Housing Characteristics 1982, DOE/EIA-0314(82), Tables 25 and 26, August 1984.

2.8 TENANT VERSUS OWNER PAYMENT OF UTILITY COSTS

Most Northwest tenants pay their own utility costs directly rather than through their rent. This tendency appears to be especially prevalent for properties with electric space heating.

Using 1980 census data, Columbia Research Center determined that in the four Northwest states tenants in 88% of multifamily buildings containing five or more units individually pay their electricity bill to their utility.^(a) The tendency for electricity to be included in rent increased with the number of units in the building. There was also a greater tendency for non-electrically heated buildings to have the cost of electricity included in rent. Of 29,168 buildings with five or more units and electric space heat, tenants in 25,959 of the buildings (89%) individually paid their electricity bill.^(b) Of 13,533 multifamily buildings without electric space heat, tenants in 9,467 buildings (70%) individually paid their electricity bill.

(a) Columbia Research Center. April 26, 1985. Multifamily Housing Database BPA Region, Table 14. Portland, Oregon.

(b) Ibid., Table 16.

The PNWRES survey included a question asking tenant respondents whether they paid their utility bills directly or whether utility costs were included in their rent. The resulting survey data are shown in Table 2.16. The table shows the number of tenant respondents for each utility category and the percentage of tenants using the category who individually pay their bill. Thus of 138 tenant respondents in 2-4 unit properties who use electricity for space

TABLE 2.16. Percent of Northwest Tenants Who Individually Pay Their Utility Bills

Utility Bill	Tenants In					
	Single-Family Homes Including Manufactured Homes		2-4 Unit Properties		>5 Unit Properties	
	N	%	N	%	N	%
Electricity for:						
Space heating	404	97%	138	95%	192	91%
Space cooling	139	96	50	96	74	92
Water heating	583	97	152	92	202	87
Lighting/appliances	665	98	179	96	222	92
Cooking	621	98	170	97	207	91
Natural Gas for:						
Space heating	151	97%	33	91%	31	45%
Water heating	71	93	23	83	20	35
Cooking	28	93	10	80	18	50
LPG for:						
Space heating	14	93%	1	100%	1	100%
Water heating	10	90			2	50
Cooking	19	90			1	100
Fuel Oil for:						
Space heating	61	95%	5	80%	3	33%

Source: PNWRES.

N = Number of respondents.

heating, 95% pay their bill directly to the utility rather than through their rent. Recall that the total PNWRES sample included 4703 respondents of which 1076 were tenants (Section 2.0).

Although the PNWRES survey data are consistent with the 1980 census data, an important caveat for the responses in Table 2.16 is applicable to electricity use in multiunit buildings. Potential respondents in the PNWRES survey who indicated that they shared a common electric meter with other housing units were excluded from the final survey sample. Of 6,227 potential respondents initially contacted about participating in the PNWRES survey, 72 indicated they did share a common electric meter.^(a) These respondents were thus excluded from the survey. A high percentage of these 72 respondents were presumably tenants. If they had been included in the survey, the percentages of tenants in multiunit buildings who pay their own electric bill would have been lower.

(a) Louis Harris and Associates. June 29, 1984. Pacific Northwest Residential Energy Consumption Survey: Response Analysis Final Report, p. 15, Table 1. DOE/BP-336, New York, New York.

3.0 PAST CONSERVATION IMPROVEMENTS

The survey data in Section 2.7 suggest that, on average, the thermal integrity of rental housing is less than that of owner-occupied housing. Owners of rental property and to a lesser extent their tenants have made significant energy conservation improvements to their properties in recent years, however, and will likely continue to do so. These improvements have been made under utility incentive weatherization programs and also on the owners' and tenants' own initiative. The purpose of this section is to briefly review survey data on the extent and types of past improvements to rental housing units. Section 3.1 discusses improvements by rental housing owners and Section 3.2 improvements by tenants.

3.1 ENERGY CONSERVATION IMPROVEMENTS MADE BY OWNERS

This section includes results from five surveys--McClelland, the Hall and SRC reports for Seattle City Light, RMH, and PNWRES--on conservation improvements made by owners to Northwest rental housing units. The RMH and PNWRES surveys gathered data from tenants and homeowners. The three other surveys gathered data directly from owners of rental property.

McClelland surveyed owners of 24 rental properties in Portland, Oregon, where tenants paid their own utility bill. The survey was apparently conducted in 1982.^(a) She was particularly interested in tenant-payment properties because these properties provide less incentive to owners to make conservation improvements than properties where the owner pays for utilities. All surveyed properties had at least 12 units and were built between 1960 and 1977. McClelland found that 60% of the owners had improved one or more energy system in the previous four years and that 25% had improved two or more systems.^(b) The number of energy-efficiency improvements made by owners was found to be related to the frequency of tenant inquiries about energy consumption and costs. McClelland thus concluded that the financial concerns of tenants who pay their own energy costs do affect owner behavior.

(a) McClelland, p. 39.

(b) McClelland, p. E-6.

The Hall and SRC survey reports for Seattle City Light both include data on conservation improvements made by owners within the previous three years. The Hall survey included 100 owners of properties of five or more units. The SRC survey included 151 owners of properties containing one to four rental units. All units were located in the Seattle City Light service area. The percentages of owners who indicated they had made particular improvements are shown in Table 3.1. The most common improvement was installation of water heating blankets. Most of the blankets were likely installed under Seattle City Light's "Blanket Seattle" program which operated from 1981-1983. Nearly 50% of owners had made no conservation improvements during the three-year

TABLE 3.1. Conservation Improvements Made by Seattle Rental Housing Owners in the Three Previous Years

Type of Improvement	Percent of Owners (a)	
	1-4 Unit Properties (b)	>5 Unit Properties (c)
Water heater blankets	25%	22%
Other water heating improvements	3%	5%
Roof/ceiling insulation	23%	7%
Wall insulation	11%	3%
Floor insulation	10%	2%
Weatherstripping/caulking	8%	11%
Storm windows/doors	9%	8%
Heating equipment upgrading	2%	4%
Installed thermopane/double pane windows	5%	3%
Lighting changes	1%	1%
Other	7%	5%
Number of Respondents Making Some Improvements	83	51
Number of Respondents Making No Improvements	68	49

(a) Percentages show percent of all owners in the surveys, not the percent of owners who made at least one improvement.

(b) SRC report for Seattle City Light, question 18.

(c) Hall report for Seattle City Light, p. 10.

period. The average total expenditure during the three-year period for owners who made improvements was \$4485 for properties with five or more units^(a) and \$3589 for properties with one to four units.^(b)

In the RMH survey, tenants were asked whether the owner of their residential rental unit had installed energy conservation measures. The survey results, broken out by geographic region, are shown in Table 3.2. The term Northwest in Table 3.2 corresponds to Western Washington. Southwest corresponds to Western Oregon. Northeast roughly corresponds to that area of the Pacific Northwest region that is north of the Oregon-Washington border (as extended to the eastern edge of the region) and east of the Cascade Mountains. Southeast corresponds to the remainder of the region.

The survey data in Table 3.2 reported by tenants agree reasonably well with the data in Table 3.1 reported by owners. It is interesting that owners in the milder climates west of the Cascade Mountains have apparently made more

TABLE 3.2. Conservation Improvements Made by Northwest Rental Housing Owners as Reported by Tenants

Type of Improvement	Percent of Tenants				
	Region	Northwest	Southwest	Northeast	Southeast
Insulation/weatherstripping	36%	40%	40%	27%	31%
Improved heating equipment or appliances	7%	8%	4%	7%	10%
Low cost measures such as temperature reductions	5%	8%	4%	2%	1%
None	46%	43%	45%	52%	51%
Don't know	11%	9%	13%	14%	12%

Source: RMH.

(a) Hall report for Seattle City Light, question 25.

(b) SRC report for Seattle City Light, question 19.

improvements than owners east of the mountains. One possible explanation is that utility-sponsored weatherization programs may have been more aggressively marketed west of the Cascade Mountains.

3.2 ENERGY CONSERVING ACTIONS AND IMPROVEMENTS BY TENANTS

Northwest tenants have also taken energy-conserving actions and made energy-conserving improvements to their housing units. Data from the RMH and PNWRES surveys on energy conservation actions and improvements made by tenants and, for comparison, homeowners are shown in Tables 3.3 and 3.4. The "tenants" column includes tenants in all housing types. One caveat with the data is that it is very likely that some improvements made by owners of rental property rather than tenants are included in the responses of tenants. Nevertheless, it is apparent from the data that tenants take energy-conserving actions and make energy conservation improvements, especially low cost improvements.

The energy conservation improvements made by tenants have been less extensive than those made by homeowners, but this result is not surprising. Although tenants are interested in reducing their energy costs, they have significant disincentives to making energy conservation investments to their housing unit. First, because of tenants' generally shorter tenure in their living

TABLE 3.3. Energy Conservation Actions Taken by Homeowners and Tenants

<u>Action/Practice</u>	<u>Percent of Respondents</u>	
	<u>Tenants</u>	<u>Homeowners</u>
Home energy audit	18%	30%
Use window shades	87%	88%
Lower thermostat 10 or more degrees when home is vacant	82%	81%
Select energy-efficient appliances	60%	74%
Wrap water heater	54%	64%
Use storm windows	37%	67%
Use dimmer switch on lights	35%	49%
Use water flow restrictor in showers	25%	38%

Source: RMH.

TABLE 3.4. Insulation Additions During Previous 12 Months
by Homeowners and Tenants

<u>Insulation Addition</u>	<u>Percent of Respondents</u>	
	<u>Tenants</u>	<u>Homeowners</u>
Outside wall	1.8%	6.6%
Ceiling	5.8%	10.7%
Floor	1.7%	4.9%
Basement wall	0.1%	1.5%

Source: PNWRES.

unit (Table 2.6), they are less likely to be concerned about the energy efficiency of the unit. Second, the long-term benefit of improvements to the unit's structure accrues to the owner rather than the tenant. Third, the tenant must frequently obtain the owner's permission before making improvements.

Tenants in single-family homes have been found to make more improvements than tenants in multiunit buildings.^(a) This result is likely due to a longer tenure in the home and an accompanying assumption of greater responsibility for the home's operation and condition.

(a) Kevin Neels. March 1983. Energy Use in Housing, p. 35. R-3030-DOE, The Rand Corporation, Santa Monica, California.

4.0 IMPACT OF CONSERVATION IMPROVEMENTS

This section reviews the limited available information on the impact of past conservation improvements on rental housing in the Northwest. Impacts discussed are energy and dollar savings, the ability of building owners to reflect energy efficiency improvements in rents, and the use of energy efficiency information in advertising. In general, the available information suggests that weatherization can lead to reasonably significant energy savings, that investment in energy efficiency can be recaptured to some extent in rents, and that energy efficiency considerations are infrequently used in advertising residential rental units.

4.1 IMPACT ON ENERGY SAVINGS

No studies on actual energy savings realized by weatherizing rental housing units in the Northwest were found. Actual savings have been documented for owner-occupied, single-family detached homes weatherized under the BPA-sponsored residential program. Actual reductions in electricity usage for this class of housing averaged 4130 kWh/yr.^(a) The average retrofit cost yielding this savings was \$2100. A similar study by Snohomish County PUD, a participant in the BPA weatherization programs, that included all housing types found actual savings of 2947 kWh/yr.^(b) A review of evaluations of Northwest conservation programs found that annual energy savings attributable to program weatherizations average approximately 3500 kWh with a range of 2500-4000 kWh.^(c) Average costs were found to vary between \$1500 and \$2200 per housing unit.^(c)

(a) Eric Hirst, et al. May 1985. "Actual Energy Savings and Audit Predictions for Residential Retrofit in the Pacific Northwest." Energy and Buildings, p. 83. Elsevier Science Publishers, New York.

(b) G. Leaf. April 12, 1984. "The Effectiveness of Weatherization Measures in the Pacific Northwest," p. 26. Public Utilities Fortnightly.

(c) David Dornbusch and Company. May 1985. Evaluation of Utility Sponsored Conservation Programs: Review of Programs, Vol. 1, p. III-24. Prepared for the Council. Portland, Oregon.

4.2 IMPACT ON RENTS AND ADVERTISING

Even though weatherization can be shown to produce energy savings, a landlord who does not pay the utility bills for his rental property is not likely to want to invest in energy conservation unless the investment can be recaptured in rents. If the investment can only be recaptured at the time the property is sold, most owners are less likely to be interested. Rental buildings are ordinarily held for a reasonably long term, and realization of the investment at sale would likely be too remote in time for most investors.

Data from recent surveys for Seattle City Light on the period of time owners plan to hold property are shown in Table 4.1. The holding periods shown in Table 4.1 are in addition to the period of ownership prior to administration

TABLE 4.1. Period of Time Seattle Rental Property Owners Expect to Hold Property

	Percent of Respondents	
	Owners of Buildings with 1-4 Units ^(a)	Owners of Complexes with 5 or More Units ^(b)
Property being sold	20%	2%
1-3 years	9%	
4-6 years	6%	
7-10 years	7%	
>10 years	2%	
Indefinitely	45%	75%
Don't know	28%	12%
Average planned holding period of those owners providing an estimate	6.3 yr	9.2 yr
Number of respondents	151	100

(a) SRC report for Seattle City Light, question 12.

(b) Hall report for Seattle City Light, question 14.

of the surveys. A significant percentage of owners plan to hold their properties indefinitely. A 1984 survey of buyers of apartment complexes with 20 or more units in the Puget Sound area found that the median expected holding period was 5.3 years.^(a)

McClelland quantitatively evaluated whether energy-efficient rental properties can command higher rent than inefficient properties. She found that in Atlanta, rents for less energy-efficient units were lower by approximately 1/2 of incremental energy costs than otherwise comparable more efficient units.^(b) This result suggests that tenants are able to distinguish energy-efficient units to some extent and are willing to pay a rental premium for them, although the premium is less than the expected energy savings to the tenant.^(c) Prior studies that relied more on anecdotal evidence have generally concluded that other factors outweigh energy-efficiency considerations and that the owner of energy-efficient rental units will have great difficulty recovering conservation investments through rents.^(d)

McClelland also found that energy-efficiency considerations are seldom included in rental housing advertisements. The two cities where energy efficiency was most frequently mentioned in an August 1981 survey she conducted were Atlanta and Portland, Oregon, where 5-10% of advertisements for rental housing mentioned energy-efficiency considerations.^(e)

(a) Cain and Scott, Inc. 1985. Apartment Market Study, p. 13. Seattle, Washington.

(b) McClelland, p. E-10.

(c) A 1980 study also found that rents are discounted considerably in units where tenants must pay higher than average utility costs. J. Follain and S. Malpezzi, "Dissecting Housing Value and Rent: Estimates of Hedonic Indexes for Thirty-Nine Large SMSAs," Working Paper 249-17, The Urban Institute, Washington D.C., 1980. The paper is cited in K. Neels and M. Murray, "Energy and the Existing Stock of Housing," Energy Costs, Urban Development, and Housing, The Brookings Institution, Washington, D.C., 1984.

(d) See for example, U.S. Office of Technology Assessment. March 1982. Energy Efficiency of Buildings in Cities, p. 120-121. PB82-200346, National Technical Information Service, Springfield, Virginia.

(e) McClelland, p. E-7.

4.3 ENERGY-EFFICIENCY RATING/CERTIFICATION PROGRAMS

Many of those who have considered the problem of increasing the energy efficiency of rental property have suggested that programs that convey energy efficiency information on rental units to prospective tenants in an understandable manner can potentially be very effective.^(a) The information can be conveyed in the form of an energy-efficiency rating or certification. A prospective tenant concerned about energy costs can then factor the rating or certification into his housing selection process.

Although rating and certification systems have been implemented in the Northwest and elsewhere, most application to date has been for owner-occupied, single-family homes.^(b) Several programs were found, though, where units in residential rental buildings meeting or exceeding minimum energy-efficiency characteristics are certified by utilities.

Approximately 25 utilities nationwide operate "Good Cents" programs under an agreement with Southern Electric International of Pensacola, Florida.^(c) New buildings that meet an energy-efficiency standard set by the individual utilities are inspected and certified as "Good Cents" homes. Most of the participating utilities (including BPA) limit application of the program to new single-family homes.^(d) Some utilities such as Georgia Power Co., Public Service Co. of Oklahoma, and Wisconsin Electric Power Co. also include new multifamily buildings in their Good Cents programs. McClelland surveyed managers of Atlanta rental properties with and without a Good Cents certification from Georgia Power. Most of the rental units were two bedroom apartments. The survey was administered in fall 1981. Surprisingly, she found that a Good

(a) See for example, D. Bleviss and A. Gravitz. October 1984. Energy Conservation and Existing Rental Housing, pp. 62, 63. Energy Conservation Coalition, Washington, D.C.

(b) P. L. Hendrickson, et al. October 1982. Overview of Existing Residential Energy-Efficiency Rating Systems and Measuring Tools. PNL-4359, Pacific Northwest Laboratory, Richland, Washington.

(c) The Good Cents program was originally implemented by the Gulf Power Co. in 1976. Gulf Power is a member of the Southern Electric System. Southern Electric International is a subsidiary of the Southern Electric System.

(d) The "Super Good Cents" program being operated by BPA is affiliated with the Southern Electric International program. Northwest utilities participating in Super Good Cents are in addition to the 25 other utilities.

Cents certification had essentially no impact on rents or reported energy costs.^(a) She notes that tenants in certified properties may be using the benefits of greater thermal integrity for increased comfort level rather than reduced energy consumption.

Electric and natural gas utilities in Wisconsin have been required under a December 1, 1980, order by the state Public Service Commission (PSC) to provide an energy-efficiency seal and certificate for residential rental properties meeting voluntary energy conservation standards set by the Commission.^(b) The requirement has recently been temporarily suspended until March 1, 1986, while the Commission considers the possibility of assigning an energy performance rating to rental buildings to convey additional energy-efficiency information to tenants. As of January 1, 1985, residential rental property in Wisconsin must meet minimum energy conservation standards set by the State Department of Industry, Labor and Human Relations prior to sale of the property.^(c) In submissions to the Wisconsin PSC, most utilities favored elimination of the seal and certificate program in favor of the mandatory retrofit requirements. The PSC, however, chose to suspend rather than eliminate the program. Several Wisconsin consumer groups opposed elimination of the seal and certificate program because of its role in providing energy-efficiency information to prospective tenants.

The Tennessee Valley Authority (TVA) provides a medallion and certification sticker for rental housing units built to its Energy Saver Home standards.^(d)

(a) McClelland, p. E-10.

(b) Docket Numbers 3020, 3270, 4220, 5820, 6640, 6550, 6670, 6680, 6690, 6710-GP-1. The certificate program operated by the Wisconsin Gas Co. in response to the order is described in: 1) Brian K. Fay, "Voluntary Rental Living Unit Program," Proceedings of the 1984 Summer Study on Energy Efficiency in Buildings, p. C-18, sponsored by the American Council for an Energy-Efficient Economy, Washington, D.C. (hereafter cited as "Fay"); and 2) D. Bleviss and A. Gravitz. October 1984. Energy Conservation and Existing Rental Housing, pp. 27-30. Energy Conservation Coalition, Washington, D.C.

(c) Wisconsin Statutes, Section 101.122.

(d) TVA, Conservation Report 1984, p. 12.

An interesting aspect of the three residential rental property certification programs noted above is partial reimbursement of advertising costs when certification is included in the ad copy. Georgia Power, for example, provides owners a one-time advertising subsidy from the utility.^(a) The Wisconsin Gas Co. reimburses 25% of advertising costs.^(b)

(a) McClelland, p. 61.

(b) Fay, p. C-25.

5.0 OWNERS' DECISION PROCESS FOR CONSERVATION INVESTMENTS

This section reviews survey information on decision criteria used by owners of residential rental property to make conservation improvements. Much of the information is drawn from the two recent surveys of owners conducted for Seattle City Light. The available data suggest that most owners do not use a rigorous quantitative approach in deciding to make conservation investments, are not inclined to borrow money to make improvements, and do not make improvements when funds are needed for other purposes.

5.1 REASONS FOR MAKING AND NOT MAKING CONSERVATION IMPROVEMENTS

Data from the Seattle City Light surveys on reasons for making and not making energy conservation improvements are shown in Tables 5.1 and 5.2. In both cases respondents were asked to give their two major reasons for action or inaction.

The principal reasons cited in the two surveys for making improvements were that "energy efficiency is important" and to "help the tenants." In one respect these apparently altruistic reasons are surprising. The literature on energy-efficiency improvements usually assumes that improvements will only be made if they satisfy the owner's economic investment criteria.^(a) This assumption is based on the reasonable notion that since the rental property itself is an investment, improvements to the property will be made only when the owner's investment criteria are met. Nevertheless, the responses are somewhat consistent with other parts of the surveys. First, the responses are consistent with the finding (Table 5.3) that most respondents used little economic analysis in reaching a decision. Second, the responses are consistent with the large percentage of individual owners among the survey respondents (Table 2.3) and the relatively long periods they plan to hold their properties (Table 4.1). Finally, it should be noted only about 1/2 of the survey respondents made

(a) See for example, Southern California Association of Governments, Selling Energy Efficiency to Apartment Owners: An Investment Approach, (undated), available through the California Energy Extension Service, Sacramento, California.

TABLE 5.1. Reasons Seattle Rental Housing Owners Made Energy-Efficiency Improvements^(a)

Reason	Percent of Owners	
	1-4 Unit Properties ^(b)	>5 Unit Properties ^(c)
Energy efficiency is important	45%	33%
Help tenants	24%	20%
Increase value of property	16%	20%
Increase marketability of units	12%	16%
Tenant complaints	7%	8%
Energy costs got too high	8%	24%
Energy-efficiency improvements added in conjunction with other planned improvements	4%	2%
Other	34%	37%
Number of respondents making improvements	83/151	51/100

(a) Respondents were asked to give their two major reasons for making the improvements.

(b) SRC report for Seattle City Light, question 20.

(c) Hall report for Seattle City Light, question 26.

improvements (Tables 3.1 and 5.1). The remainder had apparently not been sufficiently motivated by altruistic feelings toward energy conservation to make improvements.

There was somewhat more of a tendency among owners of properties with five or more units to recognize and act on the economic aspects of improvements. These owners were more likely than small property owners to cite increased property value, increased rental marketability, and reduced energy costs as reasons for improvements.

The Seattle City Light survey data on reasons for not making energy conservation improvements are shown in Table 5.2. For reasons that are not clear, the 1-4 unit property survey response included all survey respondents. The

TABLE 5.2. Reasons Seattle Rental Housing Owners Did Not Make Energy-Efficiency Improvements^(a)

Reason	Percent of Owners	
	1-4 Unit Properties ^(b)	>5 Unit Properties ^(c)
Money needed for other things	18%	36%
Don't want to borrow	3%	14%
Interest rates too high		5%
Don't believe I'll save money	3%	8%
Lack of time	4%	8%
Nothing needs to be done		10%
Too much hassle	2%	7%
Tenant will benefit rather than owner	1%	8%
Need more information	2%	5%
Energy is insignificant part of operating budget		7%
Other	15%	17%
No answer	68%	7%
Number of respondents	151	59

(a) Respondents were asked to indicate their two major reasons for not making any or more conservation improvements.

(b) SRC report for Seattle City Light, question 30.

(c) Hall report for Seattle City Light, question 32.

>5 unit property survey response included only those respondents whose properties needed some improvement (although 10% answered that no energy-efficiency improvements were needed). As a result of this breakdown, the percentages in Table 5.2 are higher for owners of 5+ unit properties. The most popular reason for not making improvements was that the owners had other uses for available funds that were considered to be more important. A general reluctance to borrow money to make improvements was also evident, especially among owners of larger properties. Surprisingly, few owners cited a need for more information as a reason for not making improvements.

TABLE 5.3. Type of Economic Analysis Used for Conservation Investment by Seattle Rental Housing Owners

Type of Analysis	Percent of Owners	
	1-4 Unit Properties ^(a)	>5 Unit Properties ^(b)
None	84%	78%
Savings/investment ratio	1%	5%
Simple payback	2%	4%
Return on investment	1%	4%
Don't know	5%	2%
Other	5%	2%
Number of respondents	83	51

(a) SRC report for Seattle City Light, question 21.

(b) Hall report for Seattle City Light, question 27.

5.2 DECISION CRITERIA USED FOR CONSERVATION IMPROVEMENTS

Data on the type of economic analysis used by residential rental property owners in the Seattle City Light surveys to make conservation improvements are shown in Table 5.3. Remarkably, the vast majority of owners said they used no economic analysis in making their investment decision. This result would not have been too surprising if the respondents were homeowners; it is surprising for investment property owners. Perhaps the owners made a mental calculation of the economic attractiveness of the improvement, but answered "none" to the question because the calculation was not committed to writing.

Other studies have found that return on investment, payback periods, and life cycle cost are the most common decision tools for investment property owners. The Office of Technology Assessment found that how fast a conservation improvement would pay back the investment in energy savings was the most common decision criterion. For most multifamily building owners, the minimum acceptable payback period ranged from 1-3 years.^(a) A 1984 survey conducted for BPA found that commercial building developers were most likely to use return on

(a) U.S. Office of Technology Assessment. March 1982. Energy Efficiency of Buildings in Cities, p. 109. PB82-2D0346, National Technical Information Service, Springfield, Virginia.

investment and life cycle cost as investment criteria. Developers using return on investment as a criterion looked for a return of 13-16% in their projects.^(a) This range is consistent with current return requirements. A recent survey of institutional real estate investors found that they were seeking a pre-tax yield, i.e., internal rate of return, of 12.75-15% in the third quarter of 1985.^(b)

The survey results shown in Table 5.3 suggest that, at least in Seattle, residential rental property owners do not evaluate energy conservation investments with the same criteria they (presumably) use for purchasing or developing a property. Many of the owners who make conservation improvements do so because they view energy efficiency as important and to help their tenants (Table 5.1). They are apparently content to make improvements without making a formal economic evaluation.

5.3 SOURCE OF FUNDS FOR CONSERVATION IMPROVEMENTS

Data on the sources of funds used by owners in the Seattle City Light surveys who had made conservation improvements are shown in Table 5.4. Owners of smaller properties were most likely to use funds generated from sources other than their property. Owners of larger properties used cash flow from their rental property as their principal source of funds.

None of the owners in the surveys for Seattle City Light were very inclined to borrow money from conventional source to finance improvements, although there was a greater inclination to use zero interest financing available through Seattle City Light. Other studies have also shown that homeowners^(c) and rental property owners^(d) have little interest in borrowing or in

(a) Church/Davis Architects. April 1984. Market Research: Energy Conservation Opportunities in New Commercial Buildings, p. IV-18. Prepared for BPA. Portland, Oregon.

(b) Real Estate Research Corp. Third Quarter 1985. "Real Estate Report," Vol.14. Chicago, Illinois.

(c) Paul C. Stern et al., April 1985. "Residential Conservation Incentives." Energy Policy, p. 135.

(d) Alice Levine et al. March 1982. Energy Conservation in Rental Housing: Landlord's Perceptions of Problems and Solutions, p. 13. SERI/RR-744-1308, Solar Energy Research Institute, Golden, Colorado.

TABLE 5.4. Source of Funds Used for Conservation Improvements by
Seattle Rental Housing Owners

Funds Source	Percent of Owners	
	1-4 Unit Properties ^(a)	>5 Unit Properties ^(b)
Capital reserve fund	45%	16%
Rental income	11%	31%
Loan	5%	4%
Seattle City Light zero interest financing	13%	20%
Combination of above	6%	16%
Other	20%	16%
Number of respondents	83	51

(a) SRC report for Seattle City Light, question 22.

(b) Hall report for Seattle City Light, question 28.

loan subsidies to make conservation improvements, with the possible exception of zero interest loans. This attitude is especially prevalent for loans secured by a lien on the property. Apparently those homeowners and rental property owners that believe energy conservation is important and that have available funds proceed to make improvements. Owners without available funds do not generally think conservation improvements are sufficiently important to incur the risks and the out-of-pocket and administrative costs associated with obtaining a loan unless the loan carries no interest. Further discussion of loan incentives as a means to promote conservation is in Section 6.0.

6.0 PREFERENCES OF OWNERS FOR ASSISTANCE

This section reviews the limited information found on the preferences of rental property owners for energy-efficiency improvement assistance. The three most preferred areas of assistance appear to be energy audit and analysis, financing, and information on the costs and merits of various energy conservation options.

Preference data from the two surveys conducted for Seattle City Light are shown in Table 6.1. The three types of assistance that the owners most preferred to obtain from City Light in decreasing order were energy analysis and audit, financing assistance, and inspection assistance after installation of conservation improvements. Less interest was shown in obtaining assistance for getting bids, contractor selection, and supervising installation of improvements.

Approximately 50% of the owners in the Seattle City Light surveys expressed an interest in obtaining financial assistance from the utility to make conservation improvements. Owners of buildings with low-income tenants

TABLE 6.1. Types of Conservation Improvement Assistance Desired
by Seattle Rental Housing Owners

Type of Assistance	Percent of Owners	
	Owners of 1-4 Unit Properties (a)	Owners of >5 Unit Properties (b)
Energy analysis/audit	52%	65%
Getting bids	21%	28%
Selecting a contractor	14%	14%
Supervising installation	22%	35%
Inspection	39%	46%
Financing	42%	52%
Number of respondents	151	100

(a) SRC report for Seattle City Light, question 35.

(b) Hall report for Seattle City Light, question 39.

were most inclined to desire assistance. Those owners who did desire assistance preferred a capital contribution from Seattle City Light to loans with an interest rate subsidy.^(a)

In 1981, 35 owners of residential rental property in Boston, Chicago, Denver, and San Francisco were interviewed as part of a study conducted by the Solar Energy Research Institute. The types of assistance most desired by the sample of owners were enhanced tax benefits, low-cost financing and better information.^(b) A consultant who has studied the problems of improving energy efficiency in rental housing also concludes that the greatest needs of landlords are better information and financing assistance.^(c) In contrast to these views of information needs, however, only a small percentage of Seattle owners who had not made energy-efficiency improvements cited lack of information as a reason (Table 5.2).

(a) SRC report for Seattle City Light, p. II-4. Hall report for Seattle City Light, p. 12-13.

(b) Alice Levine, et al. March 1982. Energy Conservation in Rental Housing: Landlords' Perceptions of Problems and Solutions, p. 26. SERI/RR-744-1308, Solar Energy Research Institute, Golden, Colorado.

(c) Stephen B. Friedman. July 1982. "Multifamily Energy Conservation: Owners' Economic Perspectives." Energy Efficiency in Buildings: A State Policy Handbook, p. 71. National Conference of State Legislatures, Denver, Colorado.

7.0 TECHNIQUES FOR CONVEYING INFORMATION TO OWNERS

Those that are interested in improving the energy efficiency of rental housing are faced with the task of finding landlords and presenting a persuasive case to them. Many owners view their rental properties as investments only and try to minimize their involvement and time commitment to the investment. Attempts to persuade owners to invest in energy-efficiency improvements must overcome this underlying resistance. Owners of properties in low vacancy markets where tenants pay for their own utilities are likely to be especially resistant.

Techniques for reaching owners include direct mailings; personal contact; advertising in various media such as radio, television, newspapers, and trade journals; and presentations at trade groups such as apartment owners association meetings. Each technique has particular merits and associated costs.

If direct mailings to or contact with owners is deemed desirable, an initial formidable hurdle is simply identifying and locating owners. Few owners of residential rental units live at the property site. Moreover, title to the property is often in the name of a partnership, proprietorship, or association that does not identify individual owners. In some cases, utilities will have the name of individual owners when the owner pays the utility bill for vacant units, common areas, or agrees to pay when the tenant defaults on payment. If the desired ownership data are not available from a utility, it may be necessary to use such things as business license records, tax assessor records, or privately compiled city directories to locate owners.

Direct mailings can be expensive and time-consuming, but one utility, Wisconsin Gas Co.,^(a) found them to be effective in reaching owners. Including information brochures on conservation programs in utility bill envelopes is also a potential way to reach landlords. If utility bills are paid by a third party such as the property manager or bookkeeper, though, a "bill stuffer" will not necessarily reach the owner. South California Gas Co., for example, found that many rental property owners in its service area do not actually see their

(a) Fay, p. C-26.

natural gas bill because someone else pays it.^(a) Moreover, a property manager may have little incentive to pursue weatherization if he perceives that it will not affect his compensation.

Wisconsin Gas Co. found that radio and television advertising was their least effective technique for reaching landlords. This result is perhaps not surprising given the very select target market. The company did find, however, that radio and television advertising was reasonably effective in encouraging tenants to look for rental properties carrying the Wisconsin Gas energy efficiency certificate.^(b) Pacific Gas and Electric Co. (PG&E) has also found radio and television to be relatively ineffective for reaching rental property owners. The company has found face-to-face presentations to owners to be most effective. TVA has also found that face-to-face meetings and discussions with rental property owners are the most effective approaches to convince them of the desirability of energy-efficiency improvements.^(c)

PG&E provides sales training to its auditors and installation contractors to help them convince rental property owners of the desirability of energy-efficiency improvements.^(d) Themes PG&E has found useful in making a presentation to owners include: increased property value, better tenant relations, reduced tenant turnover, enhanced marketability of rental units, and state and federal tax benefits.^(d)

Data from the surveys for Seattle City Light on where owners obtain their energy conservation information are shown in Table 7.1; Seattle City Light and self-generated information were the most common information sources. Owners of

(a) Harbicht Research, Inc. November 1984. "Weatherization Financing and Credits Program: An Exploratory Investigation of the Multifamily Market." Prepared for Southern California Gas Co. Arcadia, California.

(b) Fay, p. C-26.

(c) D. Bleviss and A. Gravitz. October 1984. Energy Conservation and Existing Rental Housing, p. 26. Energy Conservation Coalition, Washington, D.C.

(d) "Pacific Gas and Electric Company's Conservation Programs for Multi-Unit Dwellings," presented by Jeff Crowe and Lee Callaway at a conference on "Energy Conservation in Rental Housing: What Works," sponsored by the California Energy Commission, Sacramento, California, May 2-3, 1985.

TABLE 7.1. Energy Conservation Information Sources for Seattle Rental Property Owners

Source	Percent of Owners	
	1-4 Unit Properties ^(a)	>5 Unit Properties ^(b)
Seattle City Light written materials	45%	43%
Self	38%	43%
Newspaper	26%	16%
Apartment Owners Association	2%	17%
Television/radio	7%	6%
Trade journals	9%	6%
Friends/associates	7%	2%
Number of respondents	151	100

(a) SRC report for Seattle City Light, question 13.

(b) Hall report for Seattle City Light, question 19.

larger rental complexes were more likely to obtain information through an apartment owners association than were owners of properties with 1-4 rental units.

REPORT ABBREVIATIONS

<u>Abbreviation</u>	<u>Report</u>
Fay	Brian K. Fay, Wisconsin Gas Co., "Voluntary Rental Living Unit Program," <u>Proceedings of the 1984 Summer Study on Energy Efficiency in Buildings</u> , p. C-18, sponsored by the American Council for an Energy Efficient Economy, Washington, D.C.
Hall	Hall & Associates, Seattle. December 1984. <u>Multifamily Survey Five Units and Above</u> , prepared for Seattle City Light.
McClelland	Lou McClelland. December 1983. <u>Tenant-Paid Energy Costs in Multifamily Rental Housing: Effects on Energy Use, Owner Investment, and the Market Value of Energy</u> . DOE/CS-20050-1, University of Colorado, Boulder, Colorado.
PNUCC	Pacific Northwest Utilities Conference Committee. August 1985. <u>Inventory of Northwest Conservation Programs</u> . Portland, Oregon.
PNWRES	Louis Harris and Associates, Inc., New York, N.Y., <u>Pacific Northwest Residential Energy Consumption Survey</u> . Reports related to the PNWRES survey and available through the National Technical Information Service, Springfield, Virginia, include: <ol style="list-style-type: none"> 1. <u>Response Analysis Final Report</u>, DOE/BP-336, June 29, 1984. 2. <u>Survey Instrument</u>, DOE/BP-331, Spring 1983. 3. <u>Interviewer Debriefing</u>, DOE/BP-329, October 18, 1983. 4. <u>Fieldwork and Data Reduction Activities</u>, DOE/BP-334, June 14, 1984. 5. <u>Fieldwork and Data Reduction Activities Appendices</u>, DOE/BP-333, April 18, 1984.
RMH	RMH Research, Inc., River Edge, N.J., <u>The Marketing Environment for Energy Conservation in the Northwest</u> , prepared for PNL and BPA, 1984.
SRC	Gary Cullen, Synergic Resources Corp., Seattle, and Will Wilcox, Market Trends, Inc., <u>A Financing Survey of Multifamily (2-4) and Single Family Rental Units</u> , SRC Report No. 7228-R3, prepared for Seattle City Light, October 1984.

ACKNOWLEDGMENTS

Two PNL staff members, Jenifer Callaway and Jeff Fang, provided helpful comments on earlier drafts of this report. Judy Danko edited the final version of the document.

DISTRIBUTION

No. of
Copies

No. of
Copies

OFFSITE

32 Pacific Northwest Laboratory

20 Terry Oliver
Bonneville Power Administration
MS/KRR
P.O. Box 3621
Portland, OR 97208

J. L. Braitman
J. W. Callaway
J. M. Fang
P. L. Hendrickson (15)
D. L. Ivey
M. S. Klan

30 DOE Technical Information
Center

A. D. Lee
B. L. Mohler
R. J. Nesse

ONSITE

DOE Richland Operations Office

R. G. Rivera
T. J. Secrest
Publishing Coordination (2)
Technical Information (5)

J. J. Sutey/D. R. Segna