

# STATISTICAL REPORT

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## 1993 SURVEY OF HOUSEHOLD ENERGY USE

### NATIONAL RESULTS

Efficiency and Alternative Energy Branch  
November, 1994



Natural Resources Canada      Ressources naturelles  
Canada



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## **IMPORTANT FACTS**

### **TOTAL STOCK OF DWELLINGS**

Of the 10.4 million Canadian household, 69% occupy a house, whether a detached house (57%), an attached house (10%) or a mobile home (2%). The other households occupy an apartment, whether in a building of less than five storeys (22%) or in a larger building (9%). Thirty-six percent of Canadian dwellings were built before 1961, 33% between 1961 and 1977, 12% between 1978 and 1982 and 19% after 1982.

Apartments are concentrated mostly in large urban areas; 68% of apartments are located in centres with a population of over one-half million. Only 35% of houses are found in these centres. Furthermore, 27% of houses built before 1941 are in rural areas, whereas less than 15% of all Canadian dwellings are found in these areas.

Twenty-three percent of total households are comprised of only one person, this percentage doubles (46%) for apartment dwellers; while only 13% of house dwellers have only one resident. Furthermore, 48% of houses are occupied by families comprised of a couple and children. This proportion increases for more recent houses.

The average age of the head of the household is higher in two categories of dwellings: houses built before 1978 (53 years of age) and apartments in buildings of five storeys or more (54 years of age). The older the head of household is, the less likely he/she is to live in a newer dwelling. The majority of apartments built before 1941 (55%) are occupied by household heads younger than age 35. However, only 22% of household heads in this age group live in houses from this period.

### **CHARACTERISTICS OF THE THERMAL ENVELOPE IN HOUSES**

An important proportion (41%) of Canadian houses have an heated living area between 1,000 and 1,500 square feet. Thirty-one percent of houses are less than 1,000 sq. ft. and 29% are larger than 1,500 sq. ft. In general, the more recently the house was built, the larger it tends to be. However, a relatively large percentage of houses built before 1941 are large; more specifically, 14% are larger than 2,000 sq. ft.

Almost half of Canadian houses (48%) have only one storey. However, only 20% of houses built before 1941 have one storey, compared to 65% of houses built between 1941 and 1977. While houses with more than two storeys (8% of houses) are more likely to have been built before 1941, multi-level houses (10% of houses) are more likely to appear after 1960.

For Canadian residential buildings, brick is the most popular exterior wall material, either as the only principal material (15.6% of houses), or combined with another material (25%). In more recently built houses, brick is less frequently used as the principal material, and more likely to be found in combination with aluminum or stucco. An important number of houses use only one material other than brick (41%); the most common stand-alone wall materials are wood (13.8% of houses), vinyl (10.9%), aluminum/steel (8.6%) and stucco (4.8%).

The average Canadian house has 3 doors leading to the outside. About one-half of these doors are made of wood (49.3%), while 30% are metal. Patio doors represent 18.1% of all exterior doors. About one-half of homeowners claim to have problems with air leaks around at least some of their doors.

On average, a Canadian house has 11 windows. Most of these windows are double-paned (60.9%), but some are single-paned with storm windows (22.2%) or even without storm windows (9.8%). The window frame is most often made of wood (61.2%), but metal (26.7%) and fibreglass or vinyl (11.9%) are also used. Nearly two-thirds of homeowners (63.2%) claim that there are no air leaks around their windows.

Three-quarters of Canadian houses have an attic (74.2%), but this space is most of the time unfinished (72.1%). As well, 38.7% of houses have an attic in which the ceiling is too low for a person to stand-up.

Seventy-one percent of Canadian houses have a full basement; other houses have either a partial basement (11.7%) or a crawl space (7.5%), or none at all (10.1%). Two-thirds of basements or crawl spaces are generally fully heated; only 48% of houses built before 1941 have heated basements.

Only ten percent of Canadian houses have a heated garage; the garage is most likely to be attached to the house (7%). About 14% of houses built after 1982 have attached heated garages.

Only ten percent of Canadian houses have an air exchanger; about 20% of houses built after 1982 have air exchangers.

## **IMPROVEMENTS MADE TO THE THERMAL ENVELOPE IN HOUSES**

Nearly two-thirds of houses with basements or crawl spaces have increased the basement inside wall insulation, whether fully (42.6%) or partially (25.5%). In 52% of houses, the homeowners upgraded the air-tightness around doors; 41% upgraded their windows this way. Roof and attic insulation was upgraded in 38% of the houses. Only 23% of houses have upgraded exterior wall insulation. More than one-third of houses (36.5%) have replaced some of their windows; less than one-third of houses (32%) had some of their doors replaced. Basement floors are rarely insulated, either fully (5.7%) or partially (4.1%). In general, the vast majority of household repairs to improve the thermal envelope were accomplished after 1983.

The older the house, the more likely some upgrading work has been done. For example, in detached houses built before 1961, 64% of households have increased air-tightness around doors and 56%, around windows, or have simply replaced the doors (48%) or windows (59%).

## **HEATING**

The central hot air furnace is the most common (45.8%) type of principal heating system in dwellings of residences. Where this system exists, the major source of energy, in 70% of the cases, is natural gas. This is followed by oil and electricity, at 16% and 8% respectively. Electric baseboards are also quite popular; they heat 26.7% of dwellings. The central hot water furnace accounts for 13.9% of the market. Here again, natural gas is the fuel most often used (63%), followed by oil (22%) and electricity (13%).

Natural gas is used as the principal fuel in 43.7% of residences. The rest of the market is divided among electricity (36.8%), heating oil (11.5%) and wood (4.9%). Electricity is the principal energy in 58.8% of apartments. A comparison of principal heating systems according to year of construction of the dwellings shows that electricity is growing in popularity as compared to other energy sources in new housing. The share of oil as principal heating fuel is clearly decreasing in new housing building.

In 30.4% of houses, the principal heating system is more than 15 years old. This percentage is higher for central systems using hot air (34.3%) or hot water (52.2%). Where oil is the principal fuel, 59.7% of systems are more than 15 years old. However, the percentage is much lower (16.6%) in the case of electricity. In 33.3% of the case, systems running on natural gas are more than 15 years old.

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Nearly one-third of all dwellings (32.1%) use a supplementary heating system; only 13.1% of dwellings use this supplementary system for a large percentage of their requirements (i.e. used more than 25% of the time). The systems used range from wood stoves (9.7% of dwellings), certain types of electric baseboards (13.5%), portable heaters (12.4%) or other devices (2.8%). Sometimes more than one supplementary system is used. The combination of wood stove and electric baseboards is present in approximately 725,000 houses, or 10% of all houses.

## AIR CONDITIONING

Approximately one-quarter of all households (26.2%) use air conditioning during the summer season. This percentage is slightly higher for houses (28.6%) than for apartments (20.8%). Generally, the air conditioning system, including the heat pump, is frequently a central system (58.2%) rather than a window or room unit (41.8%). But the type of equipment depends on the type of dwelling; two-thirds of air-conditioned houses have a central system while the reverse is true for apartments; two out of three air-conditioned apartments have window or room units. The average central air conditioning system is 6.8 years old and is thus generally newer than the window or room unit which, according to owners, is on average 8.6 years old.

Systems in dwellings built after 1982 are newer on average, whether central (4.5 years) or room units (6 years).

## HOUSEHOLD APPLIANCES

The principal refrigerator is on average 9.6 years old; 36.8% of principal refrigerators are more than 10 years old. As well, about 18.3% of households have a second refrigerator, usually much older (average 18.1 years); 35.9% of second refrigerators are more than 20 years old.

Cooking appliances are on average 10.9 years old; 24.3% are more than 15 years old. A vast majority of kitchens also have microwave ovens (79%). They are used mostly to reheat or defrost food as opposed to actual cooking.

Dishwashers appear in 44.1% of households. The average appliance is 8.3 years old; however, 25% are more than 10 years old.

Three out of five households (60.1%) own a freezer; they are on average 11.9 years old, while 32.6% are more than 15 years old.

## **IMPORTANT FACTS**

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Seventy-nine percent of households have washing machines; dryers are found in 73.9% of households. Thirty-two percent of washing machines and 37.9% of dryers are more than 10 years old.

### **HOT RUNNING WATER**

About 78% of households have a water heater. The majority of individual water heaters run on electricity (57.2%) but many use gas (38.4%). The average water heater is 7.6 years old; 26% of water heaters are more than 10 years old.

When electricity is the energy source, one out of four heaters have add-on insulation (23.2%) as well as insulation around the pipes (25.7%). These energy-saving devices are more rare in gas heaters; only 18.7% have pipe insulation and 10.9% have add-on insulation. Almost one in two household with water heater (45%) have a water-saving shower head. Water faucet aerators are more rare, owned by only 20% of household with water heater.

### **LIGHTING**

The average household uses a total of 27.1 light bulbs; 24.5 for indoor use and 2.7 for outdoor use. These figures vary noticeably depending on the type of dwelling. For example, detached houses use an average of 35 bulbs (31 indoors); the average for apartments is only 14.5 bulbs, with practically none of them used outdoors.

More than one out of two dwellings uses fluorescent bulbs (54%); they are used more frequently in houses (62.6%) than in apartments (34.9%). Halogen bulbs, a recent arrival, have yet to become a major market force; less than one-quarter of households (22.2%) use them either indoors (17.7%) or outdoors (6.5%).

## ACKNOWLEDGEMENTS

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There are several people, both inside and outside NRCan, who participated in the preparation and completion of this survey. We would like to express our sincere thanks to:

### INSIDE NATURAL RESOURCES CANADA

- *François Boulanger*, former Head of Data Development Group, who managed the project from its conception to the field collection. We acknowledge his contribution to the development of the survey's methodology.
- *Eileen Dumbrell*, Data Development Officer, who contributed to the supervision at every phase of the survey. Her experience and knowledge help to ensure the overall quality of the project.
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**OUTSIDE OF NATURAL RESOURCES CANADA**

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Finally, this survey could not have been conducted without the cooperation of a number of energy efficiency specialists in government, electrical and gas companies and public organizations who allowed us to profit from their knowledge during the development phase of the survey.

Nick Marty  
Director  
Policy Development and Analysis Division  
Efficiency and Alternative Energy Branch

November 1994

## **FOREWORD**

The first Survey of Household Energy Use (SHEU) was conducted by Statistics Canada in 1993, on behalf of Natural Resources Canada (NRCan), in cooperation with the provinces of Nova Scotia, New Brunswick, Ontario, Manitoba and Saskatchewan.

The objective of the SHEU is to provide NRCan with detailed information about energy consumption habits in Canadian households, as well as conditions or factors which affect energy use, with the emphasis on:

- energy consuming appliances and equipment;
- characteristics and state of the dwelling;
- profiles of consumers, including consumption habits.

### **SHEU: A PIECE OF THE ENERGY USE PUZZLE**

The Survey of Household Energy Use lie within the scope of a much larger information-gathering effort which aims to develop the National Energy Use Database (NEUD). This database attempts to give a comprehensive portrait of energy use in Canada in all consumer sectors: residential housing, commercial and institutional, industrial and transportation. This NRCan initiative serves as support to energy efficiency programs and to help Canada to monitor and assess its progress toward its goal to stabilize greenhouse gas emissions. The development of the NEUD is one of the many measures provided for in NRCan's Efficiency and Alternative Energy Program, announced in October 1991 as part of Canada's Green Plan.

### **APPLICATIONS**

The objective of the SHEU is to enrich NRCan's capability for analyzing energy consumption in the residential sector. More specifically, it will help to monitor on the effects of energy efficiency programs in place, analyze and better understand the effects of the foreseen measures for the future and to estimate the potential of energy efficiency in the residential sector.

In addition to improving its ability to analyze programs, NRCan foresees using SHEU data currently for a series of studies, including:

- **Validation of study results:** As a complement to the telephone survey, NRCan and Canada Mortgage and Housing Corporation (CMHC) cooperated in a field audit in British Columbia, Alberta and Nova Scotia, involving inspecting up to one hundred houses in each province. Even if these field audits were not statistically valid, they will allow us to validate the data obtained through telephone surveys and to determine the degree of trust that can be placed on each result.
- **Analysis of energy use in Canadian houses:** Using the thermal envelope data from SHEU, detailed data from the HOT-2000 model and readings of house energy consumption from SHEU respondents (collected from energy suppliers), NRCan will calculate average energy consumption in Canadian houses, by type of dwelling and year of construction. The HOT-2000 model, centred on technology, uses engineering principles to calculate energy consumption by simulating the components of a typical house.
- **Analysis of Household Appliance Energy Use:** A programme developed especially for this purpose will combine SHEU data related to energy consuming appliances and information contained in the Energuide Index, which indicates annual energy consumption of all appliances sold in Canada, classified according to brand, model and characteristics such as size and capacity, in order to calculate average energy consumption of major household appliances in Canadian households.
- **Interim Years Annual Surveys:** NRCan foresees repeating the SHEU every four years and, in the interim, conducting annual small-scale or complementary surveys. This information will be used to observe trends in energy consuming appliances (e.g. sales, technology changes and consumer tendencies to resort to more energy-efficient appliances), newly constructed dwellings and renovations of existing housing.

**ADDITIONAL INFORMATION**

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## **INTRODUCTION**

## INTRODUCTION

The Survey of Household Energy Use (SHEU), conducted in 1993, is the first in a series of surveys that Natural Resources Canada (NRCan) expects to conduct in order to establish the National Energy Use Database (NEUD). The goals of this initiative are to examine the sources of existing data, to evaluate data needs and to develop data collecting strategies in each energy consumption sector.

To develop a data collecting strategy for the residential sector, an in-depth study of existing sources of data in Canada was performed to determine the extent and quality of information available. This study revealed that there were no accurate and consistent national data on characteristics of the Canadian residential sector, nor on energy consumption of appliances used in these households. In the context of its annual Household Facilities and Equipment Survey, Statistics Canada gathered information on major household appliances and other energy-consuming equipment, but data on their technical characteristics were insufficient to permit the type of detailed analysis that NRCan wanted on energy end use.

In early 1992, NRCan asked Statistics Canada to conduct a feasibility study for a national survey on household energy use. During this study, Statistics Canada recommended the use of the Labour Force Survey (LFS), conducted monthly, for three main reasons: the methodologies used, the fact that experienced interviewers could be employed to conduct telephone interviews, and because it would not be necessary to ask detailed questions on the socio-demographic makeup of households, as the LFS already allows these data to be gathered.

As a consequence, the SHEU was conducted as a complement to Statistic Canada's monthly LFS, from a sampling of 15,182 Canadian dwellings (single-family houses, duplexes, mobile homes and apartment buildings of fewer and more than five storeys), occupied by owners or renters. This survey is unique because of its national scope. However, the survey does not

cover Yukon and the Northwest Territories, simply because the LFS does not cover these regions either. Before the telephone interview, participating households received a guide presenting the survey and helping them to prepare for it. The telephone interview lasted an average of 20 to 30 minutes. Nine hundred fifty-two (952) interviews were conducted in person with participants age 65 and over or persons who had difficulty answering the questions. Appendix 1 contains more detailed information on the methodology used.

The SHEU questionnaire contained 195 questions, divided into eight sections. Most of the questions concerned technical characteristics of household appliances and other energy-consuming equipment. Other questions related to the thermal envelope of the dwellings, meaning the infrastructure that retains heat inside; this includes walls, doors, windows, foundation and roof. These two elements (energy-consuming equipment and thermal envelope) are factors that most influence the amount of energy consumed in Canadian housing units. Some questions served to examine energy use habits of the occupants, as well as any efforts made to consume energy. In the last set of questions, at the end of the interview, the respondents were asked for permission to obtain data relative to their annual energy consumption, by contacting their supplier.

The data gathering was conducted between February 22 and March 5, 1993. Statistics Canada adopted a descending approach to verify the results, meaning that responses that contradicted or invalidated previous responses were not counted in order to correct the data. NRCan, however, wanted to conserve all the data on appliance brands and models, independently of the responses given to the preceding questions.

On April 14, 1994, Statistics Canada made available a microdata file containing the results of the survey. The total response rate was 72.3%. Less than 1% of responses were incomplete, 14% of respondents refused to participate, and approximately 13% of the questionnaires were not completed for other reasons (impossible to contact the person, moving, etc.). Only 11% of the respondents refused to allow their suppliers to contact us with information on their annual energy bill.

This statistical report presents the major national results of the survey. It covers the major components of energy use by Canadian households: the total stock of dwellings (Chapter 1); the thermal envelope (Chapter 2); heating (Chapter 3); air-conditioning (Chapter 4); appliances (Chapter 5); hot running water (Chapter 6); lighting (Chapter 7). Because of the large quantity of data gathered, we have been compelled to summarize the results, which are presented in concise tables supported by organizational charts and graphs. The accompanying text explains in a noncomprehensive manner some of the conclusions drawn related to each section, which expedites the reading and the interpretation of the results.

In order to better understand the details provided in the report, the reader should study the appendices, which contain information on the more technical aspects of the survey. These appendices include a summary of the Survey's methodology, a glossary and comments concerning data processing. The frequency distribution for all questions as well as the instruments of the Survey (guide and questionnaire) are presented in a separate document entitled *Technical Appendix*.

## **CHAPTER 1 : TOTAL STOCK OF DWELLINGS**

## **CHAPTER 1 : TOTAL STOCK OF DWELLINGS**

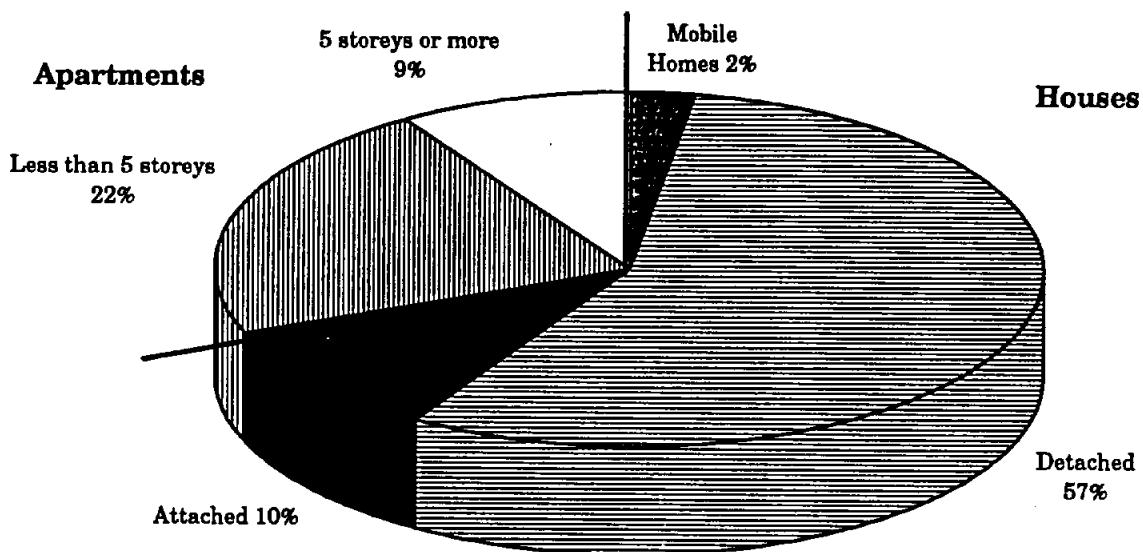
### **1.1 DISTRIBUTION OF DWELLINGS ACCORDING TO TYPE OF DWELLING AND YEAR OF CONSTRUCTION**

According to the results of this survey, seven out of ten Canadian households occupy a house (see attached Glossary for definitions), whether a detached house from an other building (57%), an attached house (10%) or a mobile home (2%). Approximately one third of dwellings date from between 1961 and 1977 (33%), while another third were built after this time (31%).

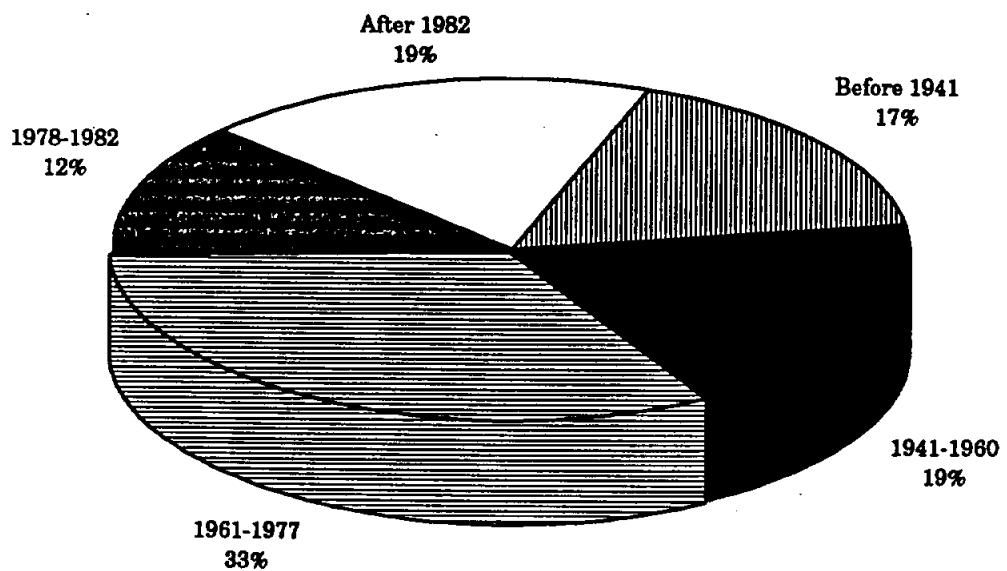
No matter what the period of construction, the detached house occupies the largest part of the market varying between 56% and 62% (Graph 1.1.2). Furthermore, apartments located in residential buildings of five storeys or more were constructed after 1960. Finally, since 1978, the proportion of houses has increased appreciably in relation to apartments; for example, among all dwellings built between 1978 and 1982, 77.6% of dwellings constructed were houses.

Graph 1.1.1  
**Distribution of Dwellings  
According to Type and Year of Construction**

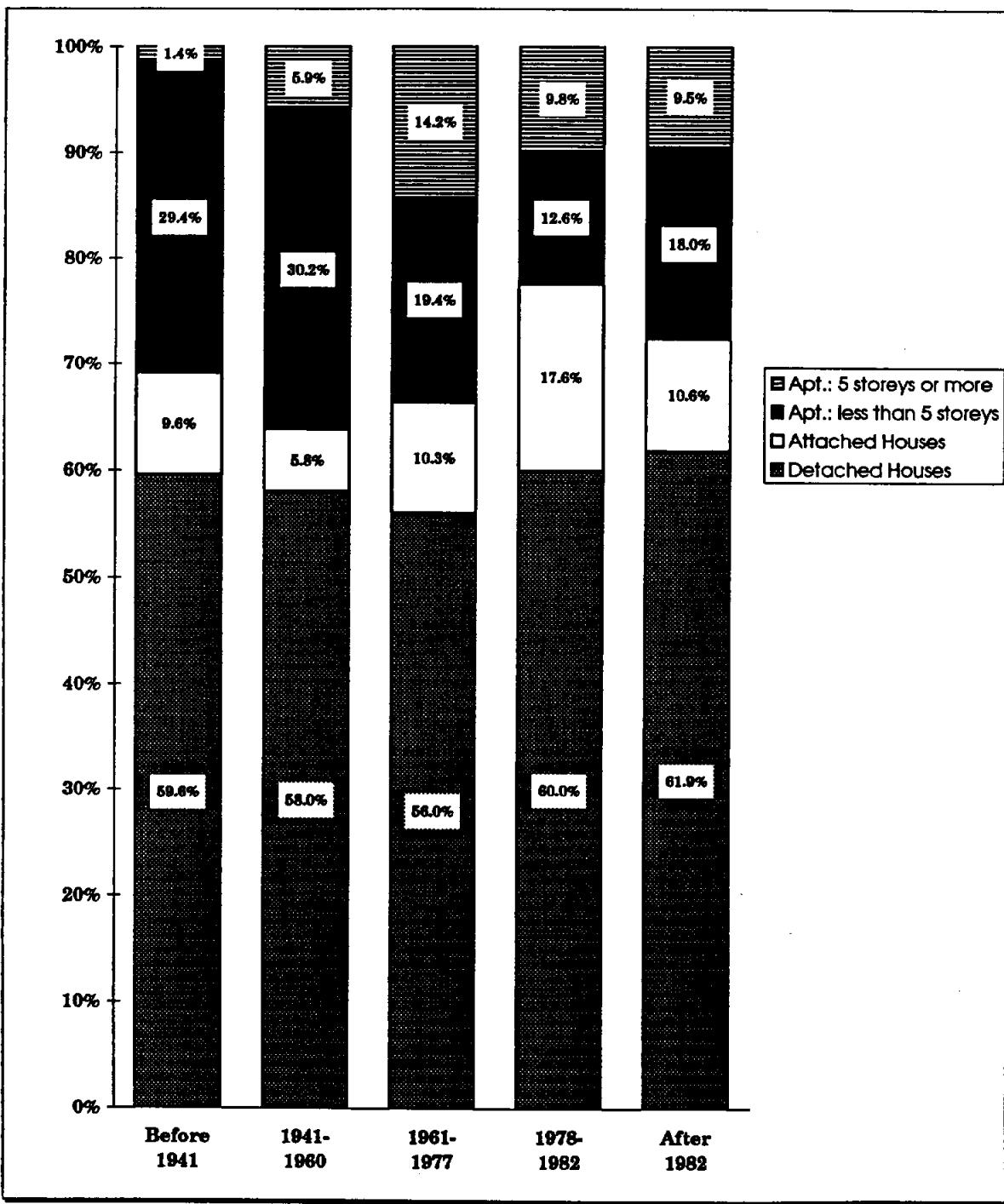
**Distribution of Dwellings According to Type**



**Distribution of Dwellings According to Year of Construction**



**Graph 1.1.2**  
**Distribution of Dwellings According to Type**  
**by Period of Construction**



Note: Mobile Homes are included in the detached houses category.

**1.2 DISTRIBUTION OF DWELLINGS BY TYPE OF  
DWELLING AND YEAR OF CONSTRUCTION  
ACCORDING TO...**

**1.2.1 OCCUPIED AND HEATED AREA (BY NUMBER OF ROOMS)**

In 41% of cases, the heated living area of houses is between 1,000 and 1,500 sq. ft. Thirty-one percent (31%) of houses have a square footage of less than 1,000 sq. ft.; square footage is greater than 1,500 sq. ft. in 29% of houses.

In general, the more recently the house is constructed, the larger it tends to be. However, a relatively large percentage of houses built before 1941 are large ones; more specifically, 14% are larger than 2 000 sq. ft.

Individual detached houses are in general larger than attached houses; the latter category includes double houses, row houses and duplexes owned by the occupants. For example, 32% of attached houses are larger than 1 500 sq. ft.; only 15% of detached houses are this size.

Nearly one-third of apartments (32%) have less than 600 sq. ft., and nearly half (47%) are between 600 and 1,000 sq. ft. in area. Dwellings built before 1977 tend to be somewhat larger; one-third are larger than 1,000 sq. ft. Buildings with five or more storeys usually contain dwellings of medium size, as nearly three-quarters of these dwellings are between 600 and 1,500 sq. ft.

Finally, seven out of ten mobil homes (70.9%) are 1,000 sq. ft. or less.

**Table 1.2.1**  
**Distribution of Dwellings**  
**According to Total Heated Area\*\*\***  
**by Type of Dwelling and Year of Construction**

	Number of Dwellings ('000)	Less than 600 sq. ft.	601- 1000 sq. ft.	1001- 1500 sq. ft.	1501- 2000 sq. ft.	2001- 2500 sq. ft.	2500 sq. ft. and over
<b>ALL DWELLINGS</b>	<b>10,359</b>	<b>12.9%</b>	<b>32.4%</b>	<b>33.6%</b>	<b>11.7%</b>	<b>5.8%</b>	<b>3.8%</b>
Before 1941	1,762	17.3%	32.6%	26.8%	12.7%	6.0%	4.6%
1941-1960	1,972	13.5%	41.4%	33.4%	8.1%	1.8%	1.8%
1961-1977	3,413	13.5%	32.4%	37.3%	10.0%	4.6%	2.2%
1978-1982	1,285	8.2%	25.0%	40.0%	15.8%	6.9%	4.1%
1983 and after	1,928	8.1%	24.3%	32.0%	16.6%	11.8%	7.1%
<b>Houses</b>	<b>7,135</b>	<b>4.9%</b>	<b>26.1%</b>	<b>40.7%</b>	<b>15.9%</b>	<b>8.1%</b>	<b>4.7%</b>
Before 1941	1,223	8.1%	30.0%	31.0%	17.3%	8.0%	5.6%
1941-1960	1,266	6.4%	34.1%	42.5%	11.6%	2.7%	2.6%
1961-1977	2,262	2.7%	25.4%	49.0%	13.3%	6.7%	2.8%
1978-1982	991	3.9%	19.8%	43.6%	19.8%	8.6%	4.3%
1983 and after	1,394	2.7%	17.9%	33.1%	20.8%	15.8%	9.7%
<b>Detached</b>	<b>5,828</b>	<b>3.9%</b>	<b>22.4%</b>	<b>41.7%</b>	<b>17.0%</b>	<b>9.5%</b>	<b>5.5%</b>
Before 1941	1,053	7.8%	29.4%	31.6%	17.2%	7.8%	6.3%
1941-1960	1,146	6.6%	33.7%	43.0%	11.0%	2.9%	2.8%
1961-1977	1,765	1.0%	20.8%	52.1%	14.3%	8.4%	3.4%
1978-1982	714	3.1%	11.2%	44.4%	24.4%	11.2%	5.6%
1983 and after	1,145	1.8%	12.2%	32.6%	23.3%	18.6%	11.4%
<b>Attached*</b>	<b>1,065</b>	<b>8.1%</b>	<b>37.8%</b>	<b>39.0%</b>	<b>12.4%</b>	<b>2.7%</b>	<b>**</b>
Before 1978	636	8.4%	34.2%	38.5%	15.5%	3.4%	**
1978 and after	429	7.0%	40.2%	40.7%	9.9%	2.3%	**
<b>Mobile Homes</b>	<b>247</b>	<b>8.1%</b>	<b>62.8%</b>	<b>25.7%</b>	<b>1.7%</b>	<b>1.7%</b>	<b>**</b>
<b>Apartments</b>	<b>3,224</b>	<b>31.6%</b>	<b>46.8%</b>	<b>17.7%</b>	<b>2.0%</b>	<b>1.4%</b>	<b>**</b>
Before 1961	1,248	31.9%	47.8%	16.7%	1.8%	1.8%	**
1961-1977	1,154	35.7%	46.9%	13.2%	3.2%	1.0%	**
1978 and after	822	23.6%	42.9%	28.0%	3.6%	2.0%	**
<b>1 - 4 storeys</b>	<b>2,268</b>	<b>34.9%</b>	<b>45.1%</b>	<b>15.7%</b>	<b>2.0%</b>	<b>1.7%</b>	<b>**</b>
Before 1961	1,117	31.6%	46.5%	18.0%	1.8%	2.0%	**
1961-1977	662	42.3%	43.9%	9.0%	2.9%	1.9%	**
1978 and after	508	29.4%	40.4%	24.1%	4.7%	1.3%	**
<b>5 or more storeys</b>	<b>936</b>	<b>24.0%</b>	<b>50.1%</b>	<b>22.3%</b>	<b>2.6%</b>	<b>0.9%</b>	<b>**</b>

\* Double houses, row houses and duplexes owned by the occupant.

\*\* The left column corresponds to areas of more than 2,000 sq. ft.

\*\*\* Some respondents (9%) gave the number of rooms rather than the square footage; see rule of attribution in Appendix 3.

### **1.2.2 NUMBER OF STOREYS (HOUSES)**

Nearly one-half of Canadian houses (48%) have only one storey. However, this characteristic varies considerably according to year of construction. Only one out of five houses built before 1941 are only one storey, while the ratio is three out of five for houses built between 1941 and 1977. After this date, the ratio is two out of five.

While houses with more than two storeys are more likely to have been built before 1941 (8% are characterized this way), multi-level houses are more likely to appear after 1960: 10% of houses built after 1960 are multi-level.

Attached houses are most likely to be two storeys (57%).

**Table 1.2.2**  
**Distribution of Houses**  
**According to Number of Storeys**  
**by Type of Dwelling and Year of Construction**

	Number of Dwellings ('000)	One Storey	One and half Storey	Two Storeys	More than two Storeys**	Multi-level
<b>Houses</b>	<b>7,135</b>	<b>47.9%</b>	<b>10.1%</b>	<b>30.7%</b>	<b>3.9%</b>	<b>7.4%</b>
Before 1941	1,223	19.5%	24.2%	48.4%	7.8%	0.0%
1941-1960	1,266	60.0%	15.1%	22.0%	0.9%	2.0%
1961-1977	2,262	65.2%	4.0%	15.7%	4.5%	10.6%
1978-1982	991	39.7%	6.9%	39.9%	1.7%	11.8%
1983 and after	1,394	38.7%	6.4%	39.5%	4.1%	11.3%
<b>Detached</b>	<b>5,822</b>	<b>49.8%</b>	<b>11.3%</b>	<b>27.3%</b>	<b>3.4%</b>	<b>8.2%</b>
Before 1941	1,053	20.9%	26.3%	44.6%	8.1%	0.0%
1941-1960	1,146	61.5%	16.4%	19.0%	0.9%	2.1%
1961-1977	1,765	70.1%	4.4%	11.5%	2.2%	11.8%
1978-1982	714	42.3%	7.9%	33.3%	2.0%	14.5%
1983 and after	1,145	36.5%	6.0%	40.4%	4.3%	12.9%
<b>Attached*</b>	<b>1,065</b>	<b>24.6%</b>	<b>5.6%</b>	<b>57.1%</b>	<b>7.9%</b>	<b>4.6%</b>
Before 1978	636	21.8%	4.6%	55.9%	12.6%	5.1%
1978 and after	429	24.4%	8.0%	60.2%	2.4%	5.0%
<b>Mobile Homes</b>	<b>247</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>

\* Double houses, row houses and duplexes owned by the occupant.

\*\* 'More than 2 storeys' includes the residual 'Other' category.

### **1.2.3 SIZE OF URBAN AREA**

As might be expected, there is a greater concentration of apartments in large urban areas; more than two-thirds of apartments (68%) are found in centres with a population of over one-half million, whereas barely one-third of houses (35%) are found in these centres.

Furthermore, more than one-quarter of houses built before 1941 (27%) are in rural areas, whereas less than 15% of all Canadian dwellings are found in these areas.

**Table 1.2.3**  
**Distribution of Dwellings**  
**According to Size of Area of Residence**  
**by Type of Dwelling and Year of Construction**

	Number of Dwellings ('000)	500,000 and Over	100,000 to 500,000	30,000 to 100,000	15,000 to 30,000	Urban, less than 15,000	Rural
<b>ALL DWELLINGS</b>	<b>19,359</b>	<b>45.5%</b>	<b>15.0%</b>	<b>9.5%</b>	<b>4.1%</b>	<b>11.0%</b>	<b>16.0%</b>
Before 1941	1,762	39.5%	13.2%	9.3%	3.7%	14.6%	19.7%
1941-1960	1,972	52.0%	14.1%	8.2%	5.2%	10.8%	9.7%
1961-1977	3,413	49.7%	14.5%	8.8%	4.0%	8.9%	14.1%
1978-1982	1,285	44.0%	17.1%	6.5%	2.4%	12.7%	17.3%
1983 and after	1,928	39.3%	15.7%	13.7%	4.0%	9.8%	17.6%
<b>Houses</b>	<b>7,135</b>	<b>35.3%</b>	<b>15.5%</b>	<b>10.3%</b>	<b>4.8%</b>	<b>13.1%</b>	<b>21.1%</b>
Before 1941	1,223	29.3%	13.6%	8.4%	4.5%	17.0%	27.3%
1941-1960	1,266	37.2%	17.8%	9.9%	6.5%	14.5%	14.1%
1961-1977	2,262	39.3%	14.6%	9.7%	5.0%	11.0%	20.5%
1978-1982	991	39.1%	16.7%	6.5%	2.6%	13.6%	21.6%
1983 and after	1,394	30.1%	15.9%	15.6%	4.5%	10.8%	23.2%
<b>Detached</b>	<b>5,823</b>	<b>34.2%</b>	<b>14.7%</b>	<b>10.3%</b>	<b>4.7%</b>	<b>13.3%</b>	<b>22.7%</b>
Before 1941	1,053	26.9%	13.4%	8.3%	4.3%	17.4%	29.6%
1941-1960	1,146	36.8%	17.6%	9.5%	6.6%	14.2%	15.2%
1961-1977	1,765	38.5%	13.8%	10.0%	5.2%	10.9%	21.5%
1978-1982	714	37.3%	15.8%	5.8%	2.9%	13.0%	25.3%
1983 and after	1,145	31.0%	14.3%	16.2%	3.2%	11.5%	23.8%
<b>Attached*</b>	<b>1,065</b>	<b>46.6%</b>	<b>21.7%</b>	<b>10.5%</b>	<b>4.9%</b>	<b>10.8%</b>	<b>5.8%</b>
Before 1978	636	49.4%	20.2%	9.1%	3.9%	11.3%	6.2%
1978 and after	429	42.9%	24.0%	11.7%	6.7%	8.9%	5.8%
<b>Mobile Homes</b>	<b>247</b>	<b>11.4%</b>	<b>8.3%</b>	<b>8.2%</b>	<b>5.1%</b>	<b>19.0%</b>	<b>48.0%</b>
<b>Apartments</b>	<b>3,224</b>	<b>68.1%</b>	<b>13.7%</b>	<b>7.7%</b>	<b>1.6%</b>	<b>8.3%</b>	<b>1.6%</b>
Before 1961	1,248	72.6%	9.5%	7.6%	2.4%	6.2%	1.7%
1961-1977	1,154	71.0%	14.3%	6.9%	2.1%	4.7%	1.0%
1978 and after	822	63.2%	16.3%	7.8%	2.4%	7.9%	2.4%
<b>1 - 4 storeys</b>	<b>1,288</b>	<b>61.7%</b>	<b>13.8%</b>	<b>10.0%</b>	<b>3.5%</b>	<b>8.6%</b>	<b>2.3%</b>
Before 1961	1,117	69.4%	10.3%	8.7%	2.7%	7.0%	1.9%
1961-1977	662	68.0%	14.3%	9.6%	3.5%	7.8%	1.7%
1978 and after	508	50.3%	17.1%	11.9%	3.9%	12.9%	3.9%
<b>5 or more storeys</b>	<b>936</b>	<b>38.9%</b>	<b>13.3%</b>	<b>2.2%</b>	<b>0.2%</b>	<b>0.4%</b>	<b>0.0%</b>

\* Double houses, row houses and duplexes owned by the occupant.

#### **1.2.4 TYPE OF HOUSEHOLD**

Whereas slightly less than one-quarter of households are comprised of only one person (23%) this percentage doubles (46%) for apartment dwellers; while only 13% of house dwellers have only one resident.

Furthermore, nearly one-half of houses (48%) are occupied by families comprised of a couple and children. This proportion increases for more recent houses: for example, about three houses in five built after 1977 accommodate such families.

**Table 1.2.4**  
**Distribution of Dwellings**  
**According to Type of Household**  
**by Type of Dwelling and Year of Construction**

	Number of Dwellings ('000)	One Person	Couple without Children	Single Parent Family	Couple with Children	Multiple Households
<b>ALL DWELLINGS</b>	<b>10,359</b>	<b>23.2%</b>	<b>22.9%</b>	<b>9.2%</b>	<b>38.3%</b>	<b>6.3%</b>
Before 1941	1,762	28.3%	21.8%	10.4%	32.1%	7.4%
1941-1960	1,972	25.6%	28.5%	10.0%	29.2%	6.8%
1961-1977	3,413	23.9%	22.0%	8.9%	39.8%	5.3%
1978-1982	1,285	15.9%	19.2%	10.5%	47.0%	7.4%
1983 and after	1,928	16.2%	25.1%	5.9%	48.2%	4.7%
<b>Houses</b>	<b>7,135</b>	<b>18.1%</b>	<b>25.0%</b>	<b>8.0%</b>	<b>48.1%</b>	<b>5.7%</b>
Before 1941	1,223	21.4%	25.2%	9.7%	37.1%	6.7%
1941-1960	1,266	18.1%	32.2%	8.2%	35.0%	6.6%
1961-1977	2,262	10.8%	25.2%	7.6%	51.2%	5.2%
1978-1982	991	7.5%	18.5%	9.8%	57.2%	7.0%
1983 and after	1,394	7.8%	24.5%	4.9%	59.4%	3.4%
<b>Detached</b>	<b>5,823</b>	<b>12.4%</b>	<b>26.6%</b>	<b>6.1%</b>	<b>49.5%</b>	<b>5.5%</b>
Before 1941	1,053	22.0%	26.7%	8.0%	37.8%	5.6%
1941-1960	1,146	18.4%	33.5%	7.6%	33.6%	6.9%
1961-1977	1,765	9.5%	27.3%	5.2%	52.9%	5.1%
1978-1982	714	6.3%	16.9%	7.3%	62.3%	7.1%
1983 and after	1,145	4.8%	25.1%	3.1%	63.5%	3.4%
<b>Attached*</b>	<b>1,086</b>	<b>15.8%</b>	<b>17.2%</b>	<b>17.7%</b>	<b>42.6%</b>	<b>7.1%</b>
Before 1978	636	15.0%	15.4%	18.8%	42.8%	8.0%
1978 and after	429	14.3%	21.2%	16.6%	42.5%	5.4%
<b>Mobile Homes</b>	<b>247</b>	<b>20.8%</b>	<b>24.4%</b>	<b>10.2%</b>	<b>41.0%</b>	<b>3.7%</b>
<b>Apartments</b>	<b>3,294</b>	<b>45.5%</b>	<b>18.3%</b>	<b>12.0%</b>	<b>18.6%</b>	<b>7.6%</b>
Before 1961	1,248	41.7%	18.3%	12.9%	19.2%	7.9%
1961-1977	1,154	50.6%	15.6%	11.6%	16.6%	5.6%
1978 and after	822	41.4%	24.8%	10.2%	15.2%	8.4%
<b>1 - 4 storeys</b>	<b>2,283</b>	<b>42.6%</b>	<b>18.2%</b>	<b>13.2%</b>	<b>18.5%</b>	<b>7.3%</b>
Before 1961	1,117	40.7%	18.6%	13.3%	20.1%	7.3%
1961 - 1977	662	48.0%	15.1%	11.6%	19.4%	5.8%
1978 and after	508	34.5%	24.8%	13.2%	19.3%	8.1%
<b>5 or more storeys</b>	<b>936</b>	<b>57.2%</b>	<b>18.4%</b>	<b>8.9%</b>	<b>12.1%</b>	<b>8.4%</b>

\* Double houses, row houses and duplexes owned by the occupant.

### **1.3 AVERAGE CHARACTERISTICS OF HOUSEHOLDS ACCORDING TO TYPE OF DWELLING AND YEAR OF CONSTRUCTION**

Houses built after 1977, and more particularly detached houses, are most likely to house, on average, the greatest number of occupants, specifically because they have the greatest number of children. Households occupying these residences report higher annual gross incomes than all other households; as well, they contain, on average, the greatest number of employed persons.

The average age of the head of the household is higher in two categories of dwelling (Graph 1.3.1): houses built before 1978 (53 years of age) and apartments in buildings of five storeys or more (54 years of age). Graph 1.3.2 reveals in addition that the older the household head is, the less likely he/she is to live in a newer dwelling. Younger household heads (under age 35) often occupy dwellings built before 1941 (31.5%) or after 1982 (35.4%).

When the results of the study are analyzed by separating houses (Graph 1.3.3) from apartments (Graph 1.3.4), it is observed that, on one hand, the more recently the houses are constructed, the more likely that young households live there. On the other hand, a high proportion of older apartments are occupied by young household heads: for example, 55% of apartments built before 1941 are occupied by household heads younger than age 35.

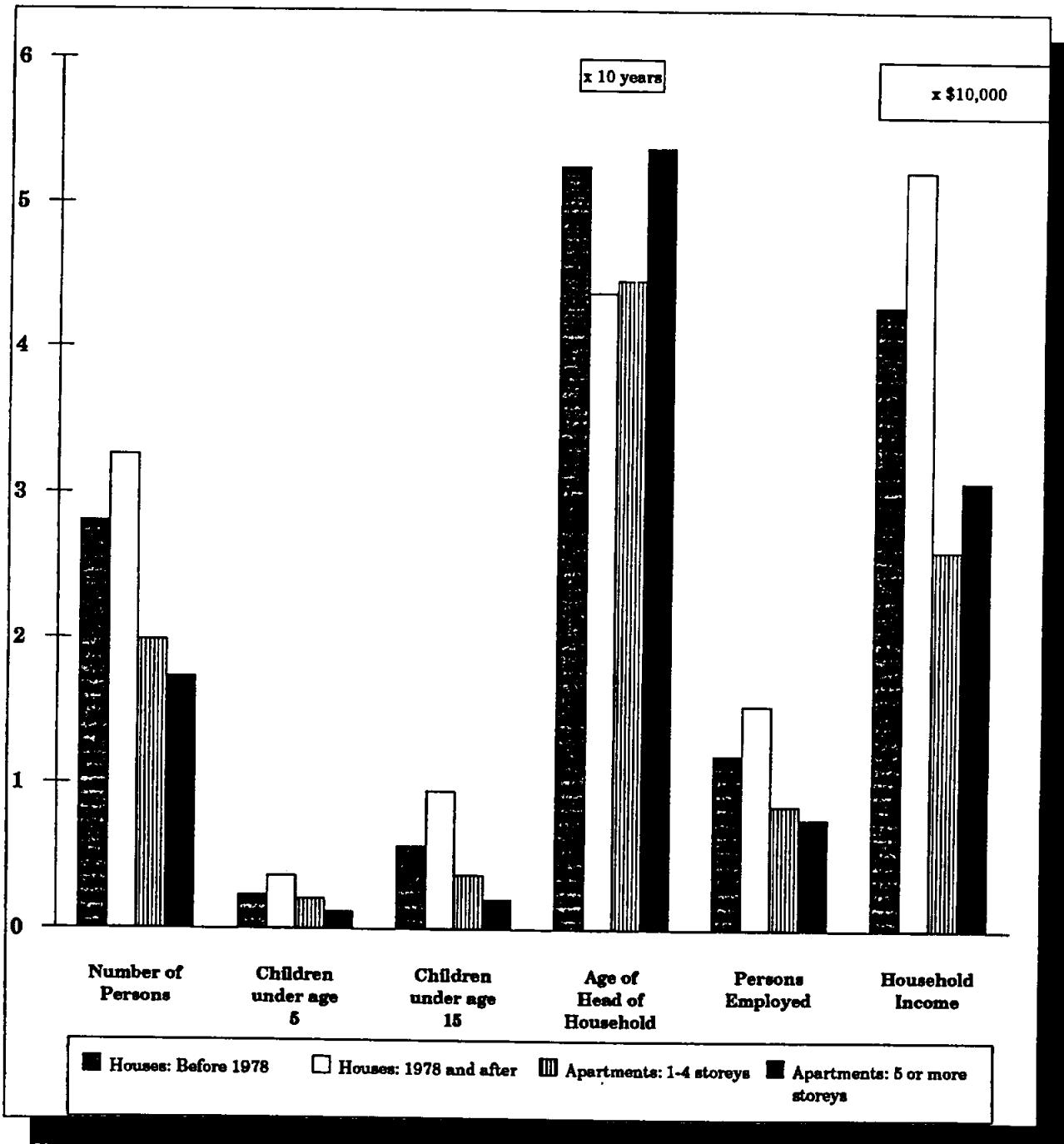
**Table 1.3.1**  
**Average\*\* Characteristics of Households**  
**According to Type of Dwelling**  
**and Year of Construction**

	Number of Dwellings ('000)	Number of persons	Number of Children 0-5 Years	Number of Children 0-14 Years	Ave. Age of Head of Household	Number of Persons Employed	Household Income
<b>ALL DWELLINGS</b>	<b>10,359</b>	<b>2.63</b>	<b>0.25</b>	<b>0.58</b>	<b>48.7</b>	<b>1.16</b>	<b>\$39,639</b>
Before 1941	1,762	2.50	0.27	0.55	50.2	0.96	\$34,309
1941-1960	1,972	2.36	0.16	0.37	51.9	0.98	\$35,105
1961-1977	3,413	2.65	0.22	0.54	51.3	1.15	\$39,478
1978-1982	1,285	2.94	0.26	0.72	45.9	1.48	\$47,710
1983 and after	1,928	2.90	0.34	0.80	43.5	1.37	\$48,258
<b>Houses</b>	<b>7,135</b>	<b>2.95</b>	<b>0.28</b>	<b>0.70</b>	<b>49.4</b>	<b>1.31</b>	<b>\$45,510</b>
Before 1941	1,223	2.67	0.24	0.57	54.5	1.07	\$39,421
1941-1960	1,266	2.55	0.15	0.40	56.6	1.03	\$40,417
1961-1977	2,262	3.02	0.27	0.65	49.3	1.36	\$46,277
1978-1982	991	3.27	0.31	0.87	44.4	1.64	\$51,921
1983 and after	1,394	3.26	0.40	1.00	43.4	1.48	\$52,547
<b>Detached</b>	<b>5,823</b>	<b>2.97</b>	<b>0.26</b>	<b>0.68</b>	<b>50.5</b>	<b>1.34</b>	<b>\$47,806</b>
Before 1941	1,053	2.63	0.21	0.54	55.4	1.08	\$39,912
1941-1960	1,146	2.55	0.14	0.40	57.1	1.03	\$40,820
1961-1977	1,765	3.06	0.24	0.62	50.7	1.42	\$49,332
1978-1982	714	3.35	0.32	0.91	44.7	1.68	\$55,469
1983 and after	1,145	3.37	0.41	1.04	43.4	1.57	\$57,474
<b>Attached*</b>	<b>1,065</b>	<b>2.92</b>	<b>0.36</b>	<b>0.79</b>	<b>44.4</b>	<b>1.20</b>	<b>\$37,055</b>
Before 1978	636	2.91	0.38	0.75	46.6	1.12	\$37,556
1978 and after	429	2.97	0.31	0.82	43.3	1.32	\$37,753
<b>Mobile Homes</b>	<b>247</b>	<b>2.52</b>	<b>0.32</b>	<b>0.68</b>	<b>44.3</b>	<b>1.07</b>	<b>\$31,273</b>
<b>Apartments</b>	<b>3,224</b>	<b>1.92</b>	<b>0.19</b>	<b>0.32</b>	<b>47.3</b>	<b>0.83</b>	<b>\$27,588</b>
Before 1961	1,248	2.04	0.26	0.39	41.7	0.81	\$24,732
1961-1977	1,154	1.89	0.12	0.31	55.3	0.72	\$26,137
1978 and after	822	1.86	0.16	0.24	46.5	1.02	\$36,296
<b>1-4 Storeys</b>	<b>2,288</b>	<b>1.99</b>	<b>0.21</b>	<b>0.37</b>	<b>44.7</b>	<b>0.85</b>	<b>\$26,212</b>
Before 1961	1,117	2.08	0.29	0.43	41.7	0.79	\$24,591
1961-1977	662	1.97	0.09	0.33	51.7	0.82	\$26,540
1978 and after	508	1.99	0.21	0.30	42.9	1.09	\$32,927
<b>5 or more storeys</b>	<b>936</b>	<b>1.74</b>	<b>0.12</b>	<b>0.20</b>	<b>53.8</b>	<b>0.76</b>	<b>\$30,953</b>

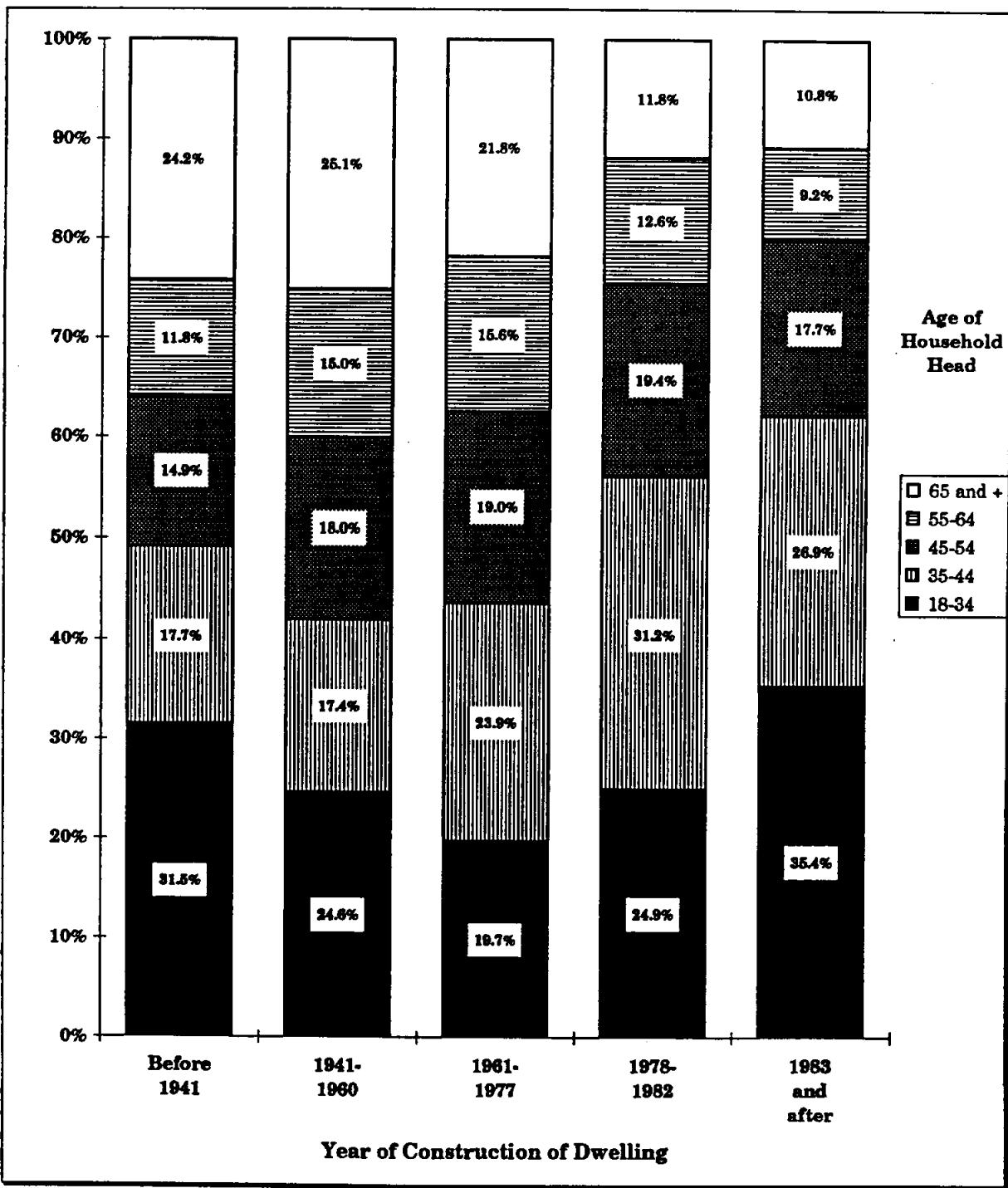
\* Double houses, row houses and duplexes owned by the occupant.

\*\* All averages calculated on total households. For example, the average number of children is obtained by assigning a value of '0' to households without children.

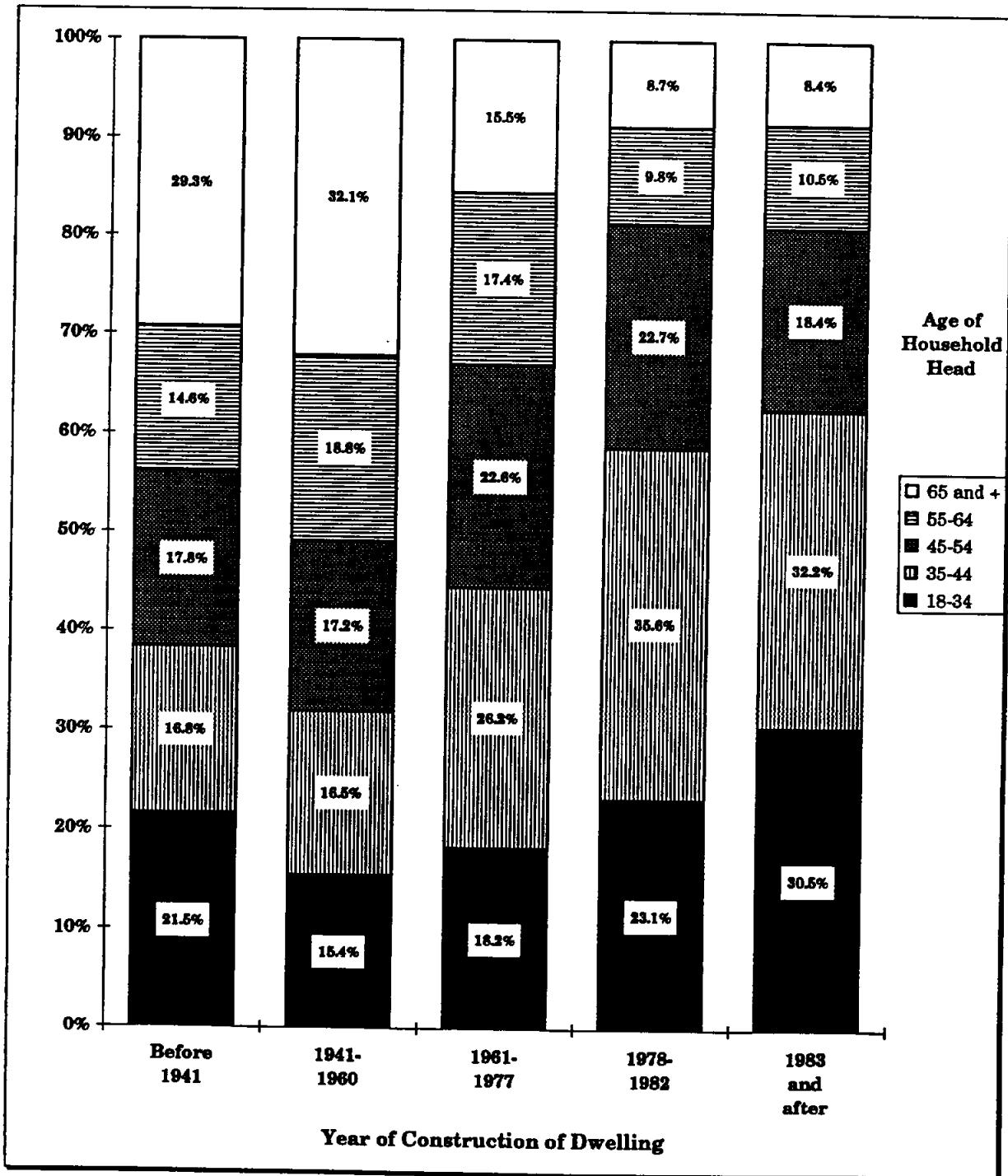
**Graph 1.3.1**  
**Average Characteristics of Households**  
**According to Type of Dwelling**



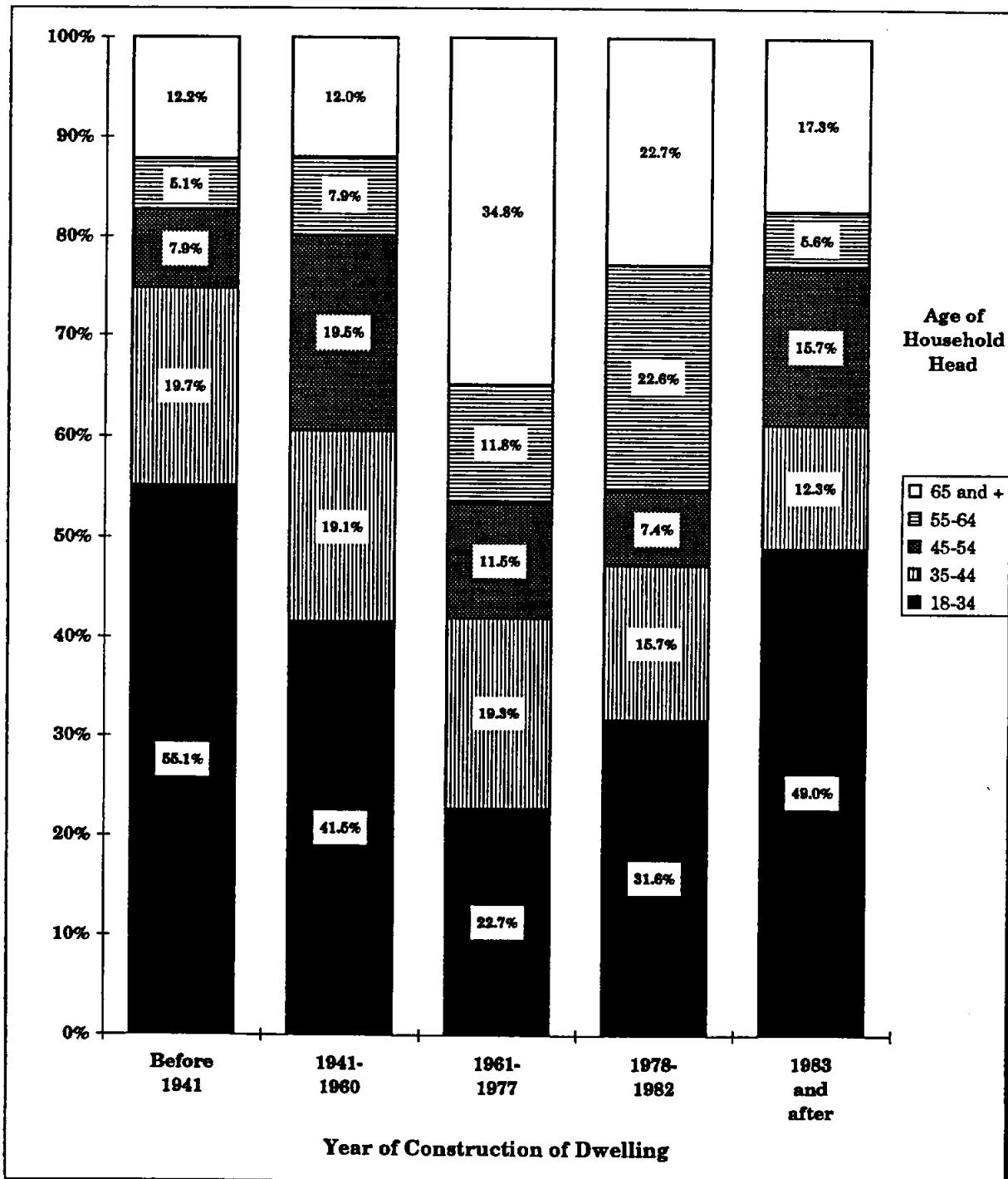
**Graph 1.3.2**  
**Distribution of All Dwellings**  
**According to Age of Head of Household**  
**by Period of Construction**



**Graph 1.3.3**  
**Distribution of All Houses**  
**According to Age of Head of Household**  
**by Period of Construction**



**Graph 1.3.4**  
**Distribution of All Apartments**  
**According to Age of Head of Household**  
**by Period of Construction**



## **CHAPTER 2 : THE THERMAL ENVELOPE**

## CHAPTER 2 : THE THERMAL ENVELOPE

### 2.1 CHARACTERISTICS OF THE THERMAL ENVELOPE OF HOUSES

In Canada, the average house has 11 windows. Most of these windows are double-paned (60.9%), but some are single-paned with storm windows (22.2%) or even without storm windows (9.8%). Most often, the window frame is made of wood (61.2%), but metal (26.7%) and fibreglass or vinyl (11.9%) are also used. Nearly two-thirds of homeowners (63.2%) claim that there are no air leaks around their windows.

The average house has 3 doors leading to the outside. About one-half of these doors are made of wood (49.3%), while nearly one-third are metal (30.4%). Patio doors represent 18.1% of all exterior doors. About one-half of homeowners claim to have problems with air leaks around at least some of their doors.

Brick is the most popular exterior wall material, either as the only principal material (15.6% of houses), or combined with another material such as aluminum (12.7%), stucco (5.2%), wood (3.3%), vinyl (2.7%) or stone (1.5%). A important number of houses (41%) use only one material other than brick; the most common sole wall materials are wood (13.8% of houses), vinyl (10.9%), aluminum/steel (8.6%) and stucco (4.8%).

Seven out of ten houses (70.8%) have a full basement; other houses have either a partial basement (11.7%) or a crawl space (7.5%), or none at all (10.1%). Two-thirds of basements or crawl spaces are generally fully heated.

Three-quarters of houses have an attic (74.2%), but this space is most of the time unfinished (72.1%). As well, nearly four houses out of ten (38.7%) have an attic in which the ceiling is too low for a person to stand up in it.

One out of ten houses have a heated garage (10.4%); the garage is sometimes separate from the house (3.3%), but most often it is attached (7.1%). About one-half of attached garages have an insulated door (3.7% compared to 7.1%).

Finally, one out of ten houses has an air exchanger. Only 5.7% of houses have an air exchanger that is used year-round; the others uses it occasionally or seasonally.

*These characteristics are represented in a series of diagrams presenting general and specific information referring to specific types of houses (detached, attached, mobile homes according to period of construction). Following these diagrams, Tables 2.1.1 and 2.1.2 present in greater detail characteristics of doors and windows, according to period of construction.*

The analysis of characteristics of the thermal envelope according to year of construction (Graph 2.1 following the series of diagrams) shows how the number of heated full basements and heated attached garages, as well as the use of air exchangers, has grown through the years. As well, homeowners in houses built after 1982 claim to have considerably fewer problems with air leaks around doors and windows than those in older buildings.

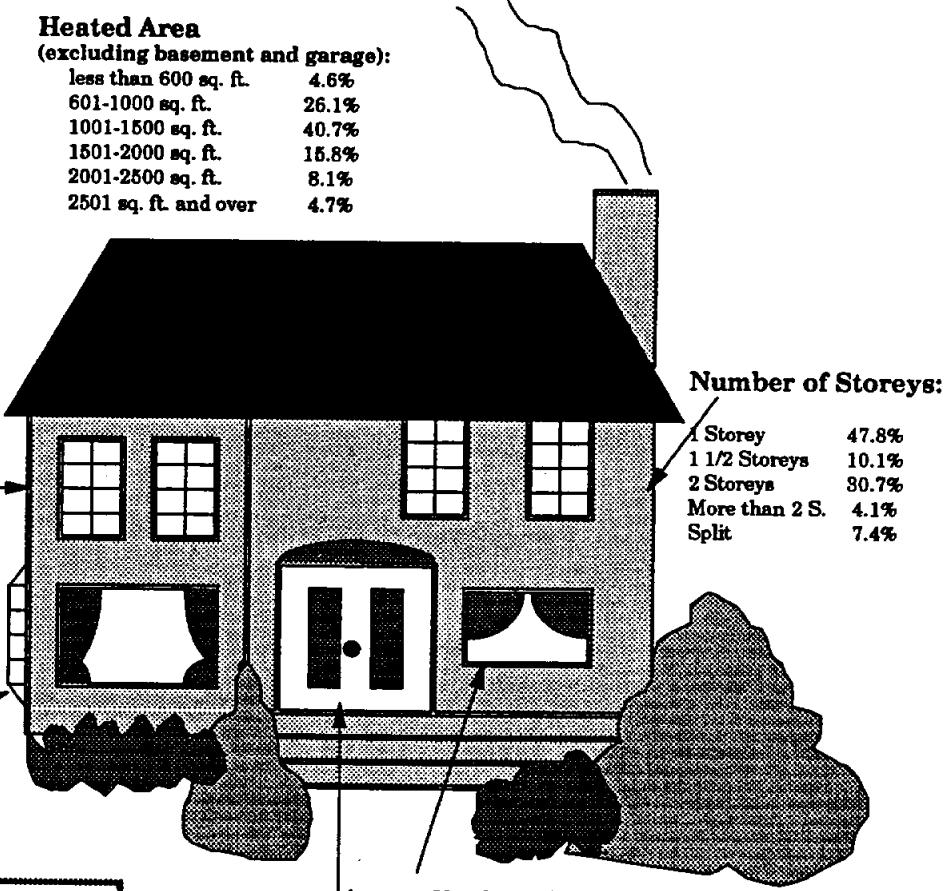
**Diagram 2.1.1a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>All houses</b>	
<b>Date of Construction:</b>	All
<b>Number of Houses:</b>	7,135,000

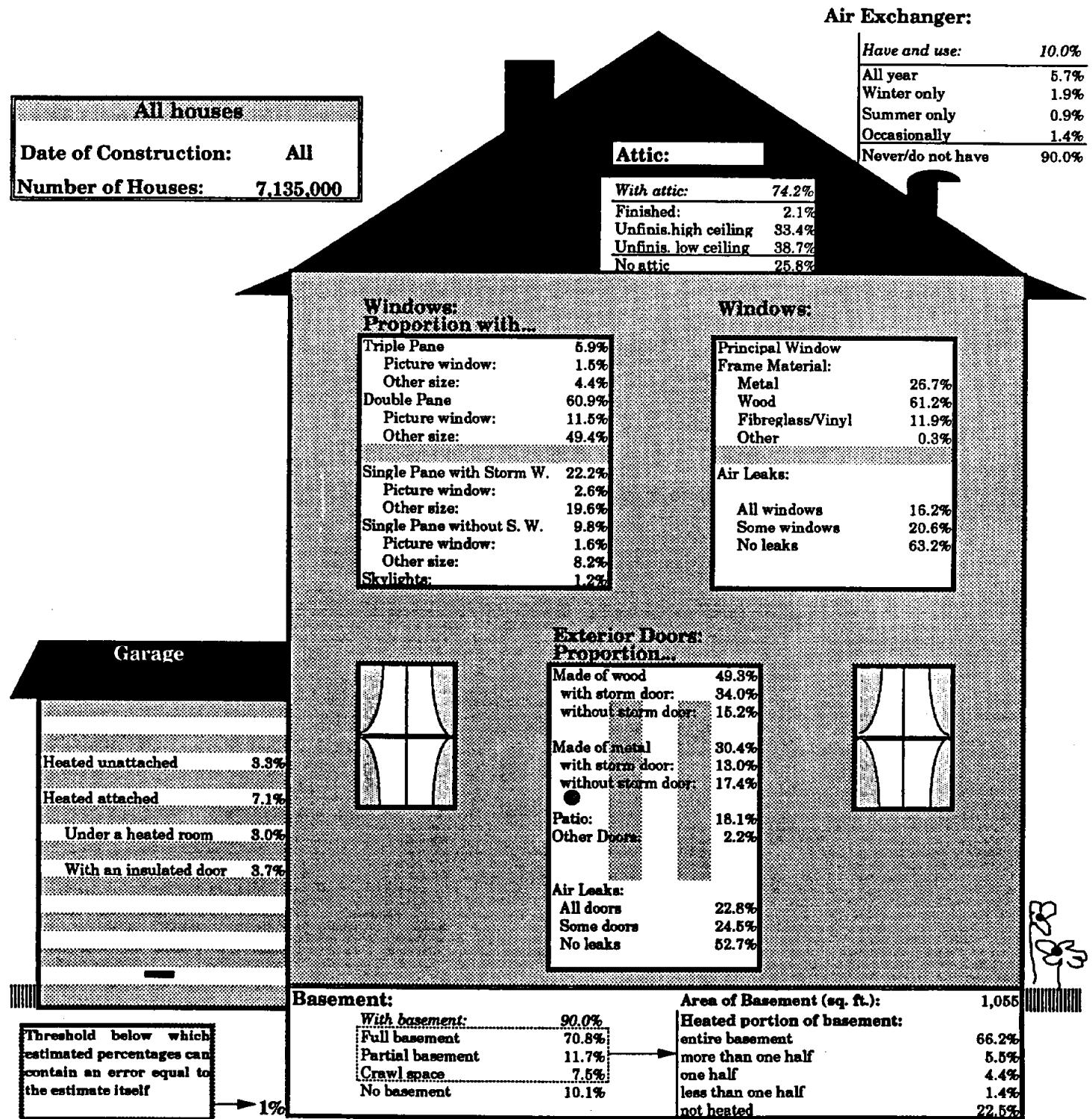
**Principal Exterior Wall Material:**

<i>One Material Only:</i>	56.8%
Aluminium/Steel	8.6%
Brick	15.6%
Stucco	4.8%
Vinyl	10.9%
Wood	13.8%
Other	3.1%
<i>Two Materials:</i>	43.1%
Brick and Aluminium	12.7%
Brick and Stucco	5.2%
Brick and Vinyl	2.7%
Brick and Stone	1.5%
Brick and Wood	3.3%
Alum. and other than Br.	4.2%
Stucco and Wood	5.2%
Stucco and Other	2.0%
Vinyl and Other than Br.	3.1%
Other Combinations	3.2%

**Presence of Heated Solarium:** 3.0%



**Diagram 2.1.1b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.2a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

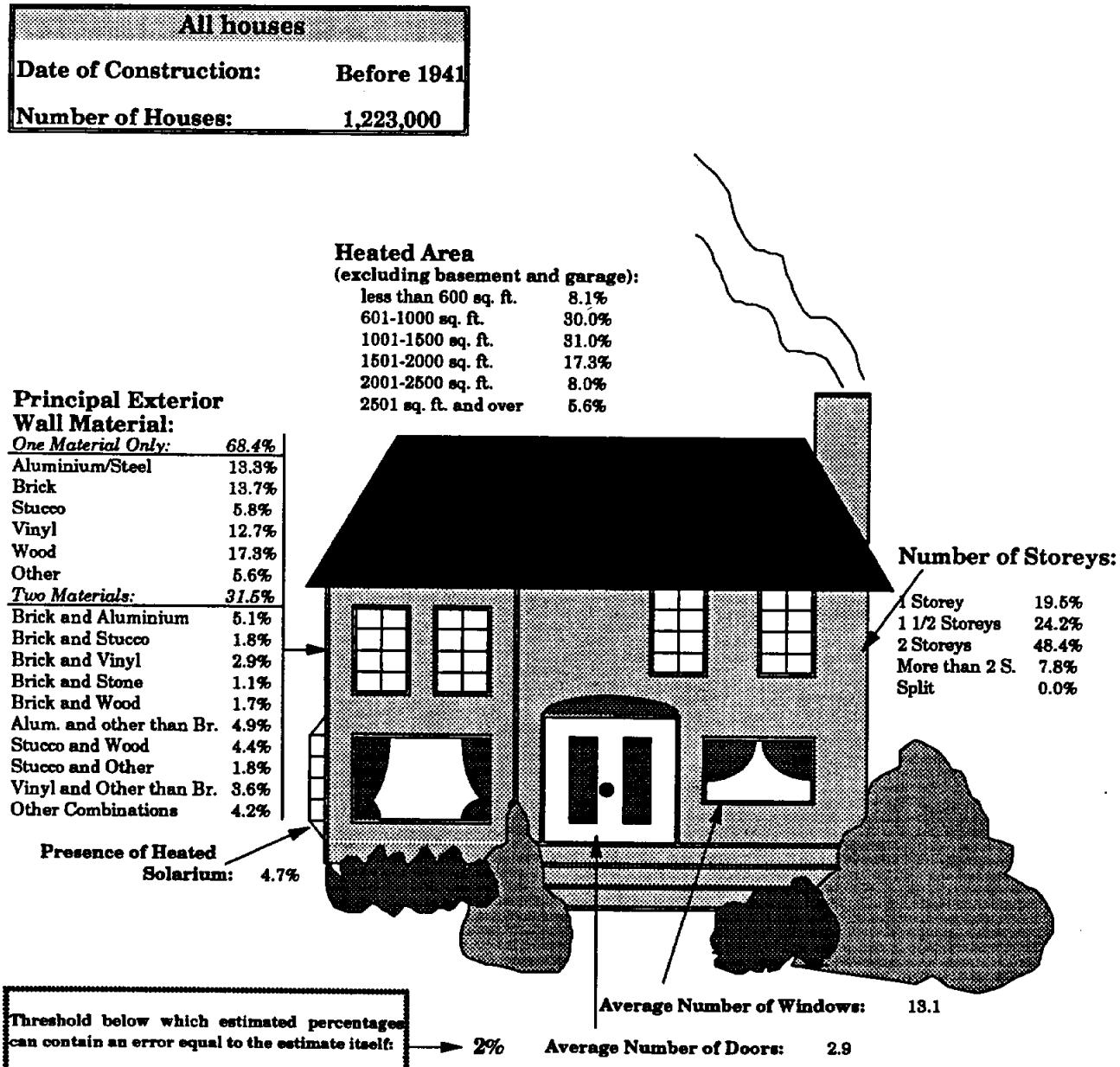
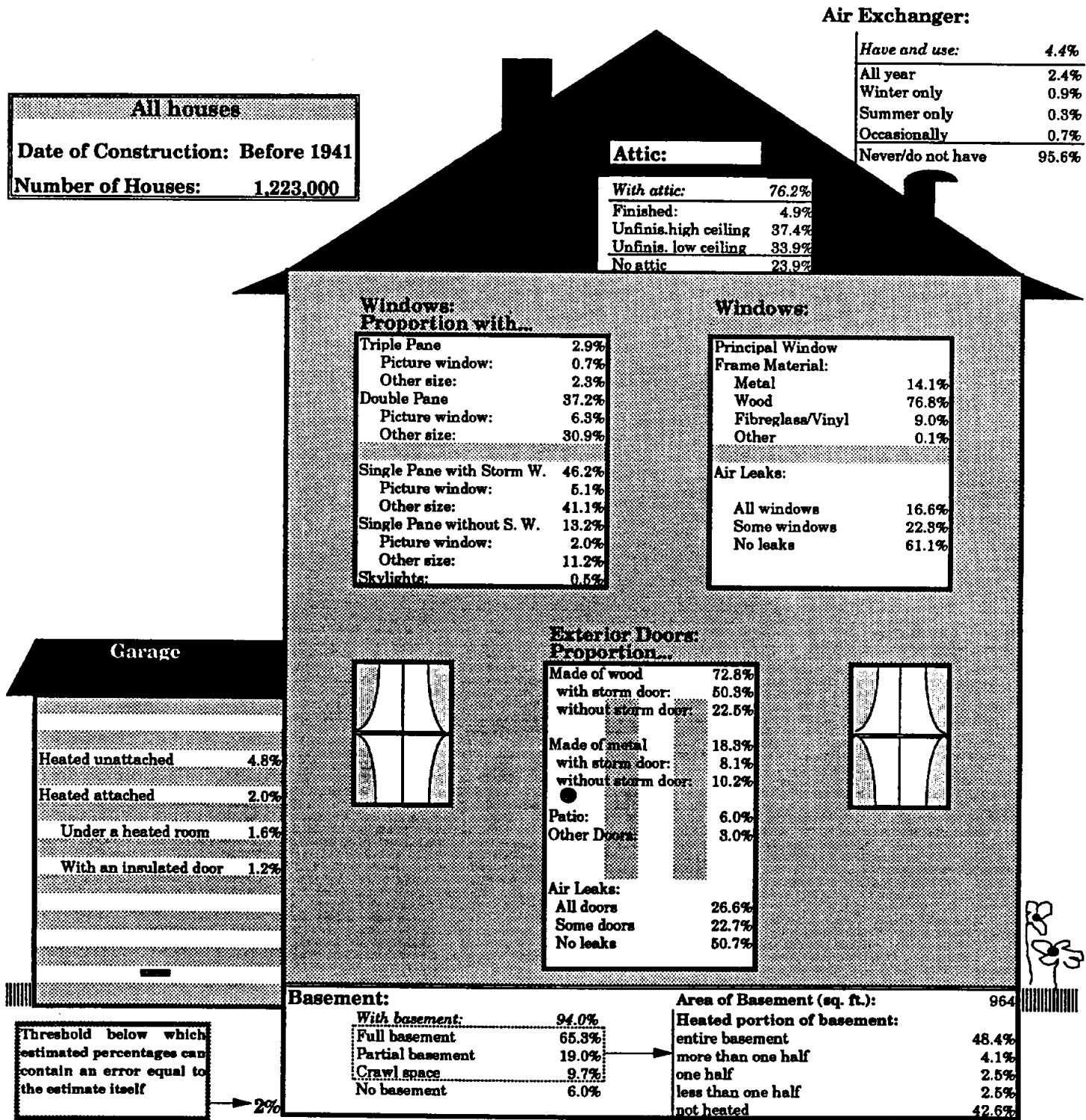
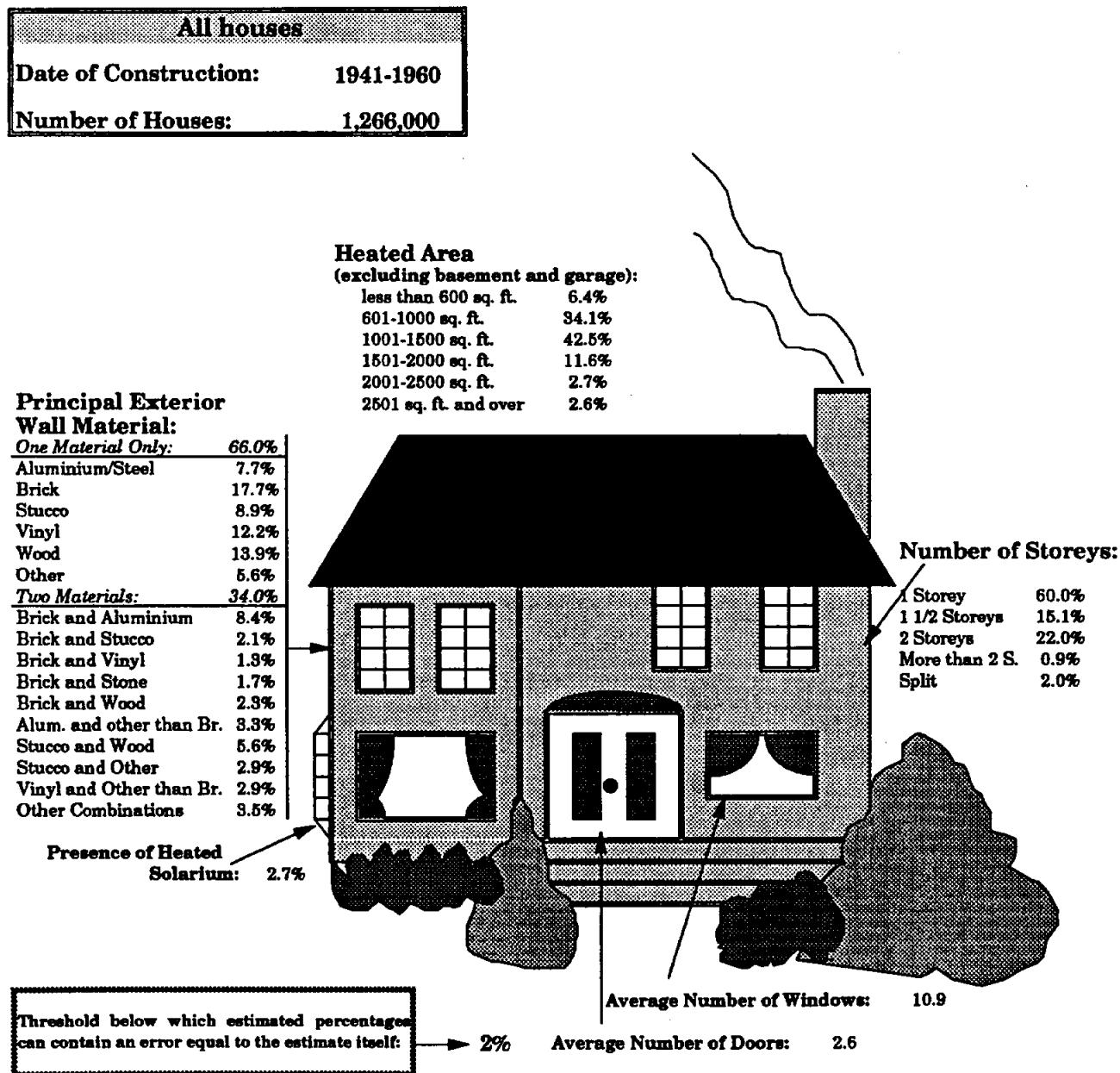


Diagram 2.1.2b

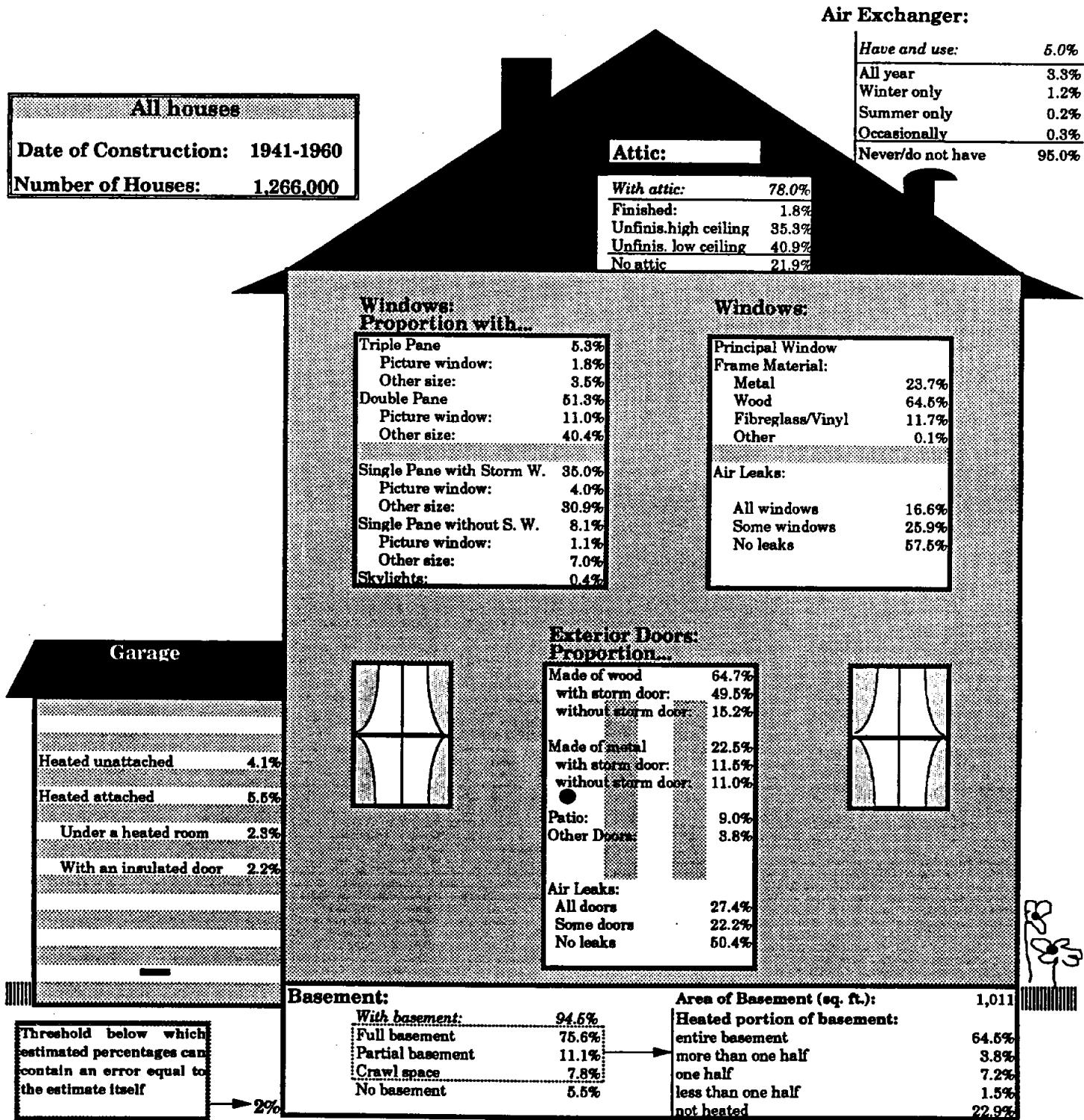
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.3a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**



**Diagram 2.1.3b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.4a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

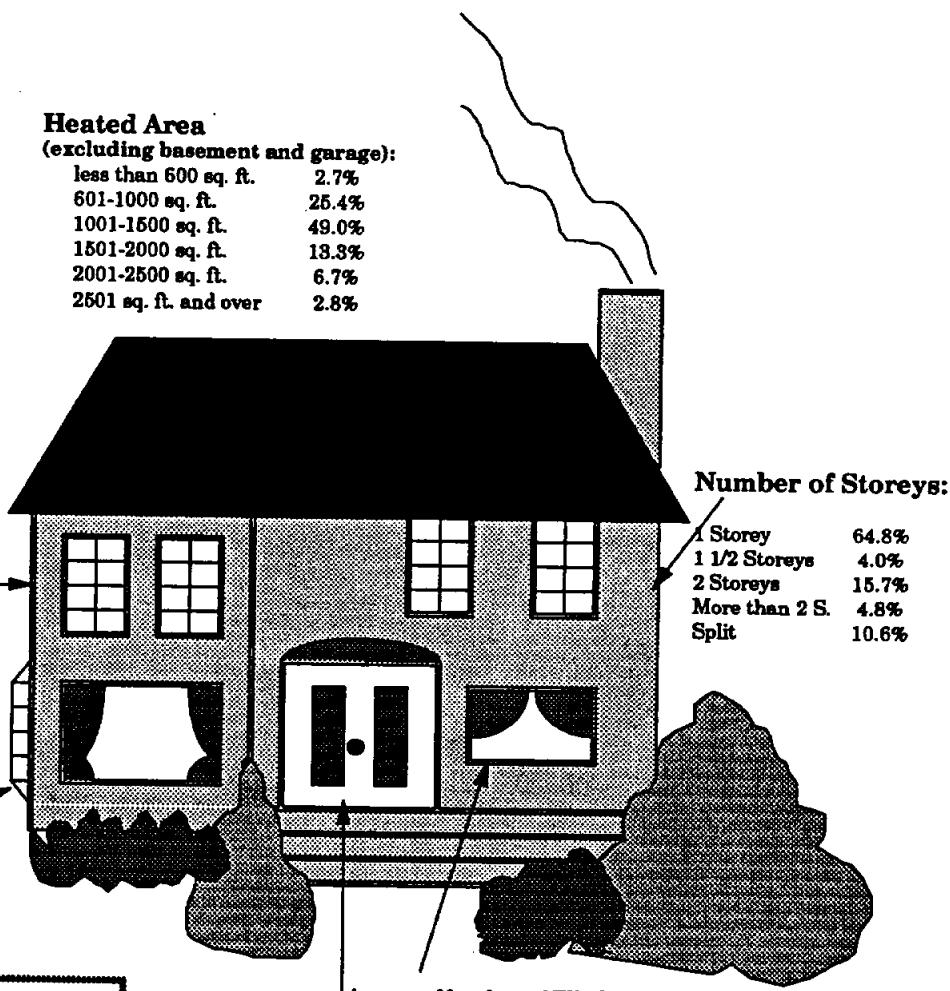
<b>All houses</b>	
<b>Date of Construction:</b>	1961-1977
<b>Number of Houses:</b>	2,262,000

<b>Heated Area</b> (excluding basement and garage):	
less than 600 sq. ft.	2.7%
601-1000 sq. ft.	25.4%
1001-1500 sq. ft.	49.0%
1501-2000 sq. ft.	13.3%
2001-2500 sq. ft.	6.7%
2501 sq. ft. and over	2.8%

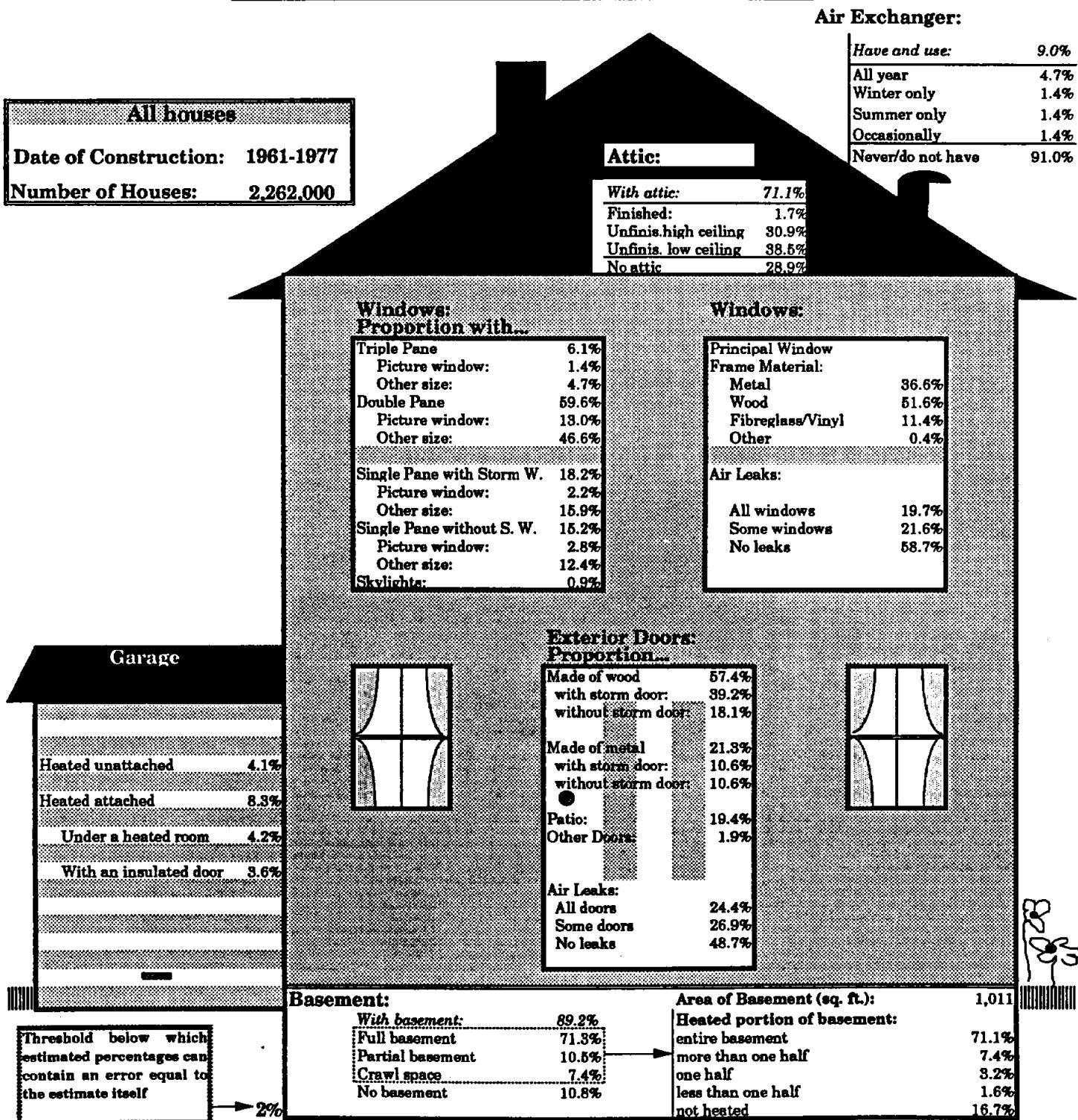
**Principal Exterior Wall Material:**

<i>One Material Only:</i>	51.5%
Aluminium/Steel	10.2%
Brick	16.8%
Stucco	3.5%
Vinyl	6.1%
Wood	13.4%
Other	2.0%
<i>Two Materials:</i>	48.4%
Brick and Aluminium	12.3%
Brick and Stucco	3.1%
Brick and Vinyl	3.3%
Brick and Stone	3.0%
Brick and Wood	5.9%
Alum. and other than Br.	5.2%
Stucco and Wood	7.9%
Stucco and Other	2.8%
Vinyl and Other than Br.	2.4%
Other Combinations	2.5%

Presence of Heated Solarium: 3.0%



**Diagram 2.1.4b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.5a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>All houses</b>	
<b>Date of Construction:</b>	1978-1982
<b>Number of Houses:</b>	991,000

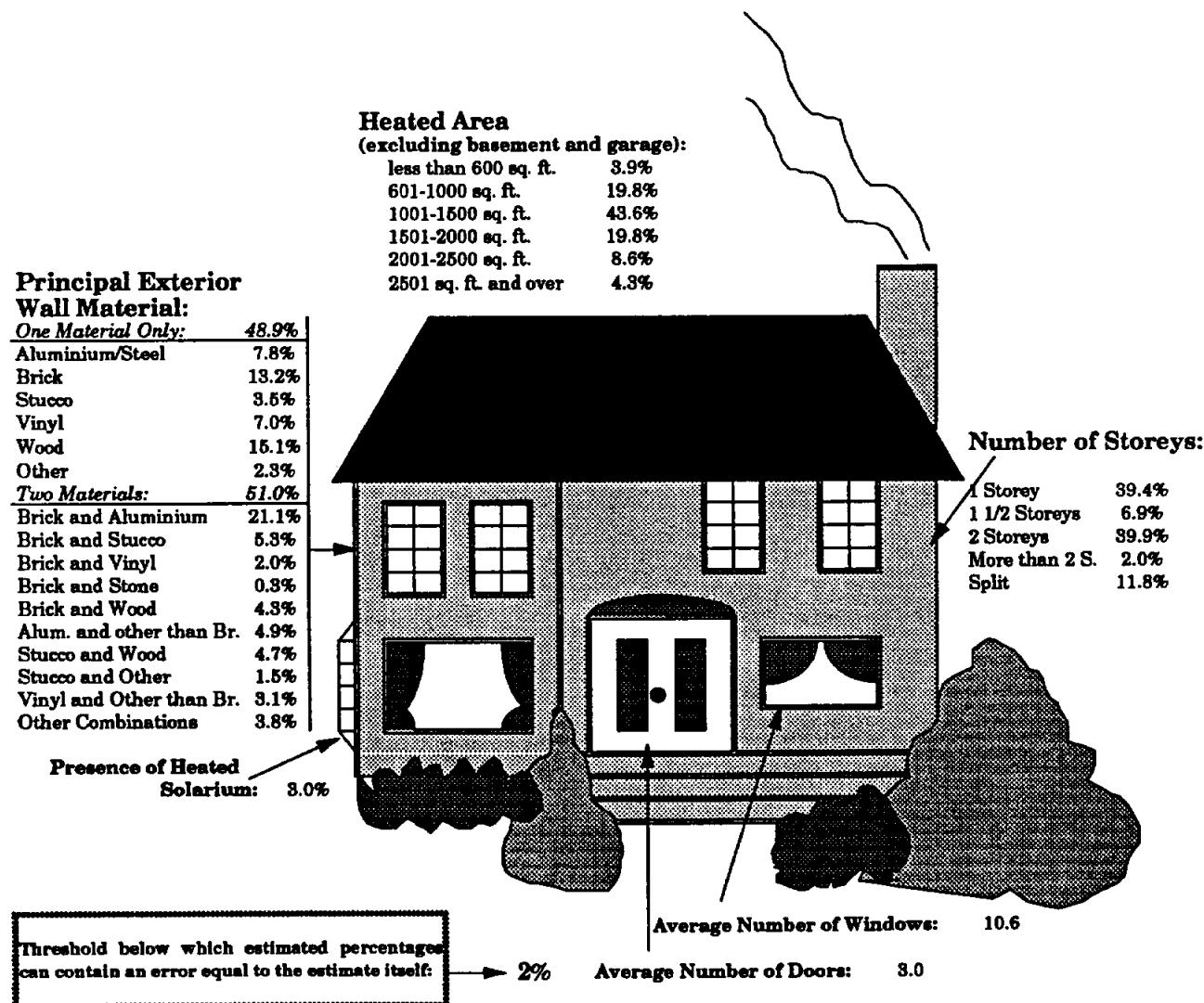


Diagram 2.1.5b

### Characteristics of the Thermal Envelope - Specific Characteristics -

**Air Exchanger:**

<i>Have and use:</i>	<i>10.9%</i>
All year	6.3%
Winter only	1.4%
Summer only	0.6%
Occasionally	2.7%
Never/do not have	89.0%

**All houses**

Date of Construction: 1978-1982

Number of Houses: 991,000

**Attic:**

<i>With attic:</i>	<i>75.8%</i>
Finished:	1.3%
Unfinis. high ceiling	31.4%
Unfinis. low ceiling	43.1%
No attic	24.2%

**Windows:  
Proportion with...**

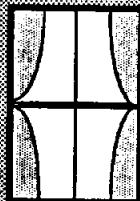
Triple Pane	7.4%
Picture window:	2.0%
Other size:	5.4%
Double Pane	78.8%
Picture window:	13.8%
Other size:	65.0%
Single Pane with Storm W.	9.1%
Picture window:	1.0%
Other size:	8.1%
Single Pane without S. W.	3.1%
Picture window:	0.6%
Other size:	2.5%
Skylights:	1.6%

**Windows:**

<i>Principal Window Frame Material:</i>	
Metal	28.3%
Wood	62.9%
Fibreglass/Vinyl	8.5%
Other	0.3%

**Air Leaks:**

All windows	15.3%
Some windows	21.3%
No leaks	63.4%

**Garage**

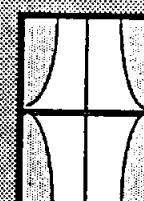
Heated unattached	1.9%
Heated attached	6.4%
Under a heated room	2.0%
With an insulated door	1.7%

Threshold below which estimated percentages can contain an error equal to the estimate itself

→ 2%

**Exterior Doors:  
Proportion...**

Made of wood	34.6%
with storm door:	25.1%
without storm door:	9.6%
Made of metal	37.6%
with storm door:	20.9%
without storm door:	16.7%
Patio:	26.7%
Other Doors:	1.0%

**Air Leaks:**

All doors	18.0%
Some doors	30.0%
No leaks	52.0%

**Basement:**

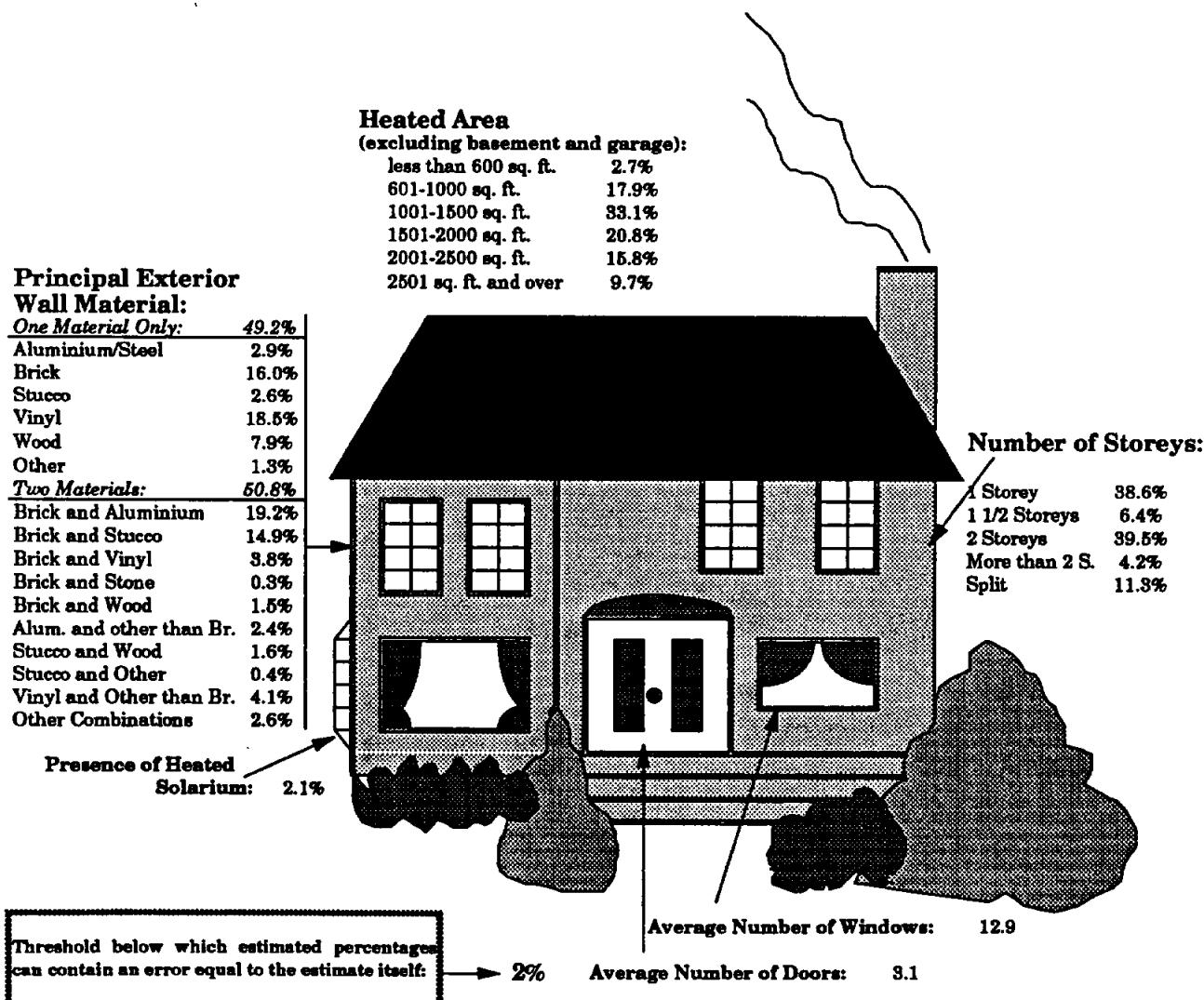
<i>With basement:</i>	<i>86.7%</i>
Full basement	67.9%
Partial basement	13.4%
Crawl space	5.4%
No basement	13.8%

**Area of Basement (sq. ft.):** 1,014

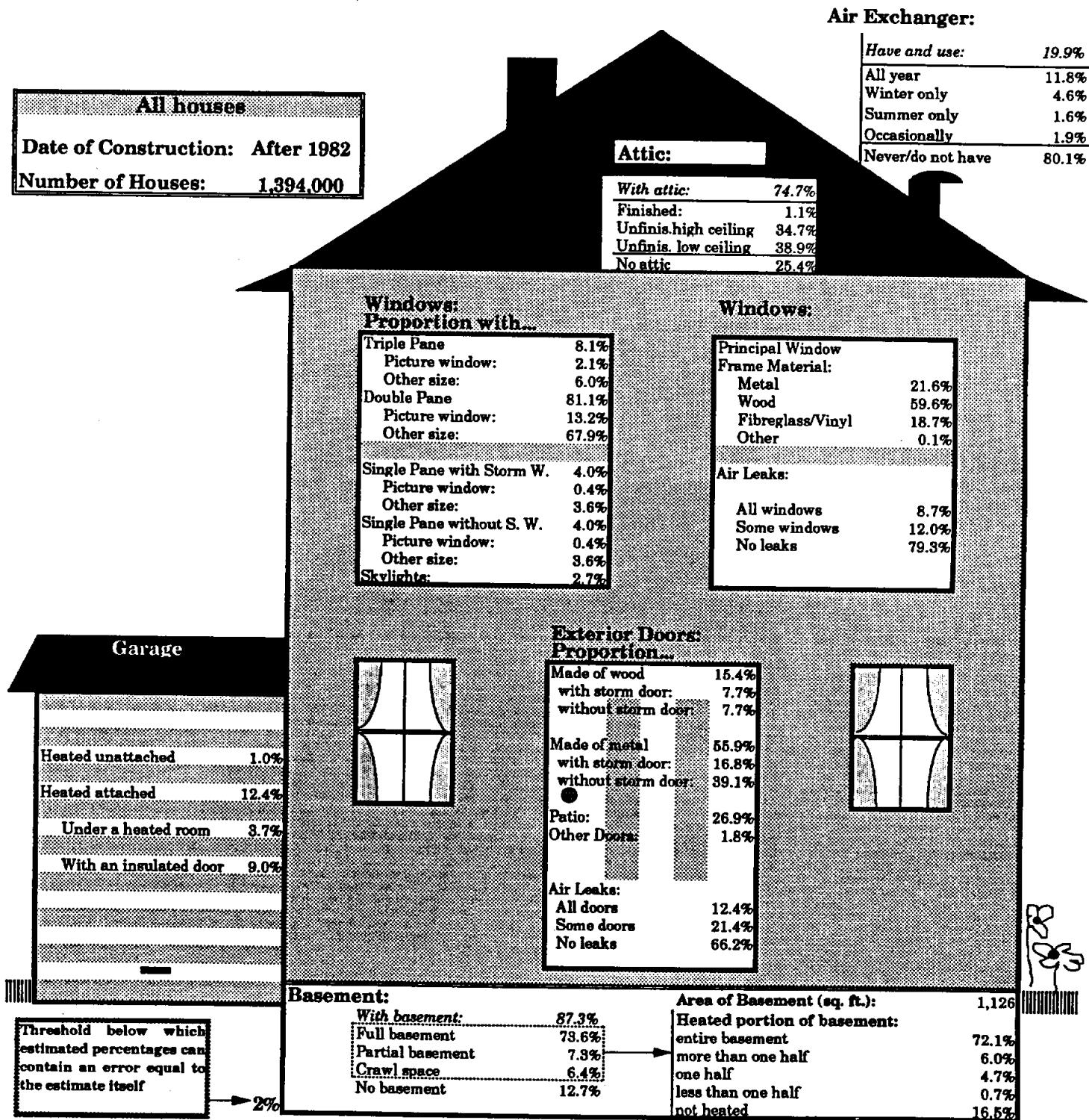
Heated portion of basement:	
entire basement	74.1%
more than one half	3.9%
one half	5.8%
less than one half	0.4%
not heated	15.8%

**Diagram 2.1.6a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

All houses	
Date of Construction:	After 1982
Number of Houses:	1,394,000



**Diagram 2.1.6b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.7a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

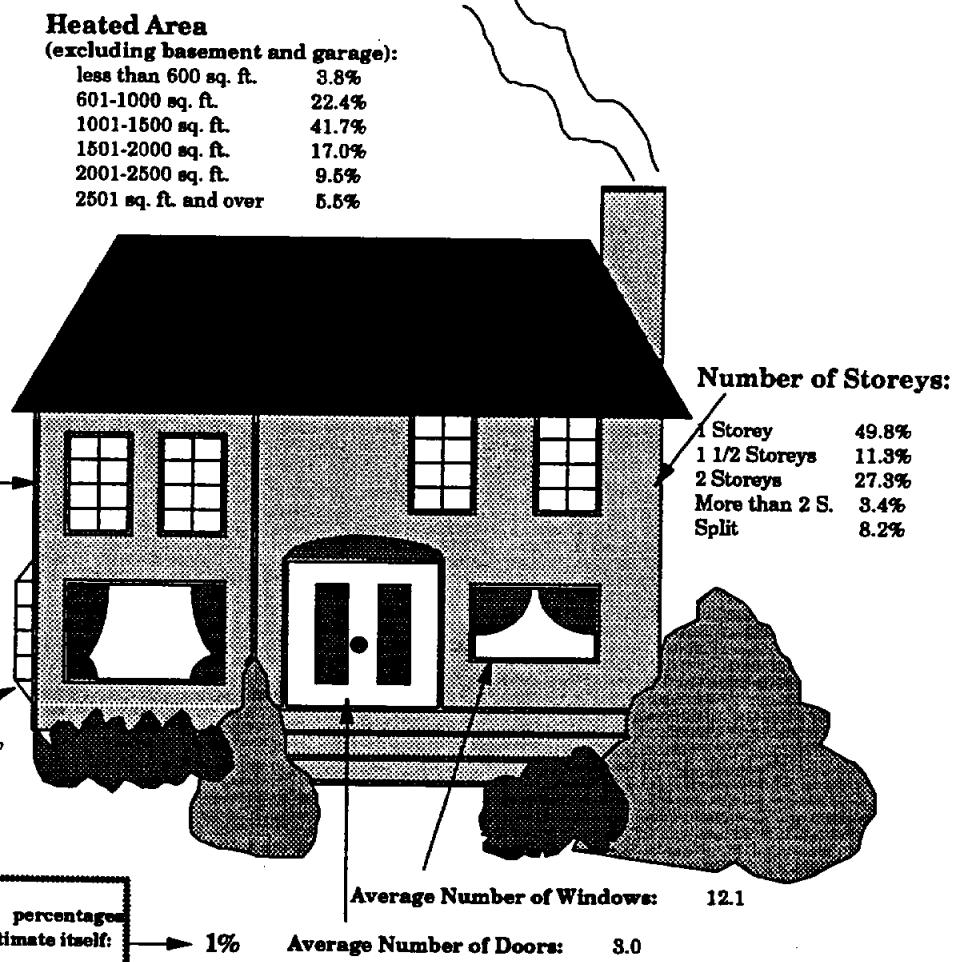
**Detached houses**

Date of Construction:	All
Number of Houses:	5,823,000

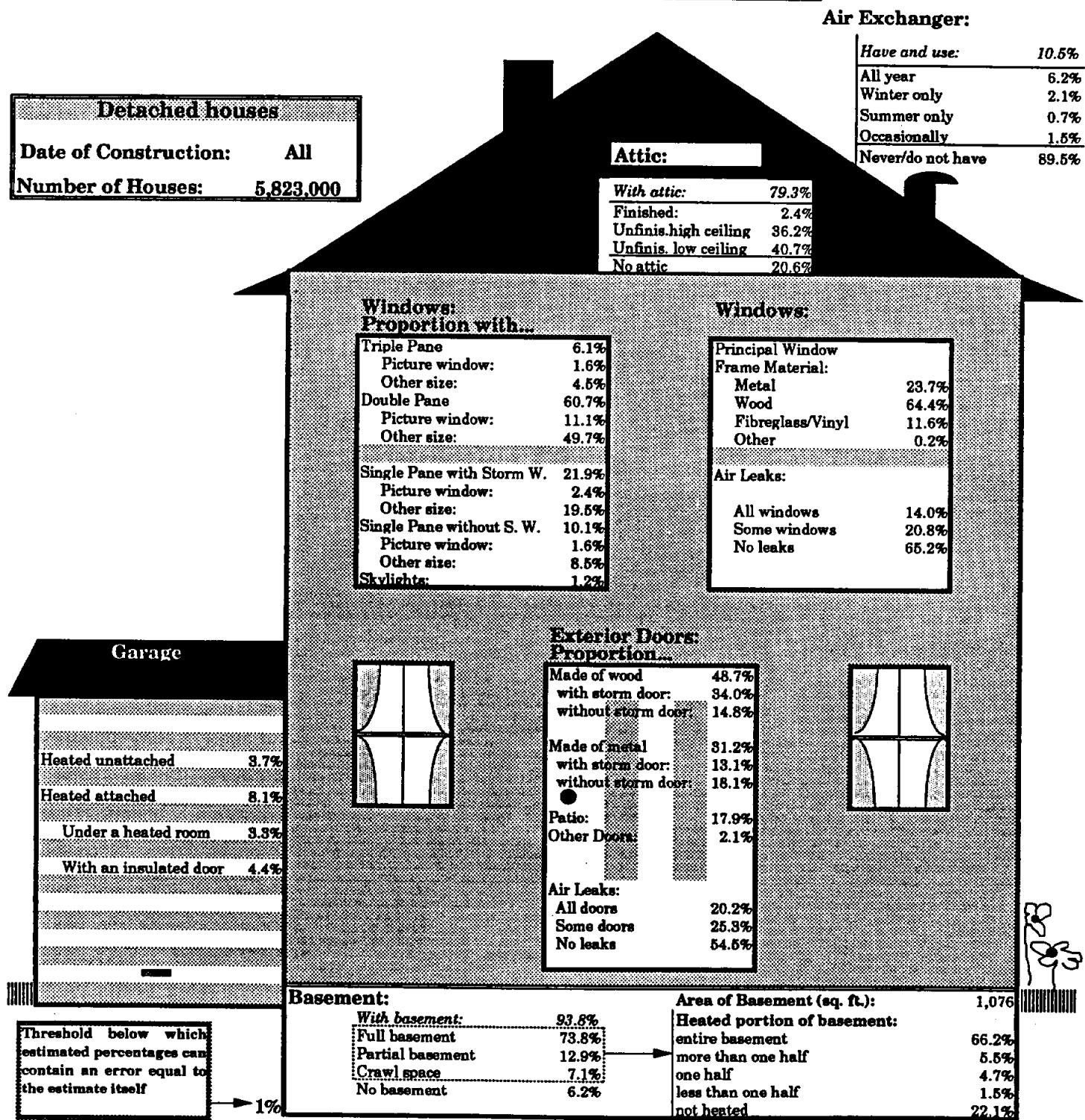
**Principal Exterior Wall Material:**

<i>One Material Only:</i>	55.5%
Aluminium/Steel	7.1%
Brick	14.3%
Stucco	4.8%
Vinyl	11.5%
Wood	14.4%
Other	3.4%
<i>Two Materials:</i>	44.5%
Brick and Aluminium	12.5%
Brick and Stucco	5.6%
Brick and Vinyl	3.1%
Brick and Stone	1.7%
Brick and Wood	3.6%
Alum. and other than Br.	3.7%
Stucco and Wood	5.3%
Stucco and Other	2.1%
Vinyl and Other than Br.	3.4%
Other Combinations	3.5%

Presence of Heated Solarium: 3.4%



**Diagram 2.1.7b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.8a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

**Detached houses**

Date of Construction:	Before 1941
Number of Houses:	1,053,000

Heated Area (excluding basement and garage):	
less than 600 sq. ft.	7.8%
601-1000 sq. ft.	29.4%
1001-1500 sq. ft.	31.6%
1501-2000 sq. ft.	17.2%
2001-2500 sq. ft.	7.8%
2501 sq. ft. and over	6.3%

**Principal Exterior Wall Material:**

<u>One Material Only:</u>	67.6%
Aluminium/Steel	13.6%
Brick	10.1%
Stucco	6.0%
Vinyl	13.5%
Wood	18.6%
Other	5.8%
<u>Two Materials:</u>	32.4%
Brick and Aluminium	3.9%
Brick and Stucco	1.8%
Brick and Vinyl	3.1%
Brick and Stone	1.3%
Brick and Wood	1.9%
Alum. and other than Br.	5.4%
Stucco and Wood	4.6%
Stucco and Other	2.0%
Vinyl and Other than Br.	3.7%
Other Combinations	4.7%

Presence of Heated Solarium: 5.4%

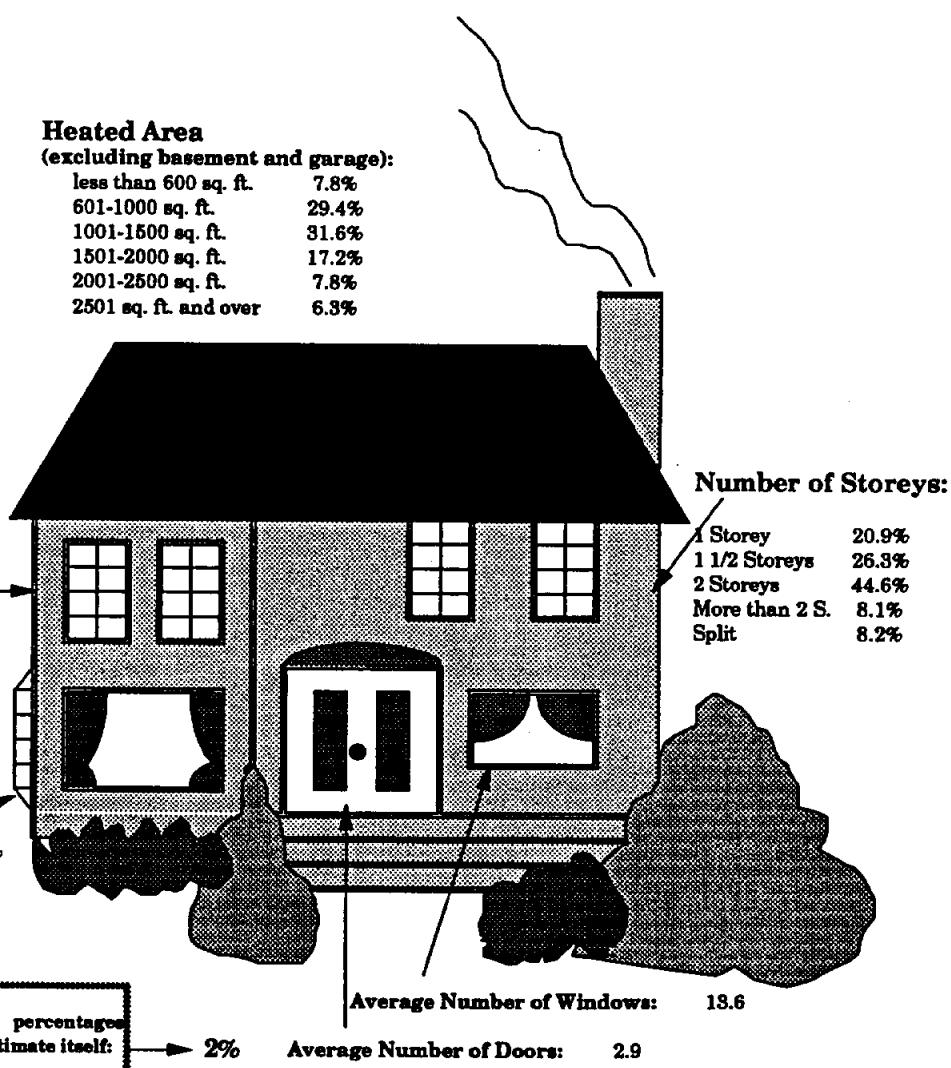


Diagram 2.1.8b

**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

**Air Exchanger:**

Have and use:	4.3%
All year	2.2%
Winter only	0.9%
Summer only	0.4%
Occasionally	0.8%
Never/do not have	95.7%

**Detached houses**

Date of Construction: Before 1941

Number of Houses: 1,053,000

**Attic:**

With attic:	80.9%
Finished:	5.2%
Unfinis. high ceiling	39.8%
Unfinis. low ceiling	35.9%
No attic	19.1%

**Windows:**

**Proportion with...**

Triple Pane	3.2%
Picture window:	0.7%
Other size:	2.4%
Double Pane	37.5%
Picture window:	6.5%
Other size:	31.0%
Single Pane with Storm W.	45.4%
Picture window:	4.4%
Other size:	41.0%
Single Pane without S. W.	13.6%
Picture window:	2.0%
Other size:	11.6%
Skylights:	0.3%

**Principal Window Frame Material:**

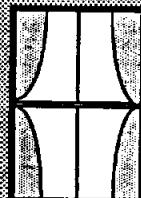
Metal	13.4%
Wood	77.2%
Fibreglass/Vinyl	9.8%
Other	0.1%

**Air Leaks:**

All windows	15.7%
Some windows	23.2%
No leaks	61.1%

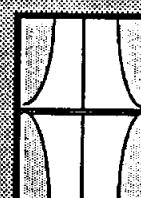
**Garage**

Heated unattached	5.4%
Heated attached	1.8%
Under a heated room	1.3%
With an insulated door	1.4%



**Exterior Doors:**  
**Proportion:**

Made of wood with storm door:	72.2%
without storm door:	50.3%
	22.0%
Made of metal with storm door:	19.0%
without storm door:	8.2%
Patio:	10.8%
Other Doors:	6.7%
	2.1%
Air Leaks:	
All doors	25.8%
Some doors	23.1%
No leaks	51.1%



**Basement:**

With basement:	94.0%
Full basement	64.9%
Partial basement	19.6%
Crawl space	9.5%
No basement	6.0%

**Area of Basement (sq. ft.):** 961

Heated portion of basement:	
entire basement	49.1%
more than one half	4.7%
one half	2.9%
less than one half	2.4%
not heated	40.9%

Threshold below which estimated percentages can contain an error equal to the estimate itself

→ 2%

**Diagram 2.1.9a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

**Detached houses**

Date of Construction:	1941-1960
Number of Houses:	1,146,000

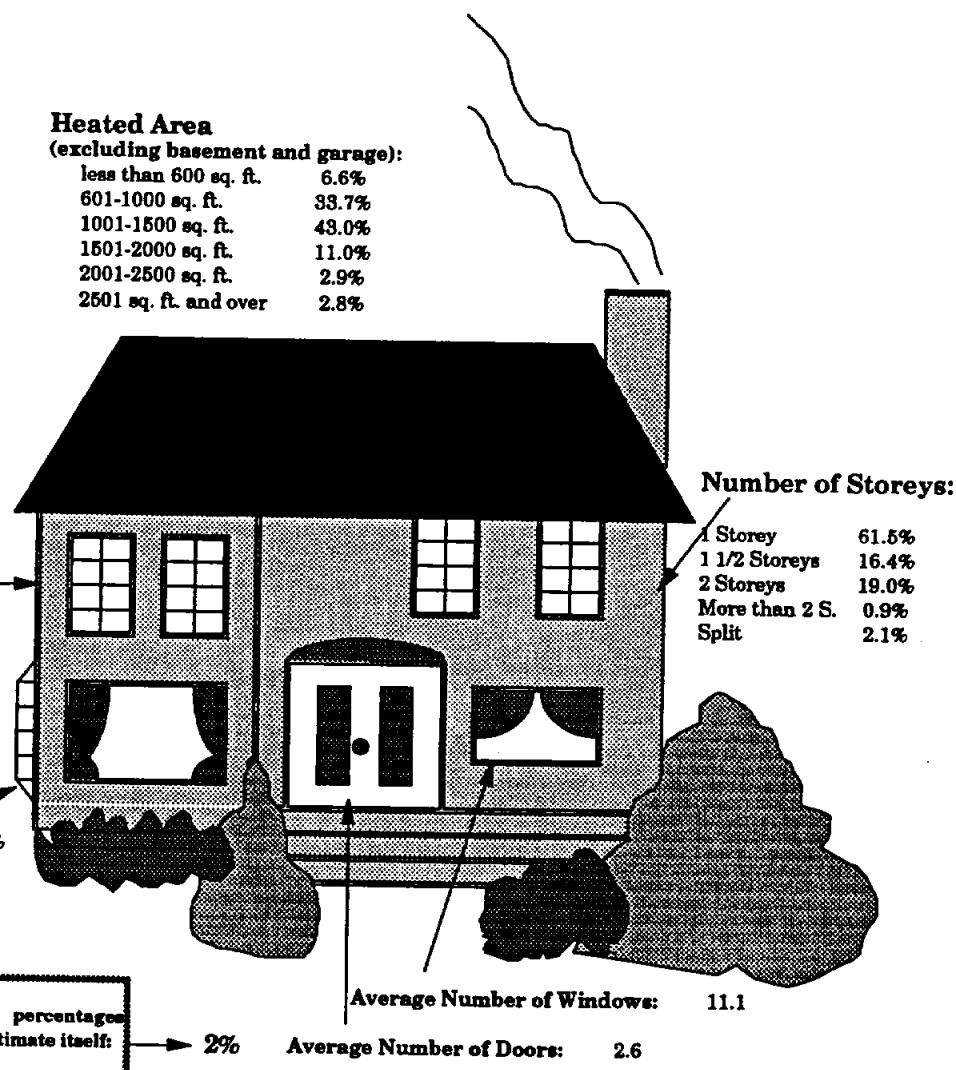
**Principal Exterior Wall Material:**

One Material Only:	66.8%
Aluminium/Steel	8.2%
Brick	16.6%
Stucco	9.1%
Vinyl	12.6%
Wood	14.8%
Other	5.5%
<b>Two Materials:</b>	<b>33.2%</b>
Brick and Aluminium	7.6%
Brick and Stucco	1.8%
Brick and Vinyl	1.2%
Brick and Stone	1.8%
Brick and Wood	2.9%
Alum. and other than Br.	3.3%
Stucco and Wood	5.9%
Stucco and Other	3.1%
Vinyl and Other than Br.	3.1%
Other Combinations	3.1%

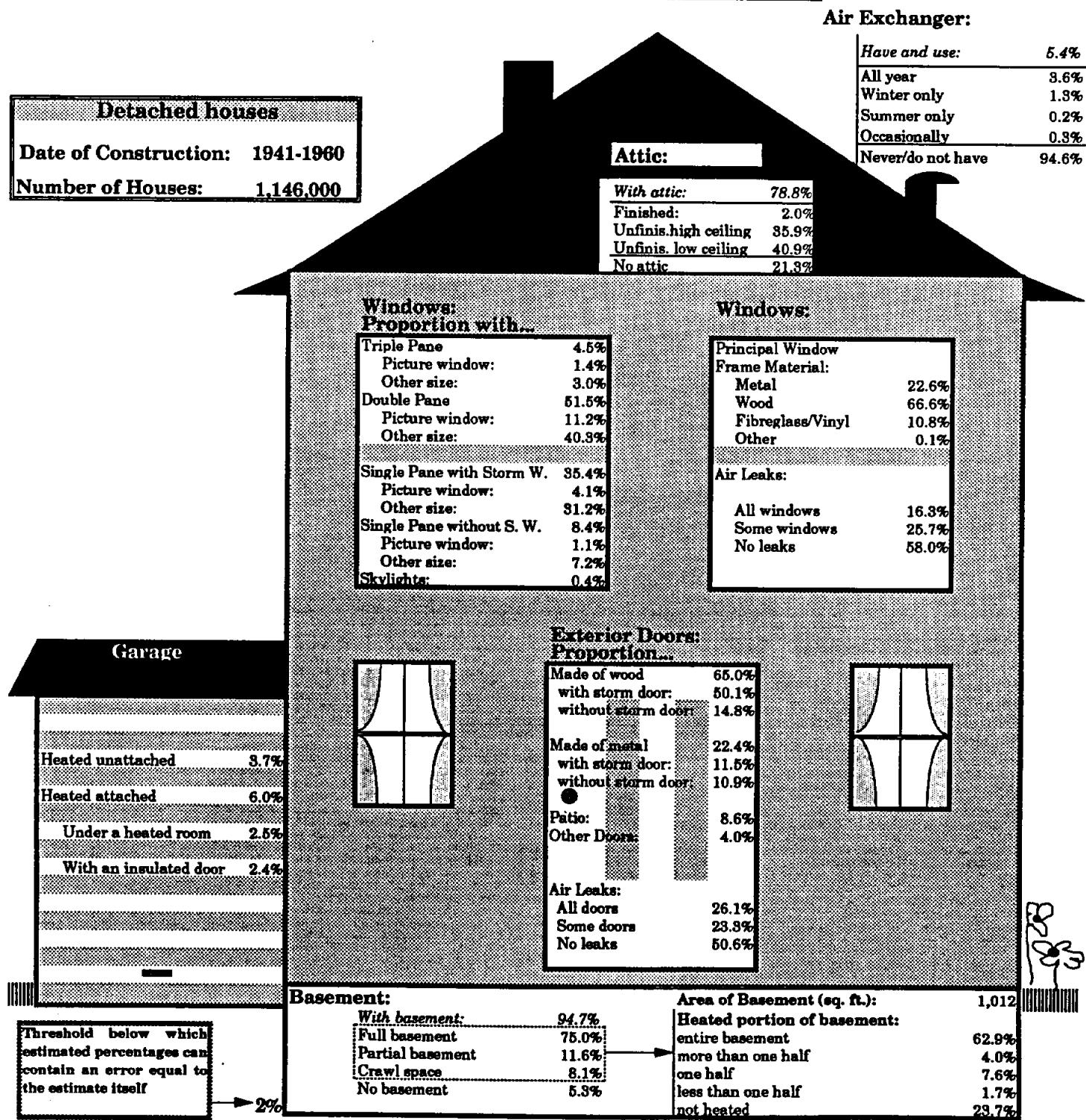
Presence of Heated Solarium: 2.4%

**Heated Area**  
(excluding basement and garage):

less than 600 sq. ft.	6.6%
601-1000 sq. ft.	33.7%
1001-1500 sq. ft.	43.0%
1501-2000 sq. ft.	11.0%
2001-2500 sq. ft.	2.9%
2501 sq. ft. and over	2.8%

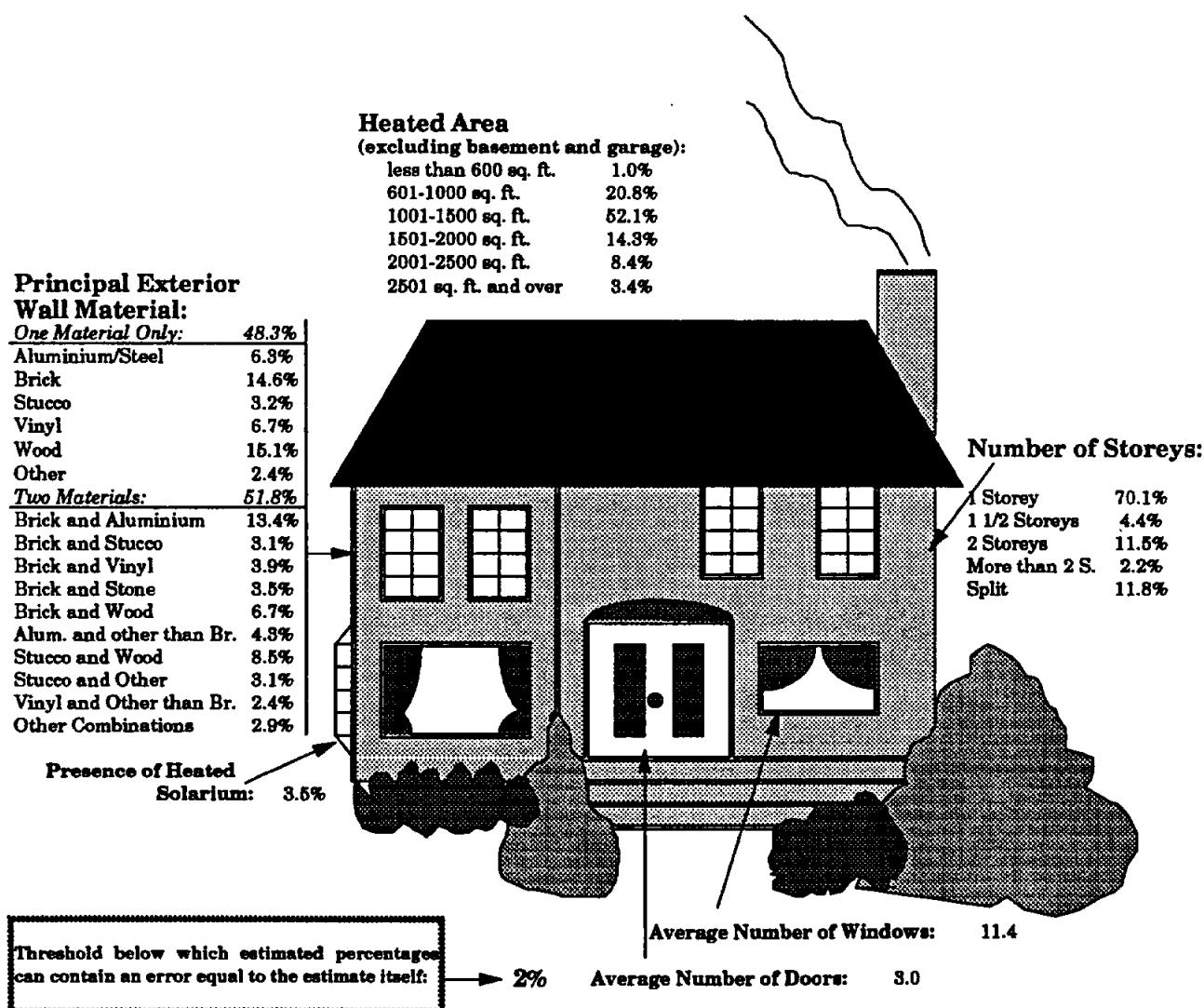


**Diagram 2.1.9b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

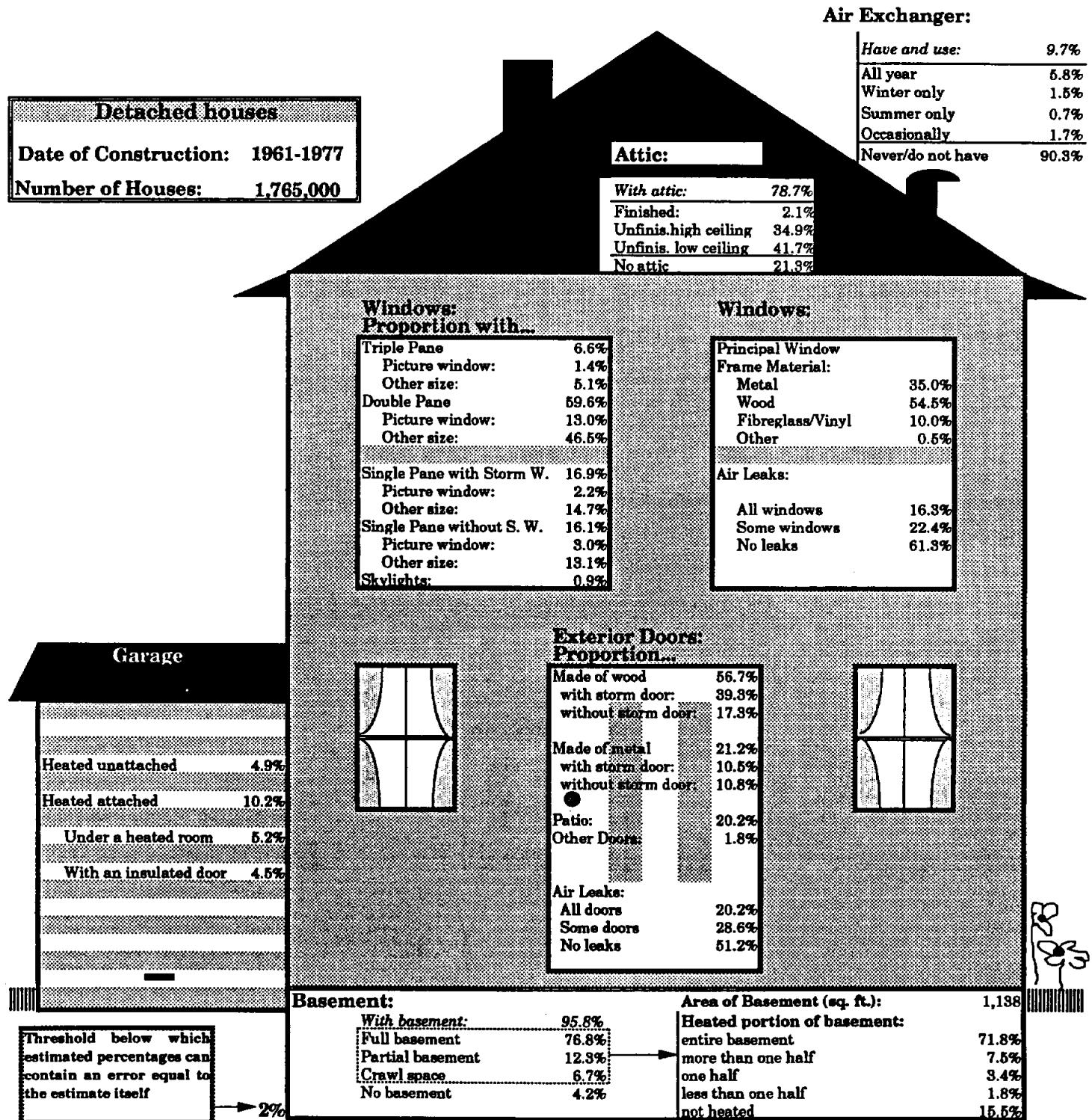


**Diagram 2.1.10a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Detached houses</b>	
<b>Date of Construction:</b>	1961-1977
<b>Number of Houses:</b>	1,765,000

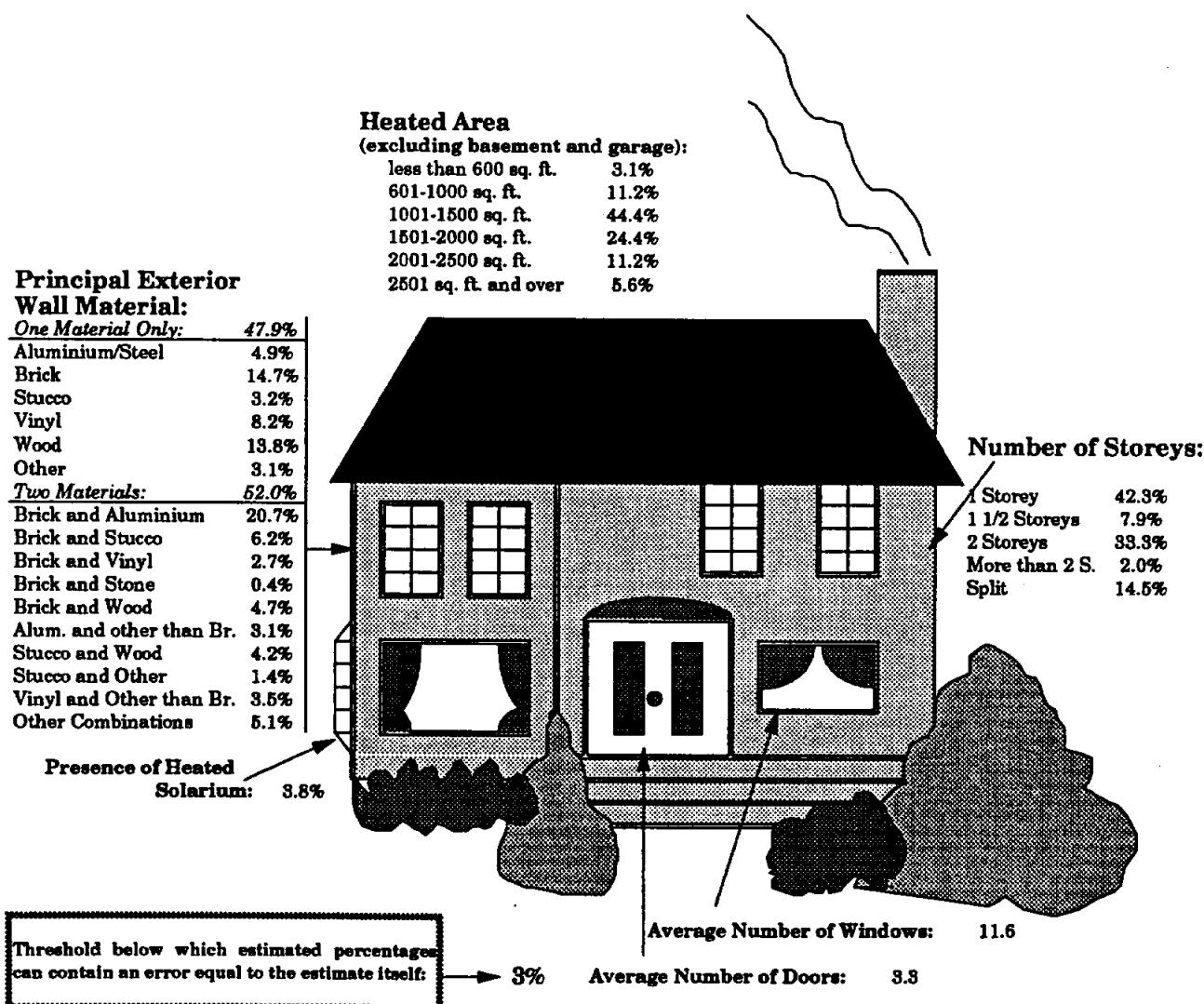


**Diagram 2.1.10b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

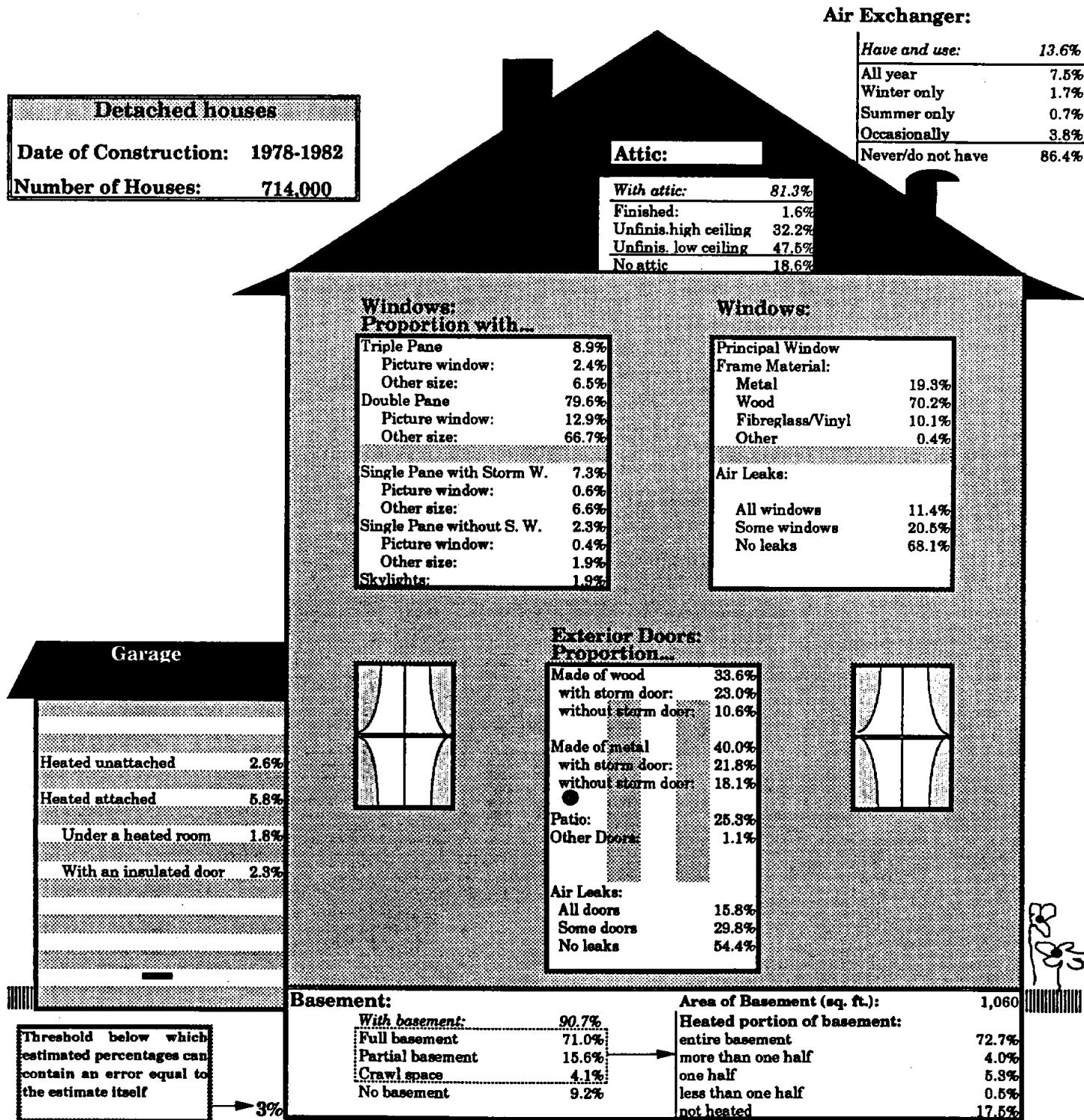


**Diagram 2.1.11a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Detached houses</b>	
<b>Date of Construction:</b>	1978-1982
<b>Number of Houses:</b>	714,000

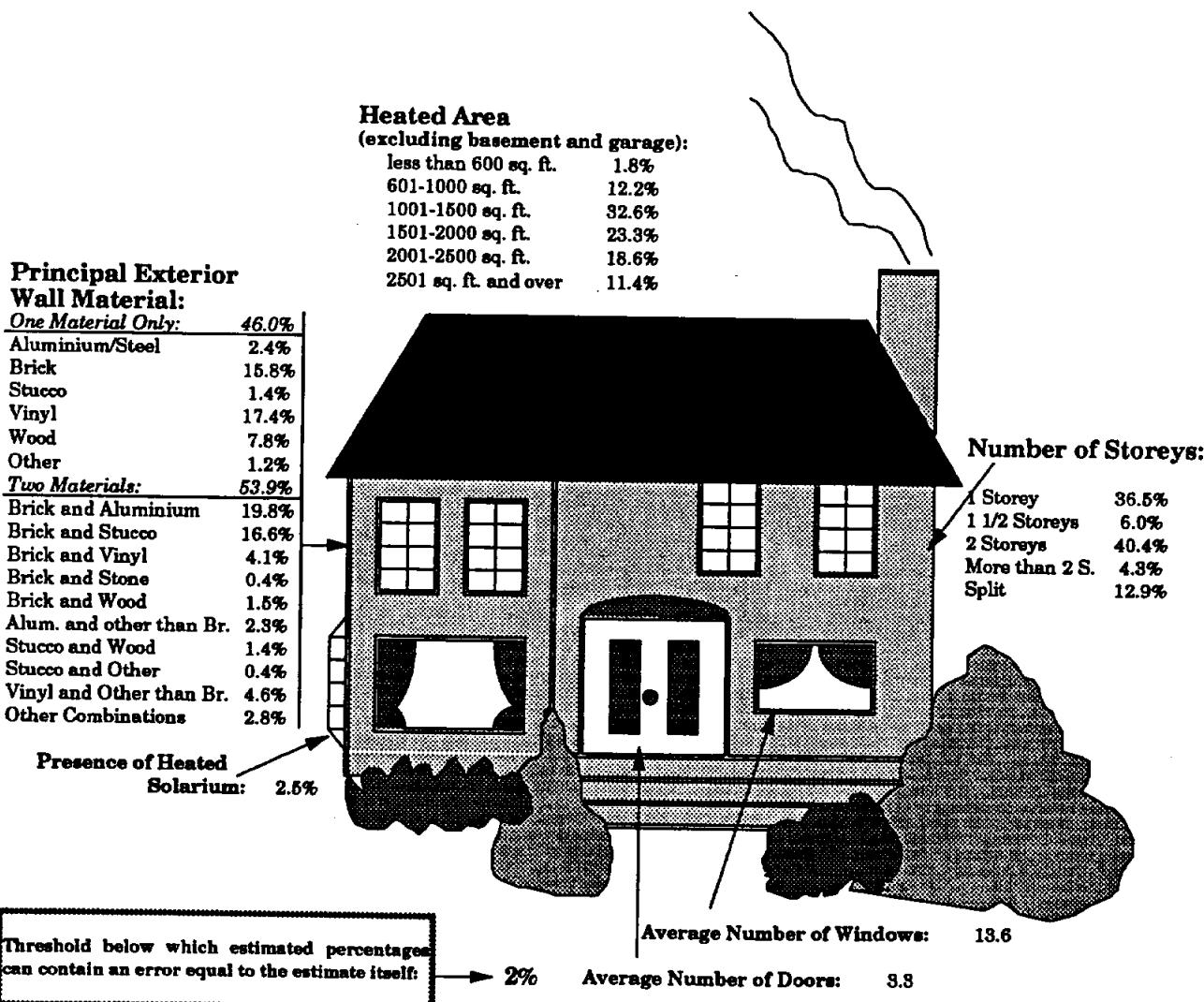


**Diagram 2.1.11b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.12a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Detached houses</b>	
<b>Date of Construction:</b>	After 1982
<b>Number of Houses:</b>	1,145,000



**Diagram 2.1.12b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

**Air Exchanger:**

<i>Have and use:</i>	21.1%
All year	12.5%
Winter only	5.2%
Summer only	1.5%
Occasionally	2.0%
Never/do not have	78.9%

**Detached houses**

Date of Construction: After 1982

Number of Houses: 1,145,000

**Attic:**

<i>With attic:</i>	78.8%
Finished:	1.2%
Unfinis. high ceiling	37.9%
Unfinis. low ceiling	39.7%
No attic	21.2%

**Windows:**  
**Proportion with...**

Triple Pane	8.3%
Picture window:	2.2%
Other size:	6.1%
Double Pane	81.3%
Picture window:	11.6%
Other size:	69.7%

Single Pane with Storm W.	3.6%
Picture window:	0.3%
Other size:	3.2%
Single Pane without S. W.	4.8%
Picture window:	0.4%
Other size:	3.8%
Skylights:	2.6%

**Windows:**

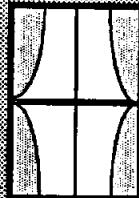
<b>Principal Window Frame Material:</b>	
Metal	19.4%
Wood	62.4%
Fibreglass/Vinyl	18.2%
Other	0.0%

**Air Leaks:**

All windows	7.6%
Some windows	11.5%
No leaks	80.9%

**Garage**

Heated unattached	1.0%
Heated attached	14.4%
Under a heated room	4.1%
With an insulated door	10.6%



**Exterior Doors:**  
**Proportion...**

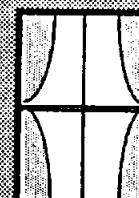
Made of wood	14.5%
with storm door:	7.3%
without storm door:	7.2%

Made of metal	57.3%
with storm door:	16.7%
without storm door:	40.6%

Patio:	26.5%
Other Doors:	1.7%



**Air Leaks:**

All doors	10.6%
Some doors	22.5%
No leaks	66.9%

**Basement:**

<i>With basement:</i>	92.1%
Full basement	78.7%
Partial basement	7.7%
Crawl space	5.7%
No basement	8.0%

**Area of Basement (sq. ft.):** 1,146

<b>Heated portion of basement:</b>	
entire basement	73.1%
more than one half	5.6%
one half	4.9%
less than one half	0.6%
not heated	15.8%

Threshold below which estimated percentages can contain an error equal to the estimate itself

→ 2%

**Diagram 2.1.13a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Attached Houses</b>	
<b>Date of Construction:</b>	All
<b>Number of Houses:</b>	1,065,000

**Principal Exterior Wall Material:**

<i>One Material Only:</i>	60.1%
Aluminium/Steel	5.1%
Brick	27.0%
Stucco	6.5%
Vinyl	6.5%
Wood	12.9%
Other	2.1%
<i>Two Materials:</i>	40.0%
Brick and Aluminium	17.0%
Brick and Stucco	4.4%
Brick and Vinyl	1.3%
Brick and Stone	0.5%
Brick and Wood	2.6%
Alum. and other than Br.	3.2%
Stucco and Wood	5.8%
Stucco and Other	1.8%
Vinyl and Other than Br.	1.4%
Other Combinations	2.0%

Presence of Heated Solarium: 0.7%

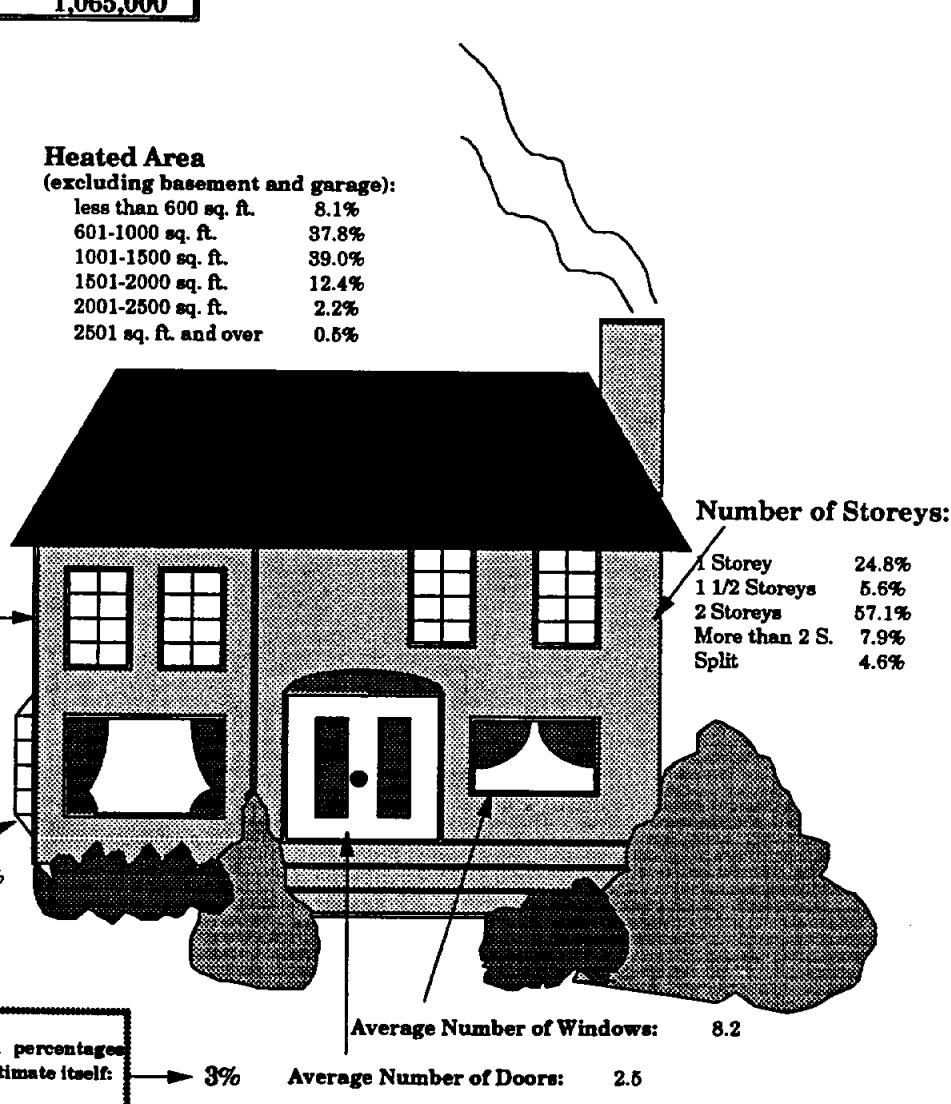
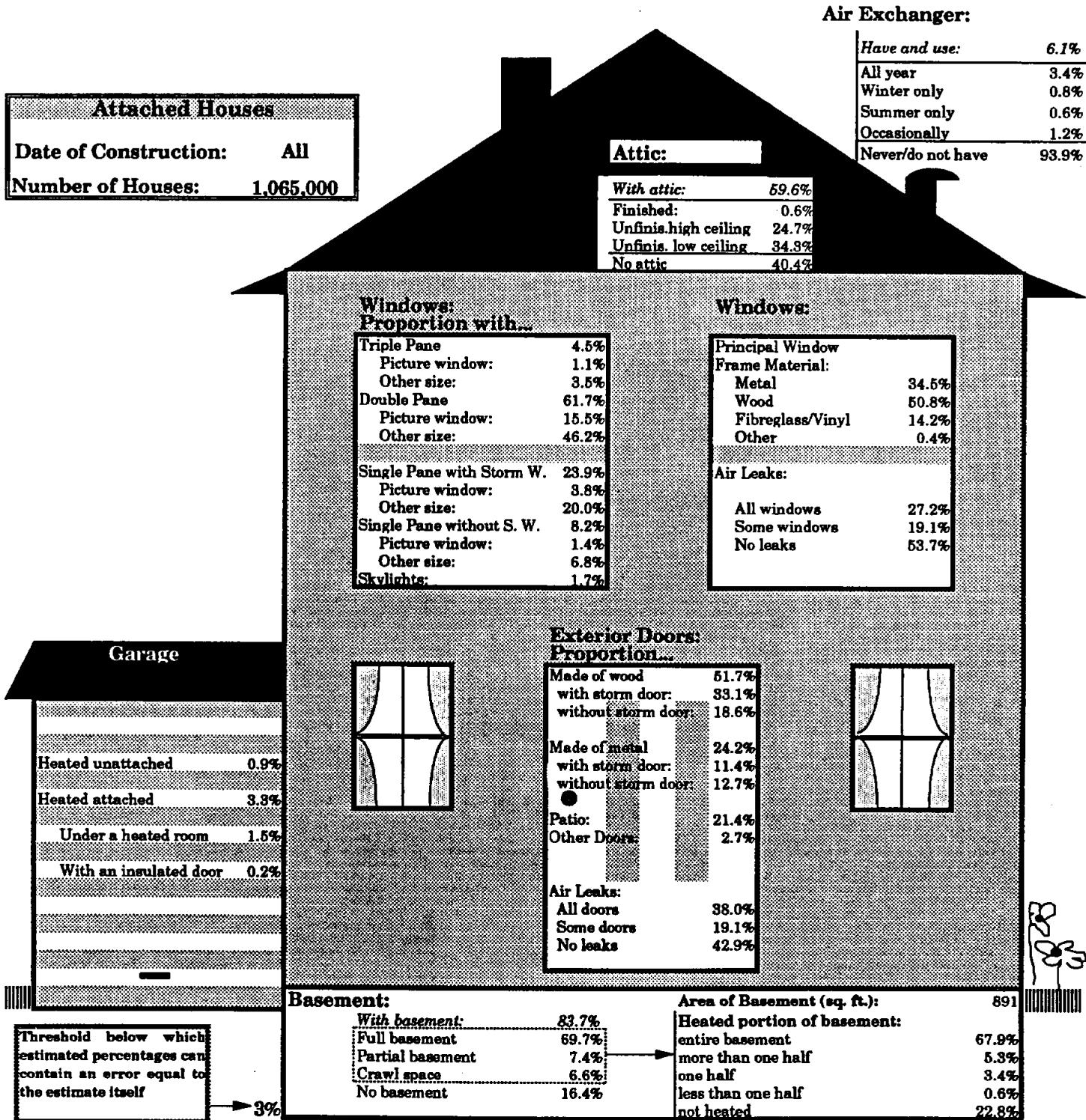


Diagram 2.1.13b

**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



**Diagram 2.1.14a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Attached Houses</b>	
<b>Date of Construction:</b>	<b>Before 1978</b>
<b>Number of Houses:</b>	<b>636,000</b>

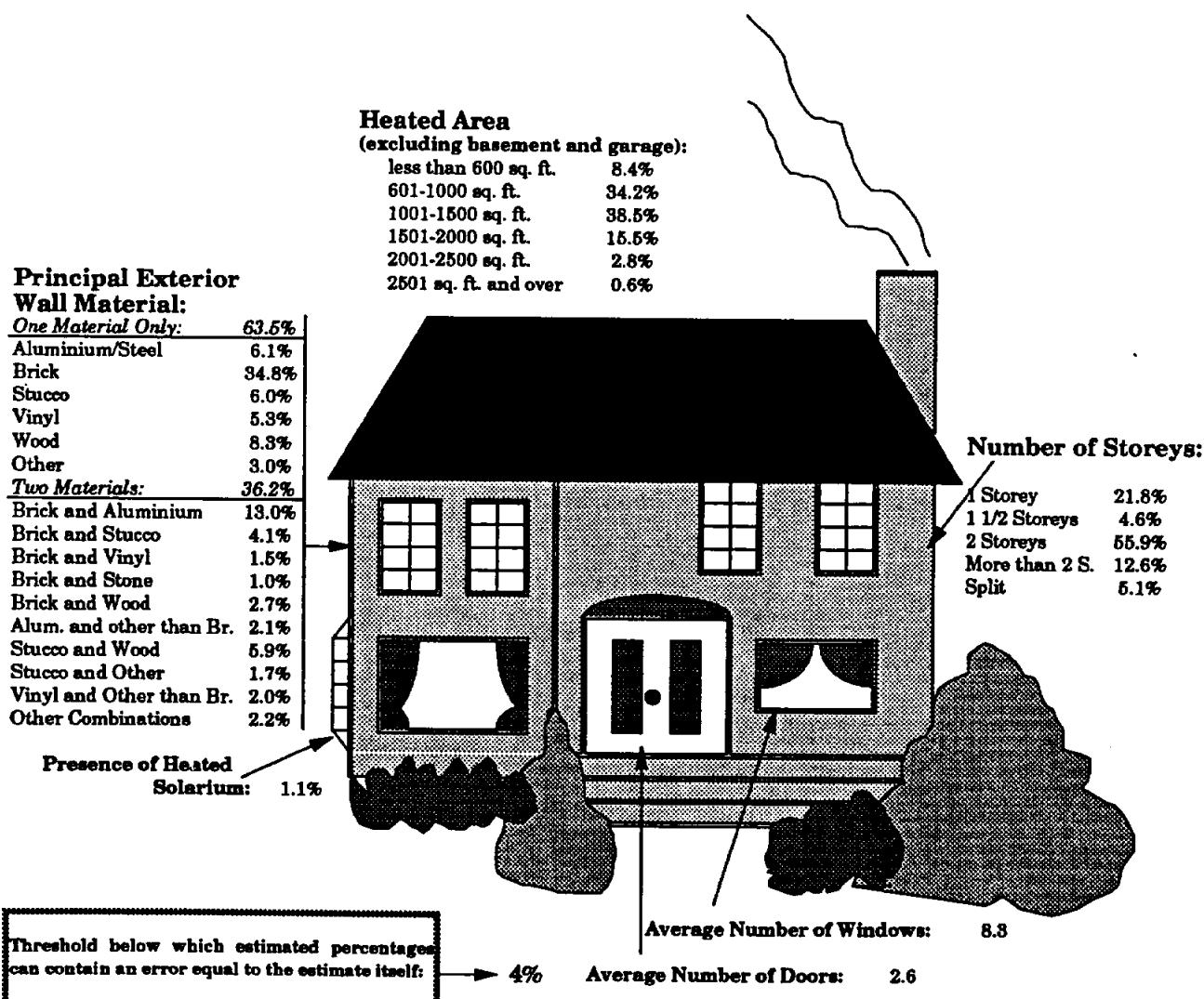


Diagram 2.1.14b

**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

**Air Exchanger:**

<i>Have and use:</i>	3.0%
All year	1.9%
Winter only	0.7%
Summer only	0.0%
Occasionally	0.4%
Never/do not have	97.0%

**Attached Houses**

Date of Construction: Before 1978

Number of Houses: 636,000

**Attic:**

<i>With attic:</i>	55.2%
Finished:	0.9%
Unfinis. high ceiling	22.1%
Unfinis. low ceiling	32.2%
No attic	44.8%

**Windows:  
Proportion with...**

Triple Pane	5.4%
Picture window:	1.5%
Other size:	3.9%
Double Pane	51.6%
Picture window:	10.8%
Other size:	41.3%
Single Pane with Storm W.	31.9%
Picture window:	4.9%
Other size:	27.0%
Single Pane without S. W.	9.2%
Picture window:	1.6%
Other size:	7.6%
Skylights:	1.9%

**Windows:**

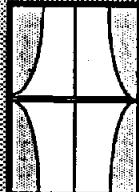
<b>Principal Window</b>	
<b>Frame Material:</b>	
Metal	29.0%
Wood	54.0%
Fibreglass/Vinyl	16.9%
Other	0.0%

**Air Leaks:**

All windows	29.4%
Some windows	18.5%
No leaks	52.1%

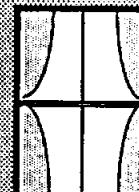
**Garage**

Heated unattached	1.7%
Heated attached	1.7%
Under a heated room	1.1%
With an insulated door	0.2%



**Exterior Doors:  
Proportion**

Made of wood with storm door:	67.9%
without storm door:	44.1%
	23.8%
Made of metal with storm door:	16.0%
without storm door:	9.1%
	7.0%
Patio:	12.3%
Other Doors:	3.8%
Air Leaks:	
All doors	42.9%
Some doors	16.3%
No leaks	40.8%



Threshold below which estimated percentages can contain an error equal to the estimate itself

→ 4%

**Basement:**

<i>With basement:</i>	88.5%
Full basement	72.9%
Partial basement	7.4%
Crawl space	8.2%
No basement	11.5%

Area of Basement (sq. ft.): 952

Heated portion of basement:	
entire basement	65.0%
more than one half	3.7%
one half	2.0%
less than one half	0.9%
not heated	28.3%

**Diagram 2.1.15a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

<b>Attached Houses</b>	
<b>Date of Construction:</b>	After 1977
<b>Number of Houses:</b>	429,000

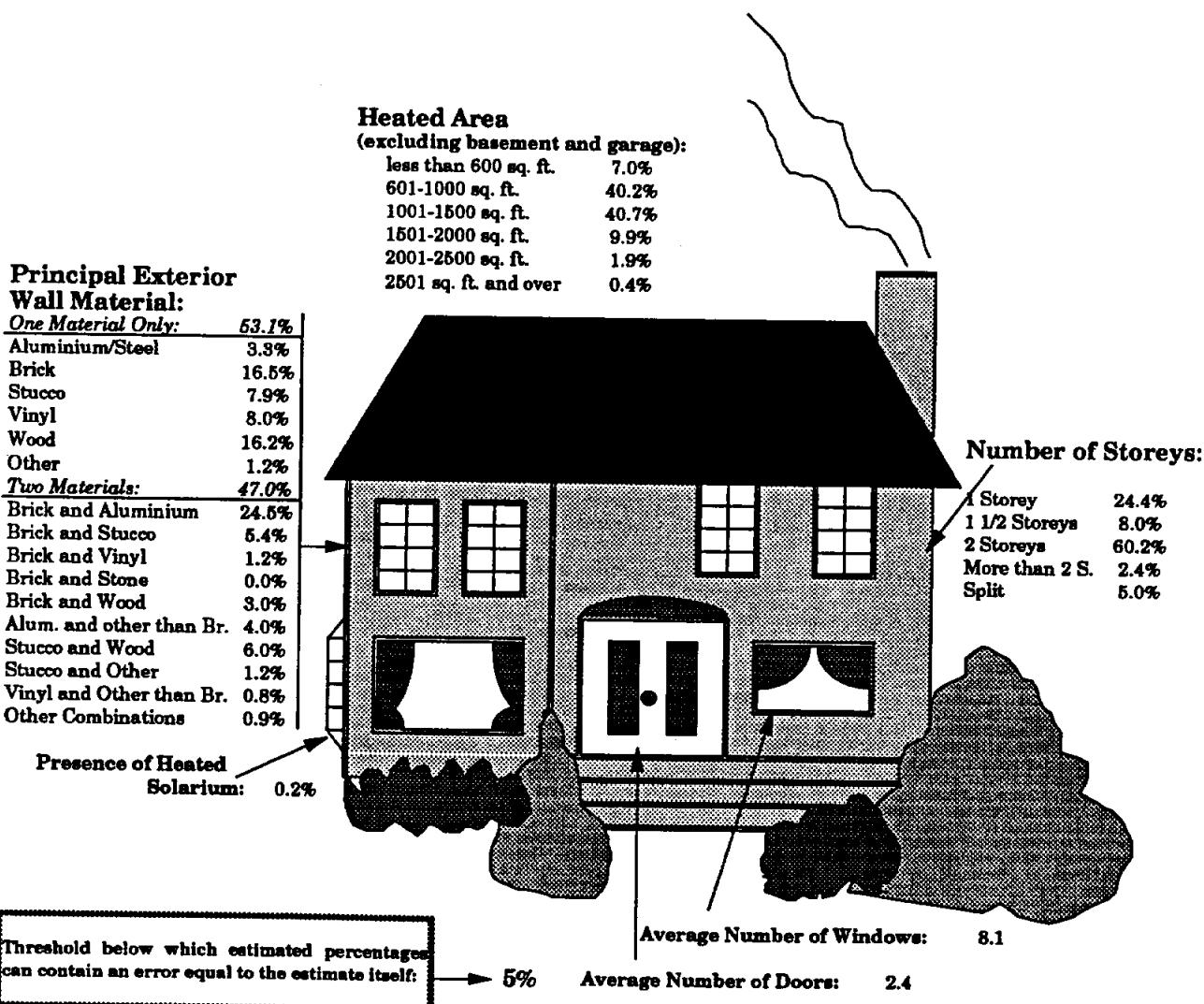
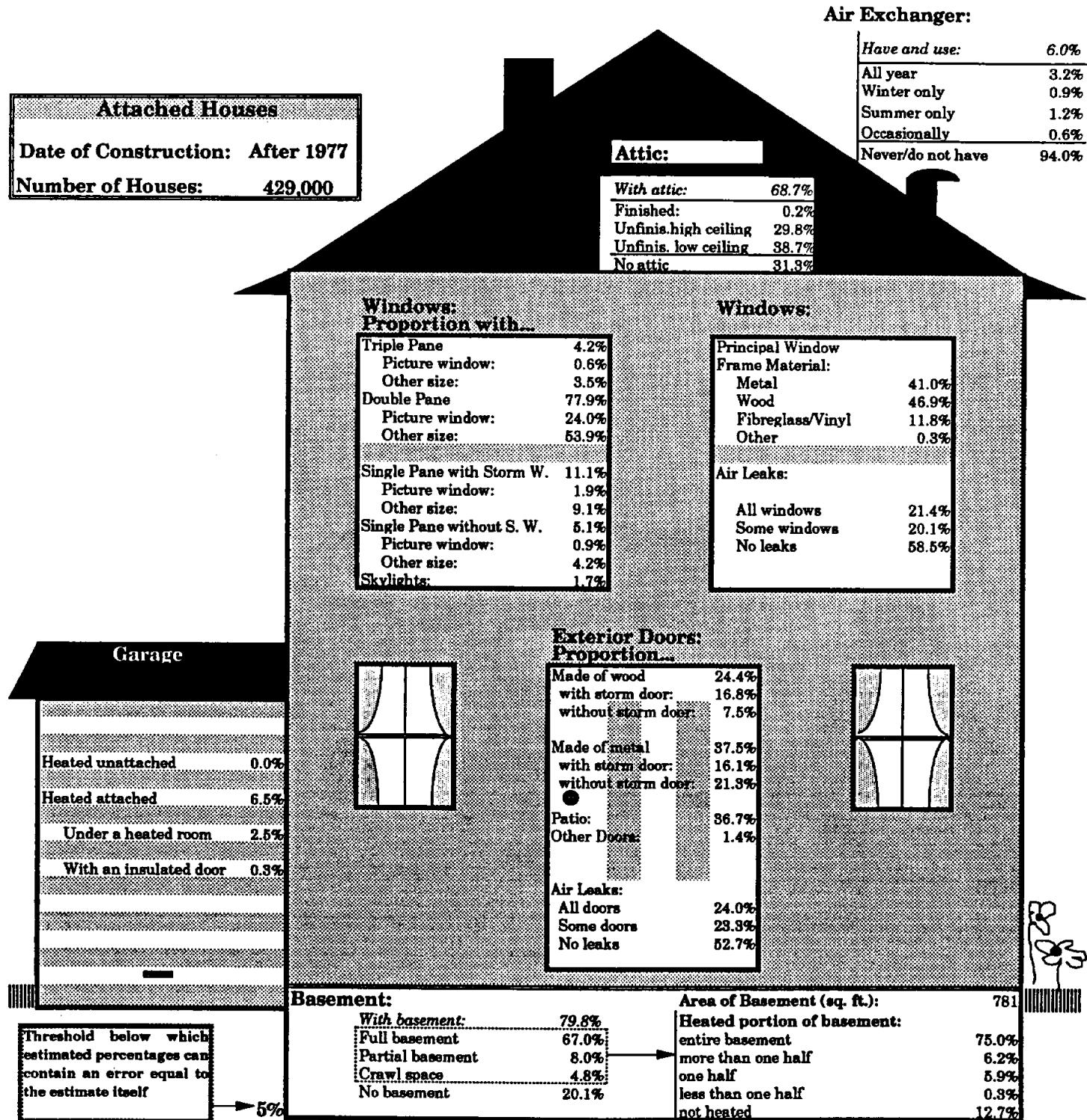


Diagram 2.1.15b

**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**



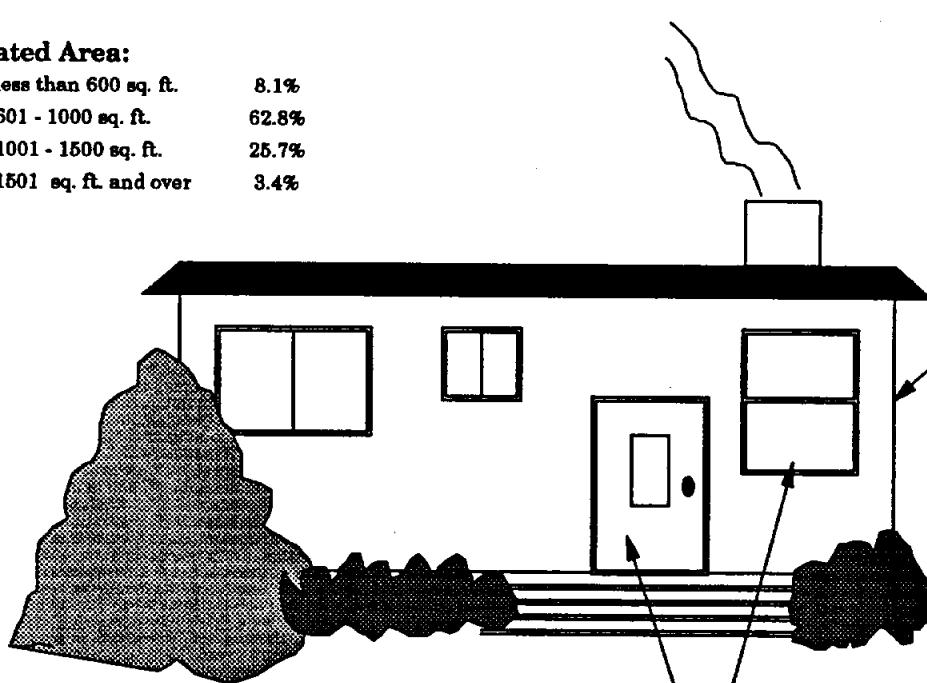
**Diagram 2.1.16a**  
**Characteristics of the Thermal Envelope**  
**- General Characteristics -**

**Mobil Homes**

**Date of Construction:** All  
**Number of Houses:** 247,000

**Heated Area:**

less than 600 sq. ft.	8.1%
601 - 1000 sq. ft.	62.8%
1001 - 1500 sq. ft.	25.7%
1501 sq. ft. and over	3.4%

**Principal Exterior Wall Material:**

<i>One Material Only:</i>	75.8%
Aluminum/Steel	57.2%
Vinyl	15.4%
Wood	3.0%
Other	0.2%
<i>Two Materials:</i>	24.2%
Brick and Aluminum	0.6%
Alum. and Other than Brick	19.5%
Vinyl and Other than Brick	3.0%
Other Combinations	1.1%

**Presence of Heated Solarium:** 1.8%

**Av. Number of Windows:** 9.2

**Presence of Detached Heated Garage:** 2.8%

**Av. Number of Doors:** 2.3

Threshold below which estimated percentages can contain  
an error equal to the estimate itself

→ 5%

**Diagram 2.1.16b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

**Mobil Homes****Date of Construction:** All**Number of Houses:** 247,000**Windows:****Principal Window Frame Material:**

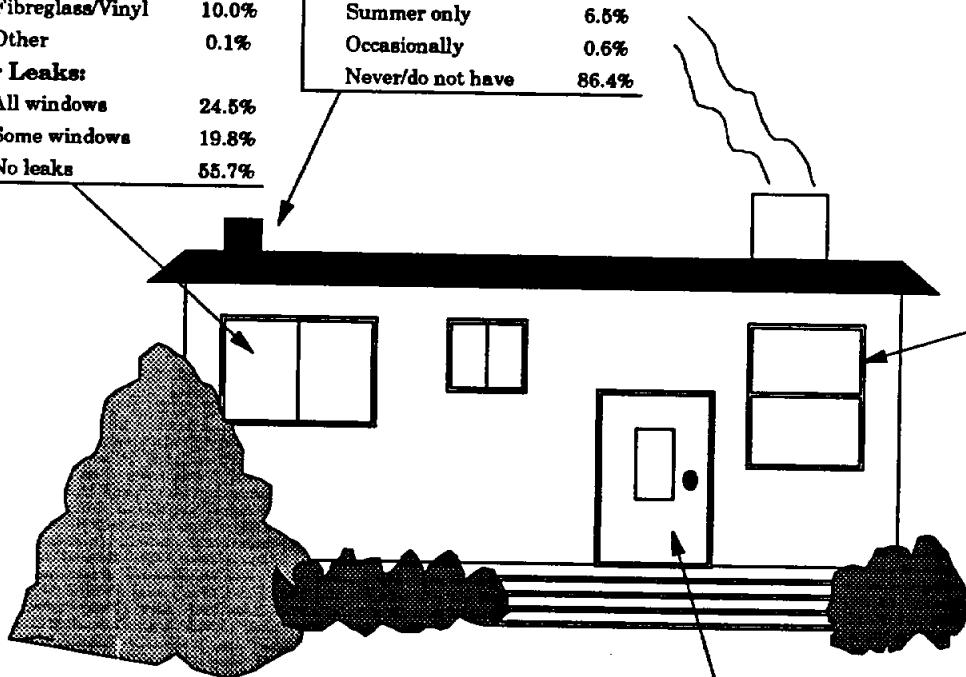
Metal	63.6%
Wood	26.3%
Fibreglass/Vinyl	10.0%
Other	0.1%

**Air Leaks:**

All windows	24.5%
Some windows	19.8%
No leaks	55.7%

**Use of Air Exchanger:**

All year	4.5%
Winter only	1.9%
Summer only	6.5%
Occasionally	0.6%
Never/do not have	86.4%

**Windows:**  
**Proportion with...**

Triple Pane	3.6%
Picture window:	2.3%
Other size:	1.4%
Double Pane	63.2%
Picture window:	12.1%
Other size:	51.1%
Single Pane without Storm W.	26.6%
Picture window:	3.4%
Other size:	23.2%
Single Pane without Storm W.	5.6%
Picture window:	1.2%
Other size:	4.4%
Skylights:	1.1%

**Exterior Doors****Proportion...**

Made of wood	54.1%
with storm door:	38.6%
without storm door:	15.4%
Made of metal	34.3%
with storm door:	18.5%
without storm door:	15.8%
Patio:	8.4%
Other Doors:	9.2%

**Air Leaks:**

All doors	22.7%
Some doors	26.1%
No leaks	51.2%

Threshold below which estimated percentages can contain an error equal to the estimate itself

5%

**Diagram 2.1.16b**  
**Characteristics of the Thermal Envelope**  
**- Specific Characteristics -**

<b>Mobil Homes</b>	
<b>Date of Construction:</b>	All
<b>Number of Houses:</b>	247,000

**Windows:****Principal Window Frame Material:**

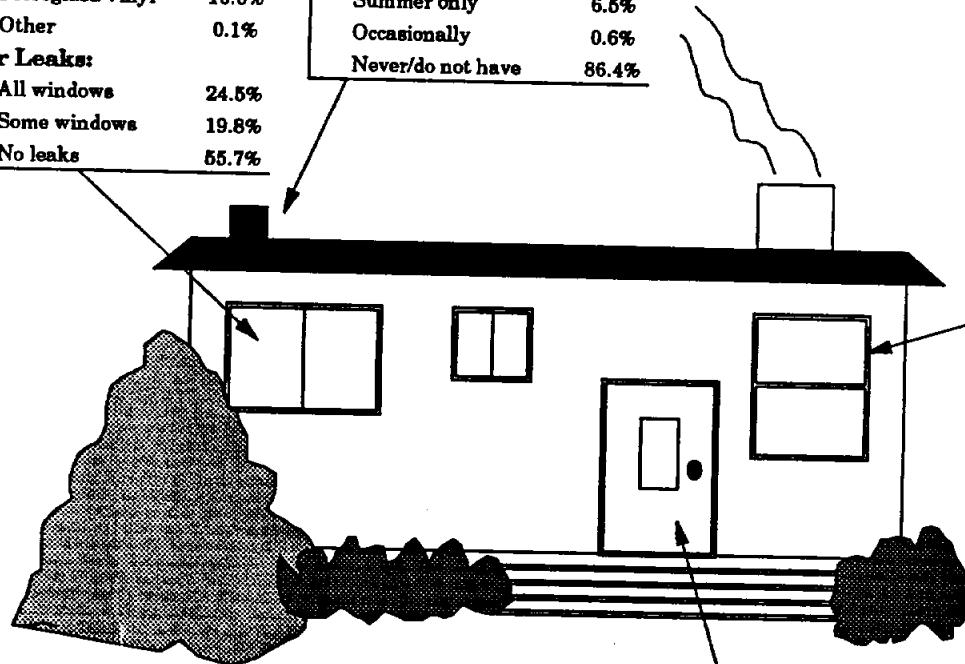
Metal	63.6%
Wood	26.3%
Fibreglass/Vinyl	10.0%
Other	0.1%

**Air Leaks:**

All windows	24.5%
Some windows	19.8%
No leaks	55.7%

**Use of Air Exchanger:**

All year	4.5%
Winter only	1.9%
Summer only	6.5%
Occasionally	0.6%
Never/do not have	86.4%

**Windows:****Proportion with...**

Triple Pane	3.6%
Picture window:	2.3%
Other size:	1.4%
Double Pane	63.2%
Picture window:	12.1%
Other size:	51.1%
Single Pane without Storm W.	26.6%
Picture window:	3.4%
Other size:	23.2%
Single Pane without Storm W.	5.6%
Picture window:	1.2%
Other size:	4.4%
Skylights:	1.1%

**Exterior Doors****Proportion...**

Made of wood	54.1%
with storm door:	38.6%
without storm door:	15.4%
Made of metal	34.3%
with storm door:	18.5%
without storm door:	15.8%
Patio:	8.4%
Other Doors:	3.2%

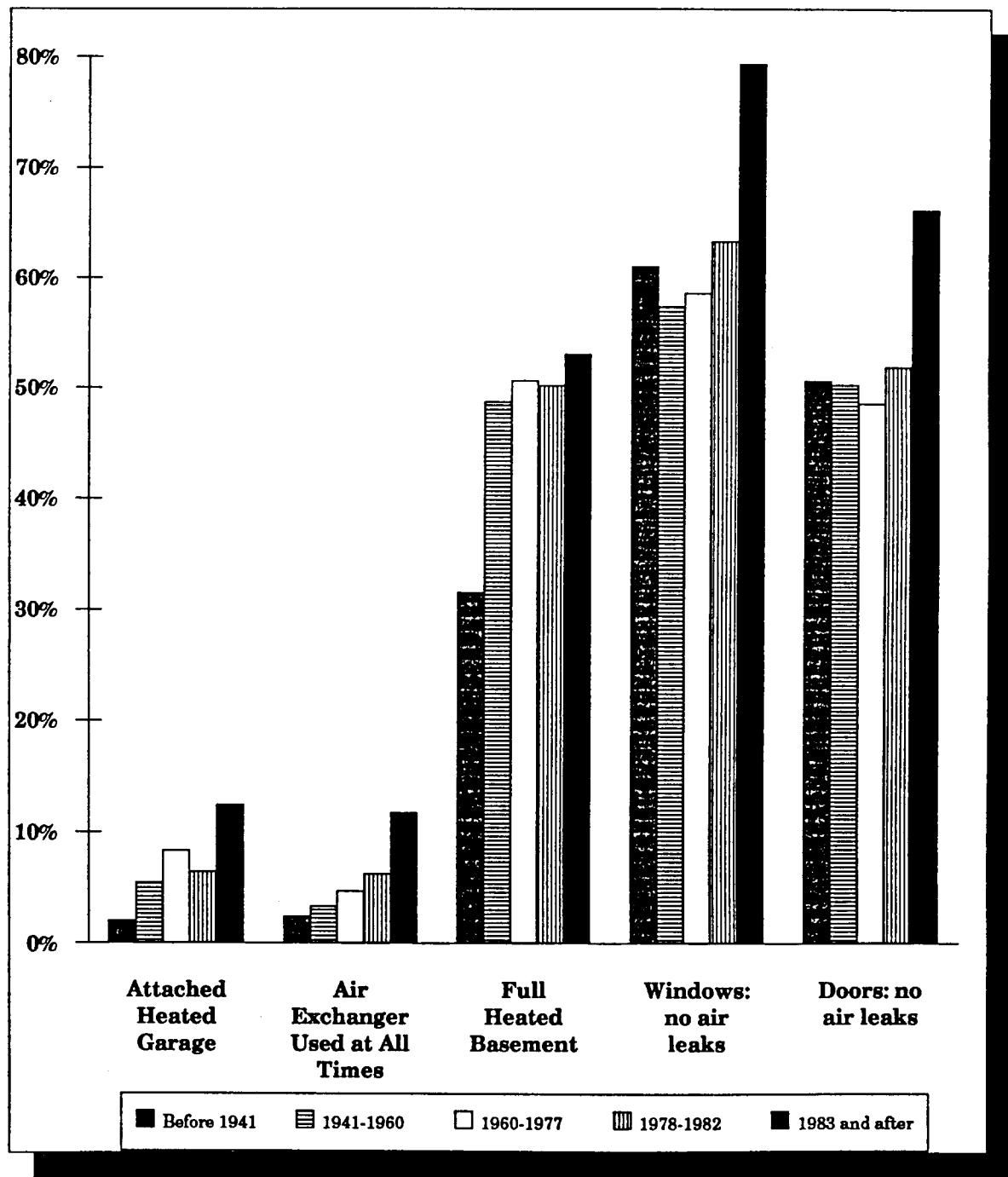
**Air Leaks:**

All doors	22.7%
Some doors	26.1%
No leaks	51.2%

Threshold below which estimated percentages can contain an error equal to the estimate itself

5%

**Graph 2.1**  
**Certain Characteristics of Houses**  
**According to Period of Construction**



**Table 2.1.1**  
**Doors and Windows**  
**According to Year of Construction of House**

Total Houses	Year of Construction of House					
	All	Before 1941	1941-1960	1961-1977	1978-1982	After 1982
N (100%) →	7,135,000	1,223,000	1,266,000	2,262,000	991,000	1,394,000
<b>Doors</b>						
<b>Proportion of Houses with Given Type of Exterior Door</b>						
<b>Wood Doors</b>	69%	89%	84%	81%	56%	25%
with storm doors	55%	75%	71%	64%	46%	15%
without storm doors	27%	40%	24%	30%	20%	17%
<b>Metal Doors</b>	49%	32%	37%	38%	63%	84%
with storm doors	25%	15%	20%	22%	44%	33%
without storm doors	30%	20%	19%	21%	33%	63%
<b>Patio Doors</b>	42%	18%	21%	44%	61%	69%
<b>Other Types</b>	5%	6%	8%	4%	3%	5%
<b>Average Number of Exterior Doors</b>						
<b>All Types of Doors</b>	2.9	2.9	3.6	2.9	3.0	3.1
<b>Wood Doors</b>	1.4	2.1	1.7	1.6	1.0	0.6
with storm doors	1.0	1.5	1.3	1.1	0.8	0.2
without storm doors	0.4	0.7	0.4	0.5	0.3	0.2
<b>Metal Doors</b>	0.9	0.5	0.6	0.6	1.1	1.8
with storm doors	0.4	0.2	0.3	0.3	0.6	0.5
without storm doors	0.5	0.3	0.3	0.3	0.5	1.2
<b>Patio Doors</b>	0.5	0.2	0.2	0.6	0.8	0.8
<b>Other Types</b>	0.1	0.1	0.1	0.1	0.0	0.1
<b>Windows</b>						
<b>Proportion of Houses with Given Type of Windows</b>						
<b>Triple Pane Windows</b>	1%	5%	13%	11%	12%	13%
Picture window	8%	6%	11%	8%	8%	9%
Other size	8%	6%	8%	7%	10%	10%
<b>Double Pane Windows</b>	79%	60%	72%	89%	89%	88%
Picture window	58%	35%	52%	67%	67%	61%
Other size	69%	51%	60%	72%	81%	81%
<b>Single Pane Windows</b>						
with storm door	33%	62%	49%	30%	19%	11%
Picture window	10%	15%	16%	10%	4%	2%
Other size	30%	56%	44%	26%	17%	10%
without storm door	18%	27%	10%	20%	8%	5%
Picture window	6%	6%	6%	8%	4%	2%
Other size	14%	24%	14%	18%	7%	5%
<b>Skylights</b>	7%	6%	8%	5%	9%	13%
<b>Average Number of Windows</b>						
<b>All Types of Windows</b>	11.5	13.1	10.9	10.8	10.8	12.9
<b>Triple Pane Windows</b>	0.7	0.4	0.4	0.7	0.2	1.0
Picture window	0.2	0.1	0.2	0.2	0.2	0.3
Other size	0.5	0.3	0.4	0.5	0.6	0.8
<b>Double Pane Windows</b>	7.0	4.9	5.4	6.4	8.4	10.4
Picture window	1.3	0.8	1.2	1.4	1.5	1.7
Other size	5.7	4.0	4.4	5.0	6.9	8.7
<b>Single Pane Windows</b>	0.0	0.0	0.0	0.0	0.0	0.0
with storm door	2.6	6.1	3.8	2.0	1.0	0.5
Picture window	0.3	0.7	0.4	0.2	0.1	0.1
Other size	2.3	5.4	3.4	1.7	0.9	0.5
without storm door	1.1	1.1	0.9	1.4	0.3	0.5
Picture window	0.2	0.3	0.1	0.3	0.1	0.1
Other size	0.9	1.5	0.8	1.3	0.3	0.5
<b>Skylights</b>	0.1	0.1	0.0	0.1	0.1	0.1

**Table 2.1.2**  
**Doors and Windows**  
**According to Year of Construction of House**

Total Detached Houses	All N (100%) →	Year of Construction of House					
		Before 1941 1,053,000	1941-1960 1,146,000	1961-1977 1,765,000	1978-1982 714,000	After 1982 1,145,000	
<b>Doors</b>							
<b>Proportion of Houses with Given Type of Exterior Door</b>							
<b>Wood Doors</b>	70%	68%	65%	62%	60%	27%	
with storm doors	58%	75%	73%	66%	44%	16%	
without storm doors	27%	38%	24%	30%	23%	16%	
<b>Metal Doors</b>	50%	33%	37%	40%	60%	88%	
with storm doors	26%	15%	21%	22%	48%	34%	
without storm doors	31%	21%	19%	22%	37%	65%	
<b>Patio Doors</b>	43%	18%	20%	47%	62%	70%	
<b>Other Types</b>	5%	5%	9%	5%	4%	5%	
<b>Average Number of Exterior Doors</b>							
<b>All Types of Doors</b>	3.0	2.9	2.8	3.0	3.3	3.3	
<b>Wood Doors</b>	1.5	2.1	1.7	1.7	1.1	0.8	
with storm doors	1.0	1.5	1.3	1.2	0.8	0.2	
without storm doors	0.4	0.6	0.4	0.5	0.3	0.2	
<b>Metal Doors</b>	0.9	0.5	0.6	0.6	1.3	1.9	
with storm doors	0.4	0.2	0.3	0.3	0.7	0.5	
without storm doors	0.5	0.3	0.3	0.3	0.6	1.3	
<b>Patio Doors</b>	0.6	0.3	0.2	0.6	0.4	0.9	
<b>Other Types</b>	0.1	0.1	0.1	0.1	0.0	0.1	
<b>Windows</b>							
<b>Proportion of Houses with Given Type of Windows</b>							
<b>Triple Pane Windows</b>	12%	9%	12%	12%	16%	15%	
Picture window	9%	6%	10%	9%	10%	9%	
Other size	9%	7%	7%	8%	14%	10%	
<b>Double Pane Windows</b>	79%	62%	73%	84%	88%	87%	
Picture window	60%	36%	54%	71%	68%	64%	
Other size	69%	53%	60%	71%	81%	83%	
<b>Single Pane Windows</b>							
with storm door	39%	61%	49%	29%	17%	10%	
Picture window	10%	14%	17%	10%	4%	2%	
Other size	30%	56%	45%	24%	16%	9%	
without storm door	17%	29%	18%	21%	7%	6%	
Picture window	6%	6%	6%	9%	4%	2%	
Other size	15%	26%	15%	19%	6%	5%	
<b>Skylights</b>	7%	3%	3%	5%	11%	19%	
<b>Average Number of Windows</b>							
<b>All Types of Windows</b>	12.1	13.0	11.1	11.4	11.9	15.8	
<b>Triple Pane Windows</b>	0.7	0.4	0.5	0.7	1.0	1.1	
Picture window	0.2	0.1	0.2	0.2	0.3	0.3	
Other size	0.6	0.3	0.3	0.6	0.8	0.8	
<b>Double Pane Windows</b>	7.4	6.1	6.7	6.8	9.4	11.0	
Picture window	1.3	0.9	1.2	1.5	1.5	1.6	
Other size	6.0	4.2	4.5	5.3	7.8	9.4	
<b>Single Pane Windows</b>							
with storm door	2.7	6.1	3.9	1.9	0.4	0.5	
Picture window	0.3	0.6	0.5	0.3	0.1	0.0	
Other size	2.4	5.6	3.5	1.7	0.8	0.4	
without storm door	1.2	1.9	0.9	1.6	0.2	0.6	
Picture window	0.2	0.3	0.1	0.3	0.0	0.1	
Other size	1.0	1.6	0.8	1.5	0.2	0.5	
<b>Skylights</b>	0.1	0.0	0.0	0.1	0.2	0.4	

## 2.2 IMPROVEMENTS MADE TO THE THERMAL ENVELOPE IN HOUSES

Clearly, the most frequently used method for increasing the efficiency of the thermal envelope in Canadian residences is increasing air-tightness around doors; this minor work was done in half of the houses surveyed. Two out of five households enhanced air-tightness around windows. Nine out of ten houses that have undergone repair work to make doors and windows more air-tight made the improvement after 1983.

In just over one-third of the residences (36.5%), some of the windows had been replaced. Thirty-two percent of houses had doors replaced. Just over three-quarters (78%) of door and window replacement work occurred after 1983.

Nearly two-thirds of houses with basements or crawl spaces had the basement walls insulated from the inside, whether fully (42.6%) or partially (25.5%). This insulation was not upgraded in nearly two out of three households (63.6%). Only one house in ten had either fully (5.7%) or partially (4.1%) insulated basement floors.

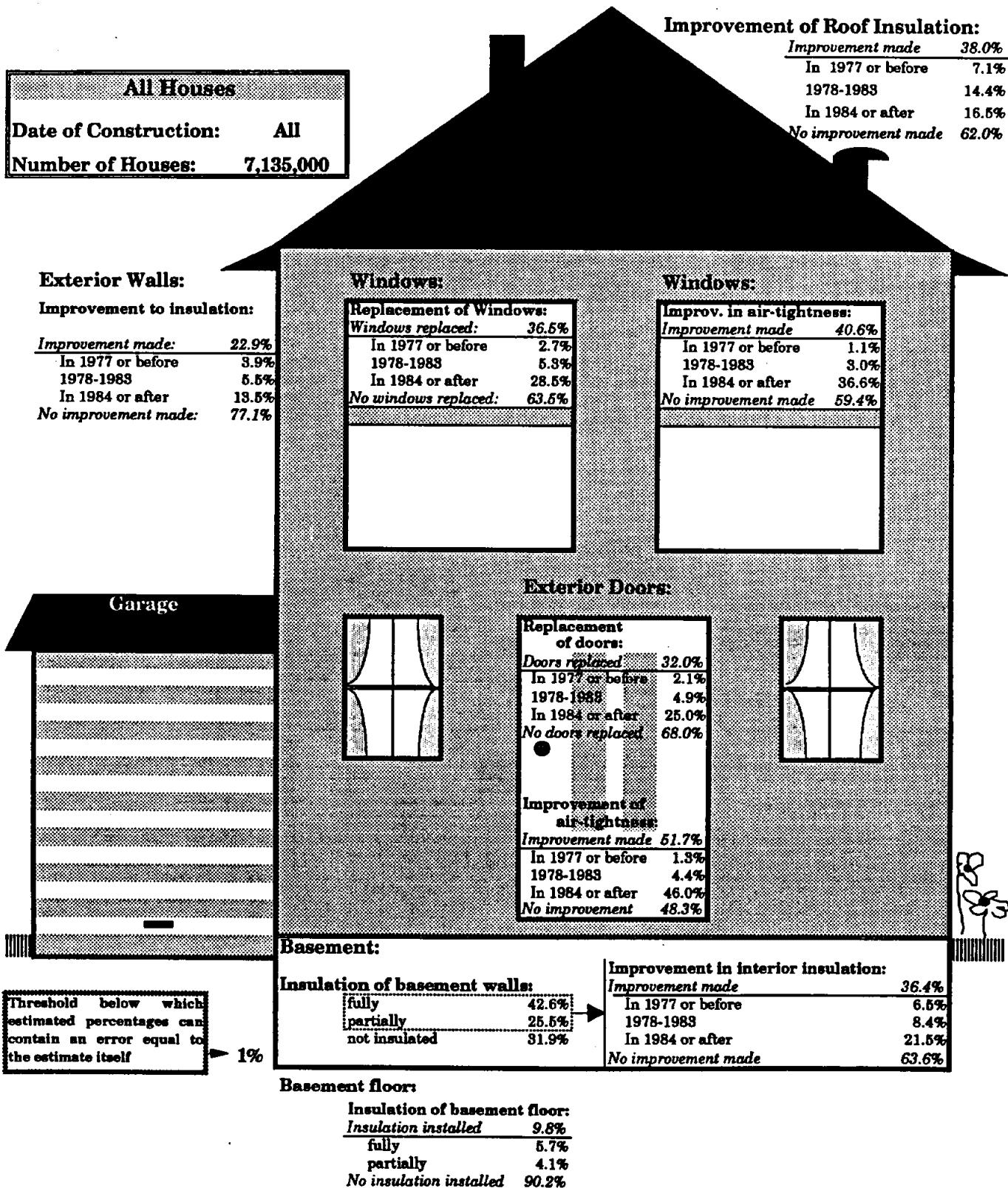
Roof and attic insulation was upgraded in 38% of the houses. This type of project was performed somewhat more frequently in 1983 or before (21.5%) than after this time period (16.5%).

Finally, less than one house in four has upgraded exterior wall insulation (22.9%); three out of five of these houses had this work done in 1984 or after.

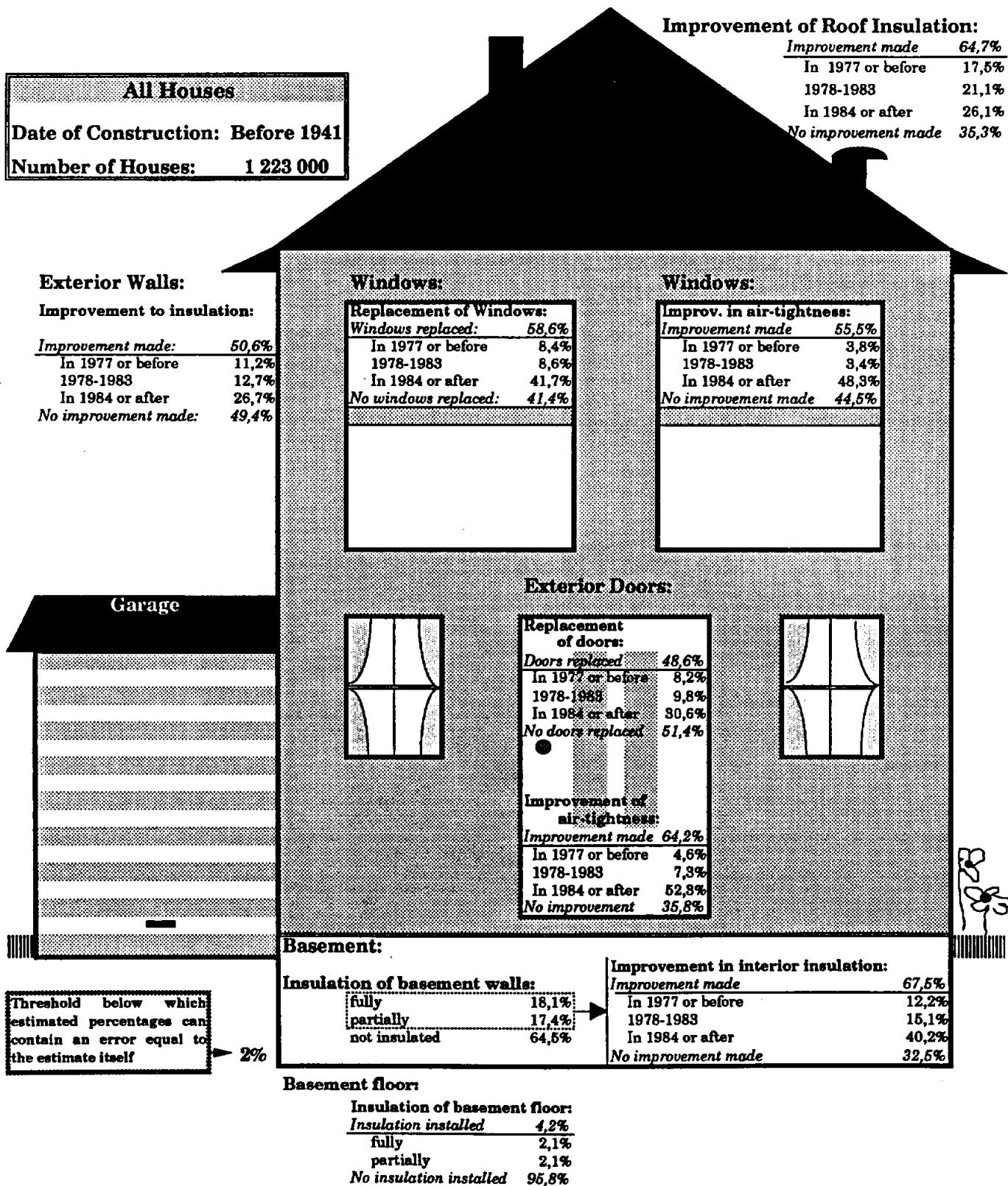
*Improvements made to the thermal envelope are also described in a series of diagrams referring to specific types of houses (detached, attached, mobile homes) according to period of construction.*

The chronological analysis (Graph 2.2, which follows the series of diagrams) shows that the older the house is, the more likely that there has been some work done to improve its energy efficiency. For example, projects to increase air-tightness in doors and windows, as well as roof insulating, have been performed on close to three out of five houses built before 1961.

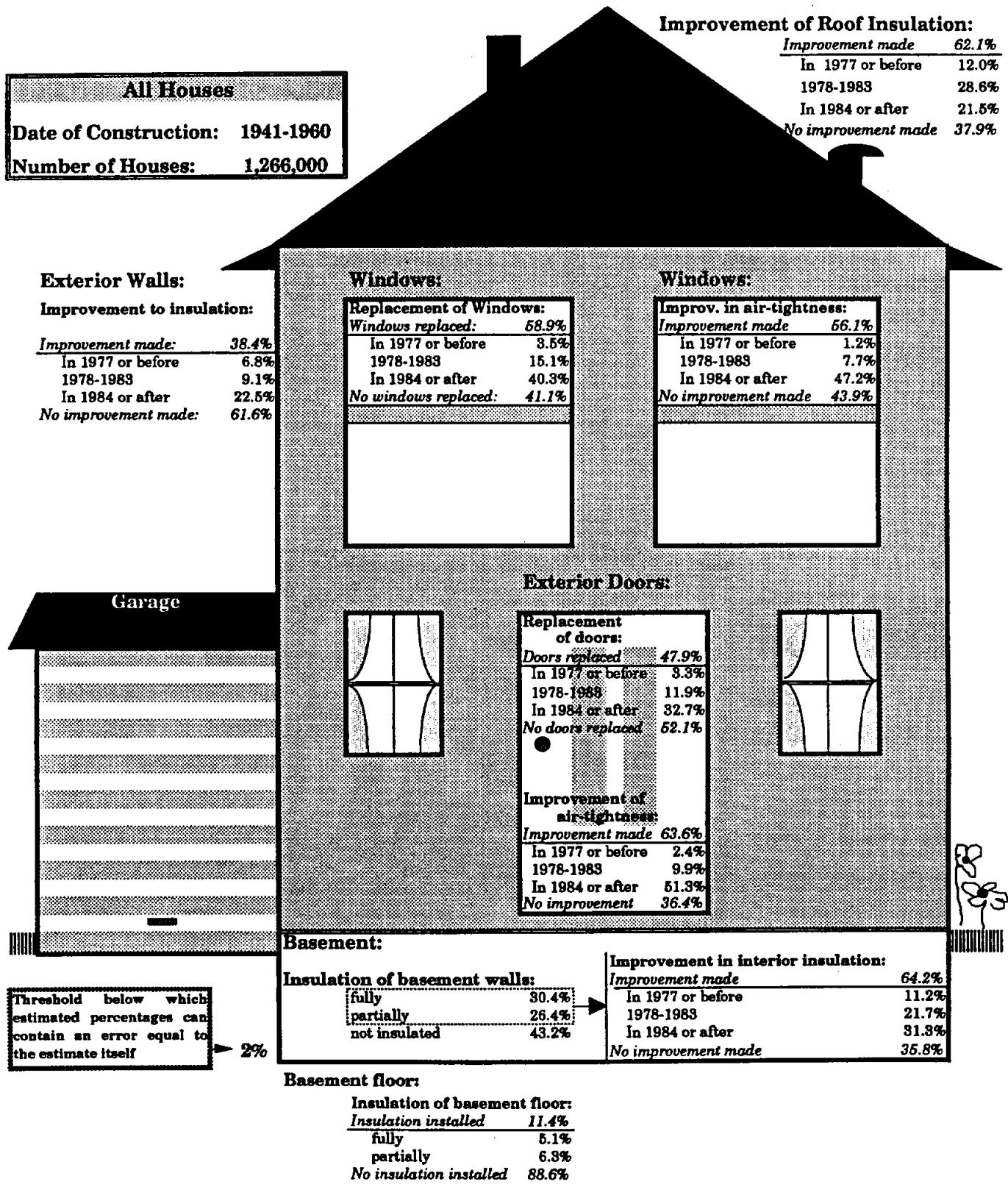
**Diagram 2.2.1  
Improvement of the Thermal Envelope**



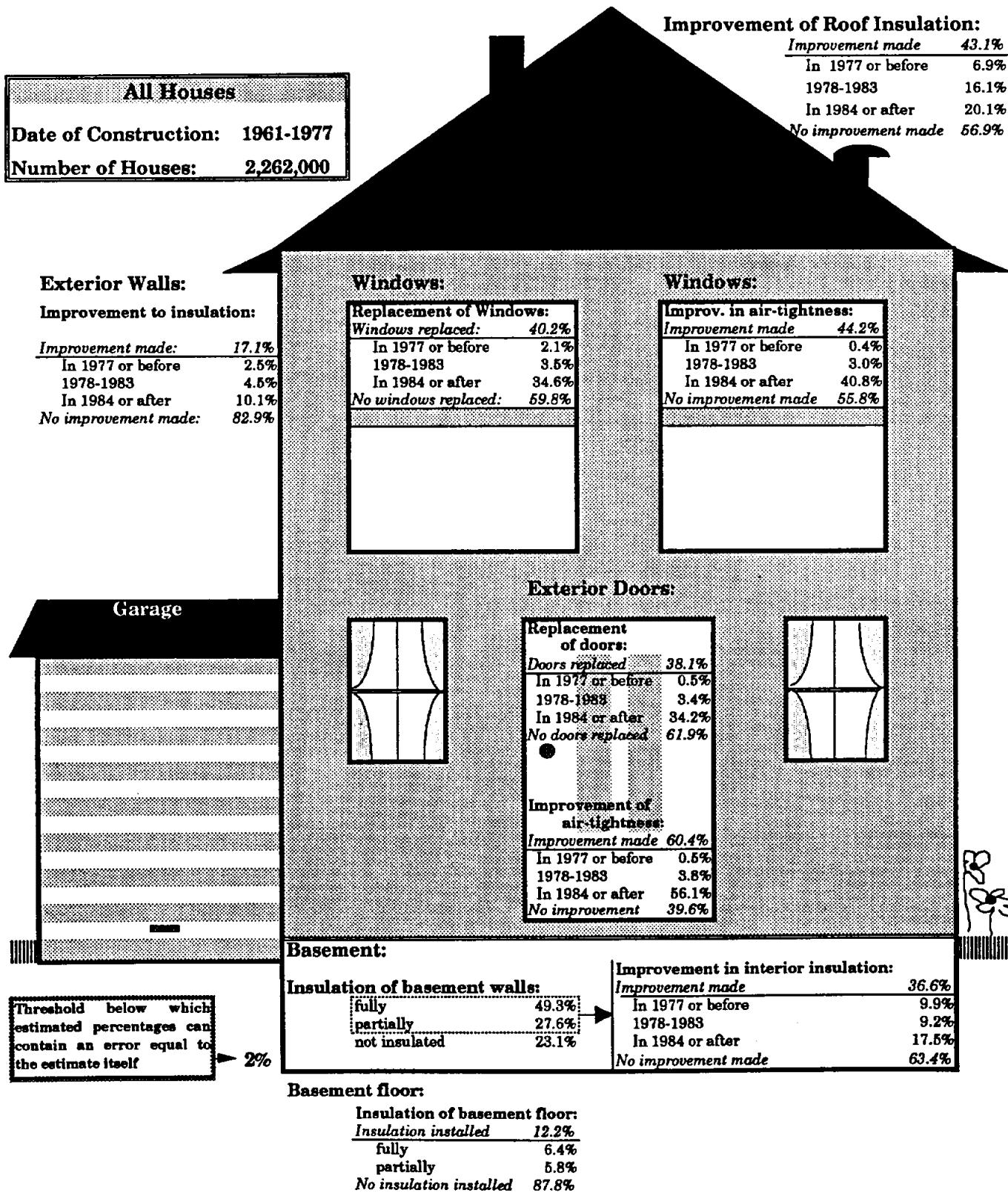
**Diagram 2.2.2**  
**Improvement of the Thermal Envelope**



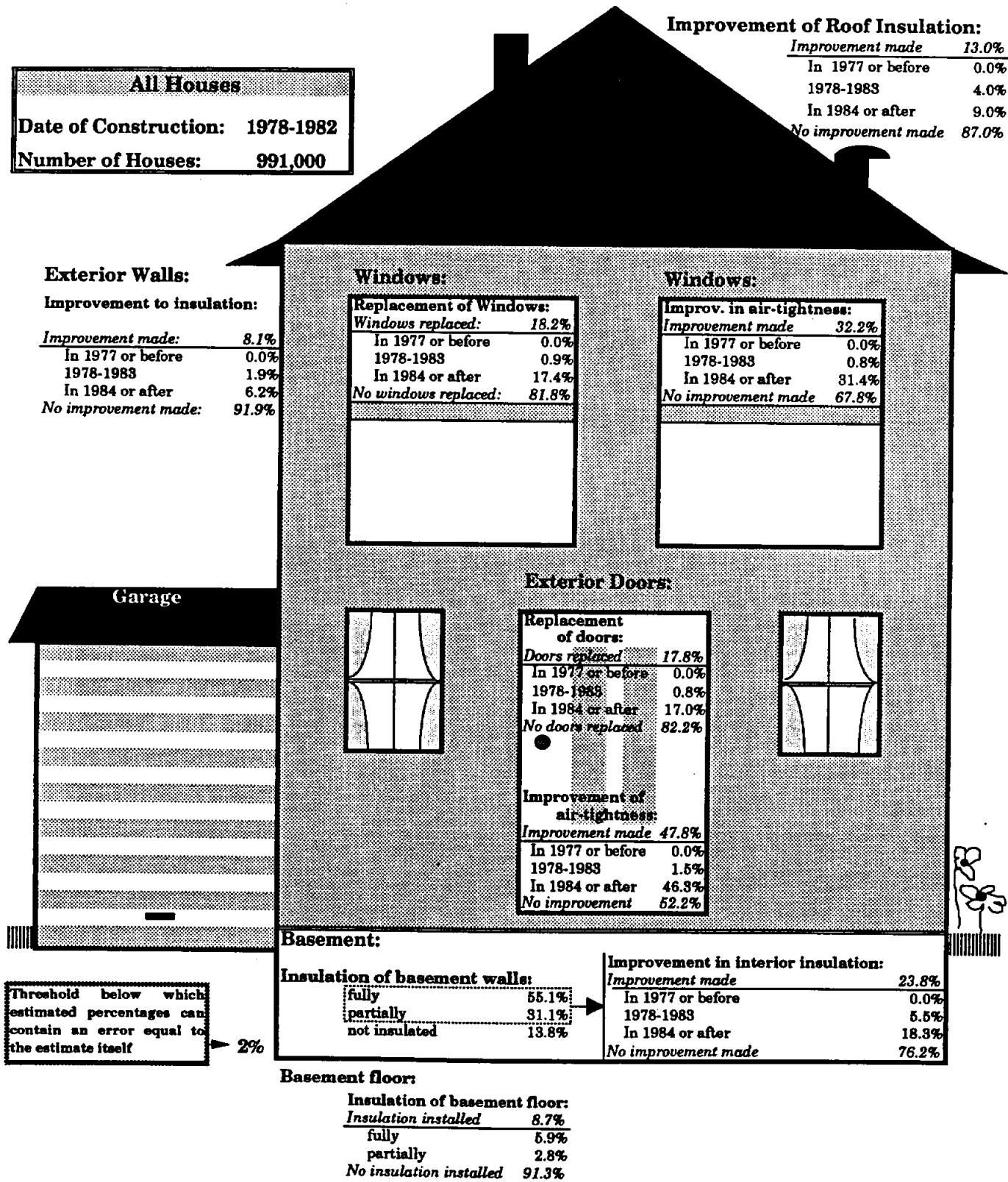
**Diagram 2.2.3  
Improvement of the Thermal Envelope**



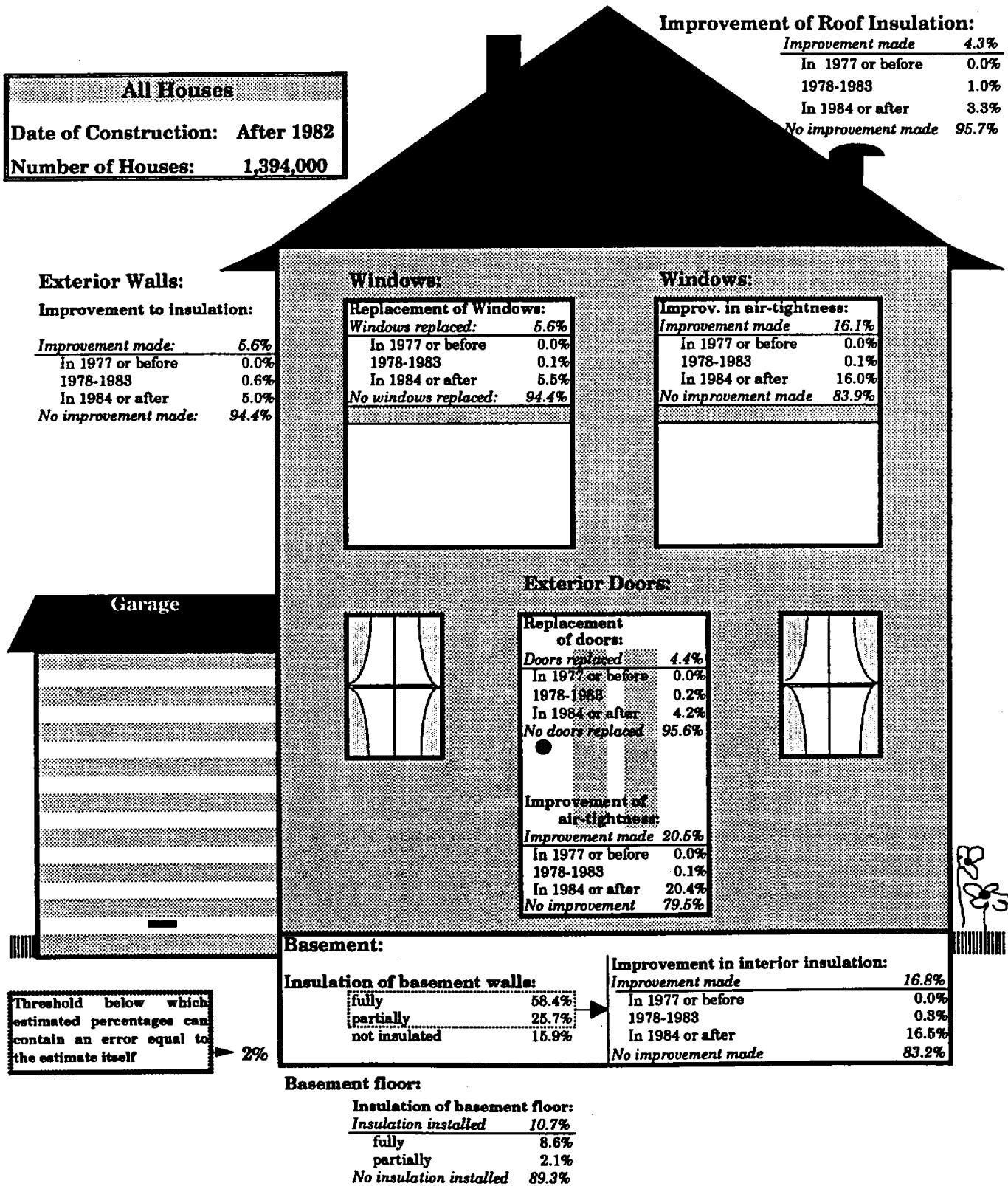
**Diagram 2.2.4**  
**Improvement of the Thermal Envelope**



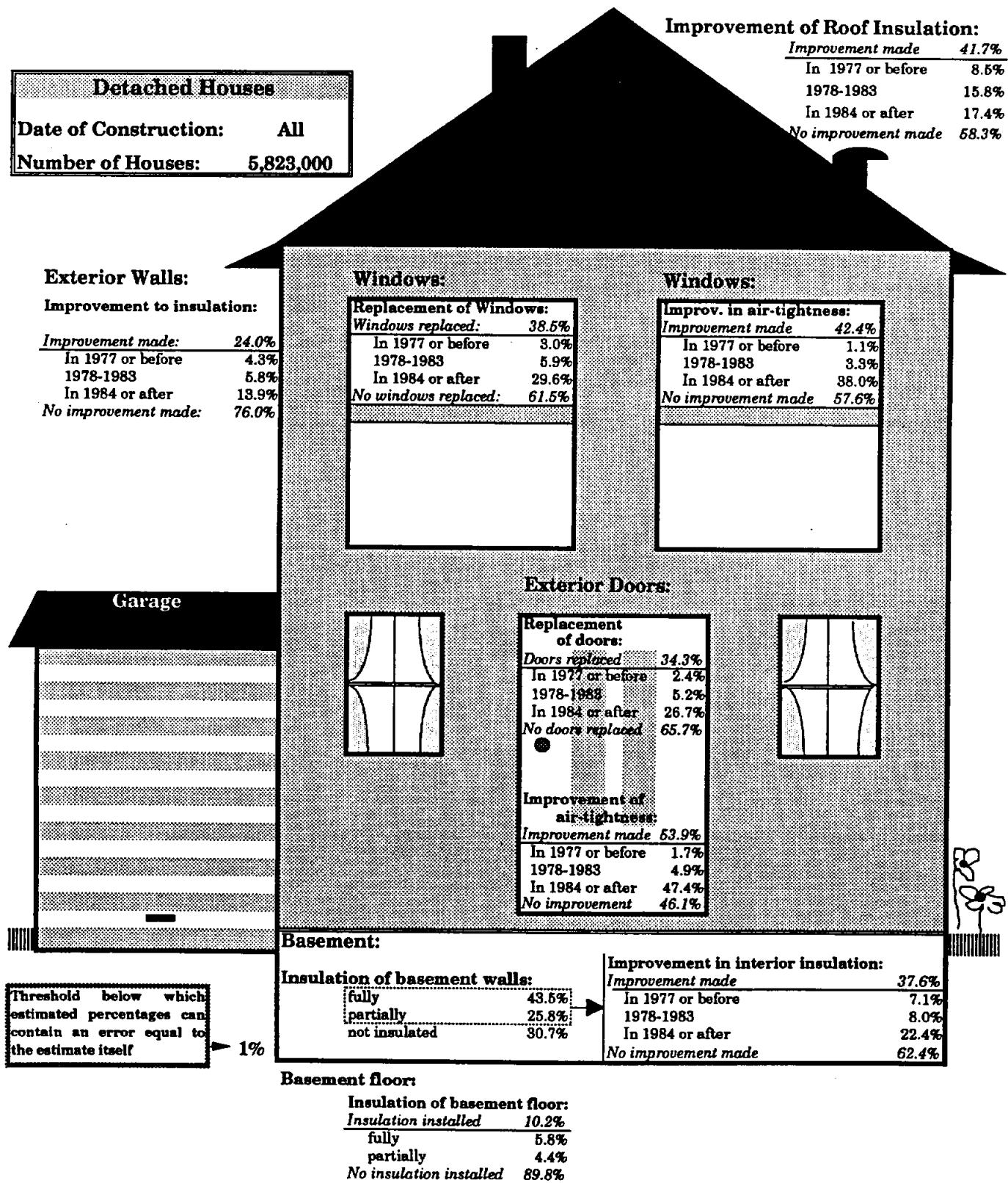
**Diagram 2.2.5  
Improvement of the Thermal Envelope**



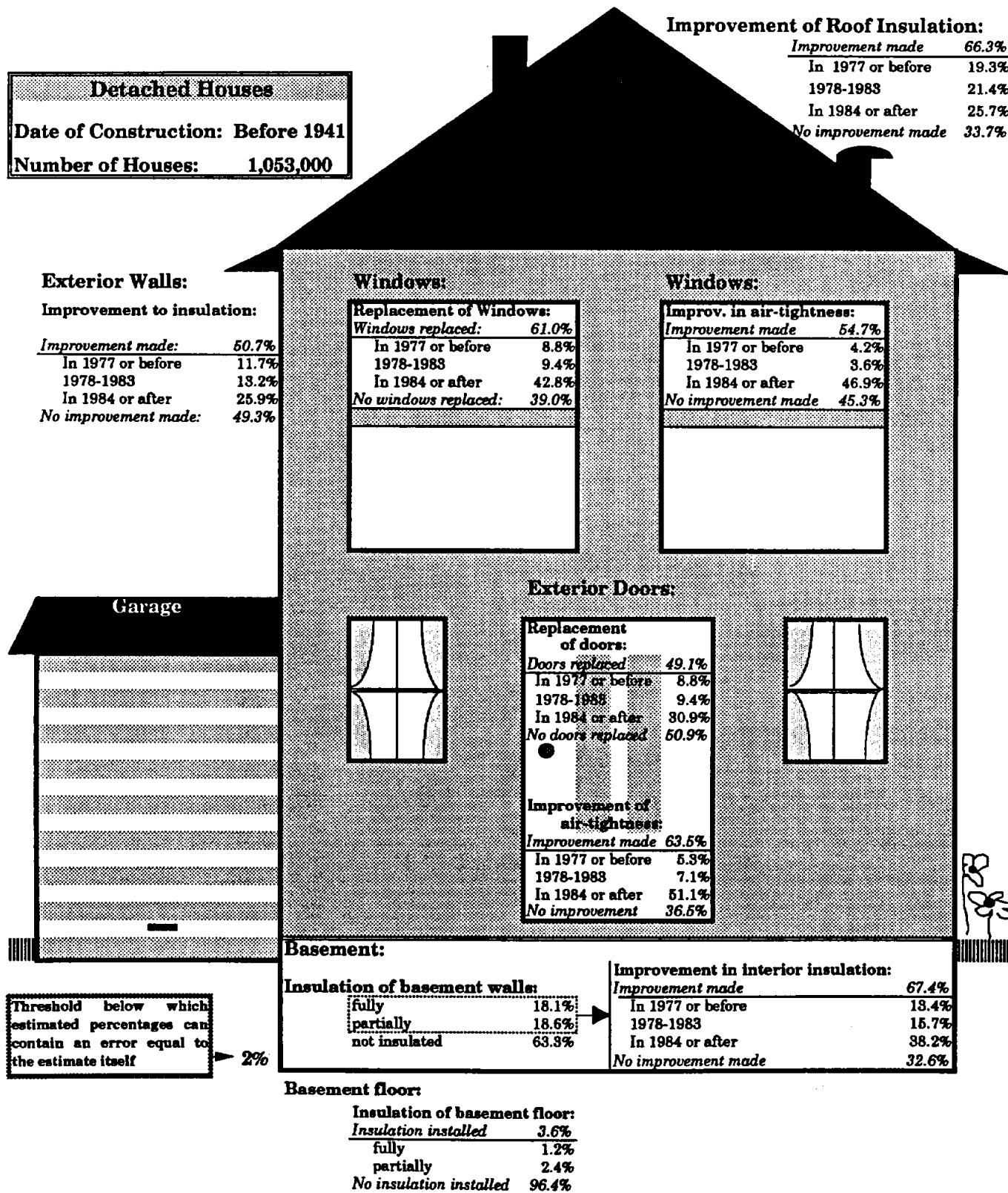
**Diagram 2.2.6  
Improvement of the Thermal Envelope**



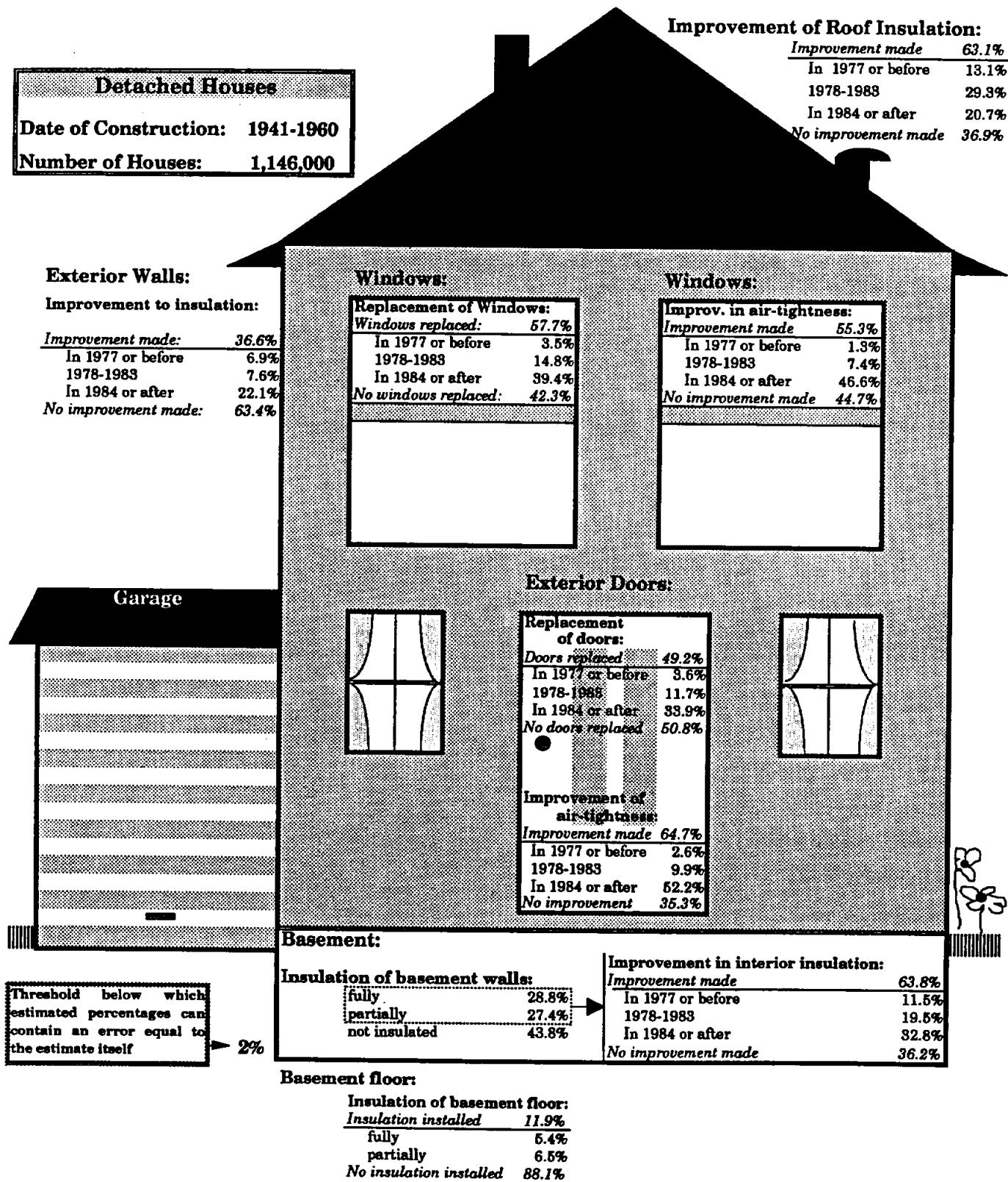
**Diagram 2.2.7  
Improvement of the Thermal Envelope**



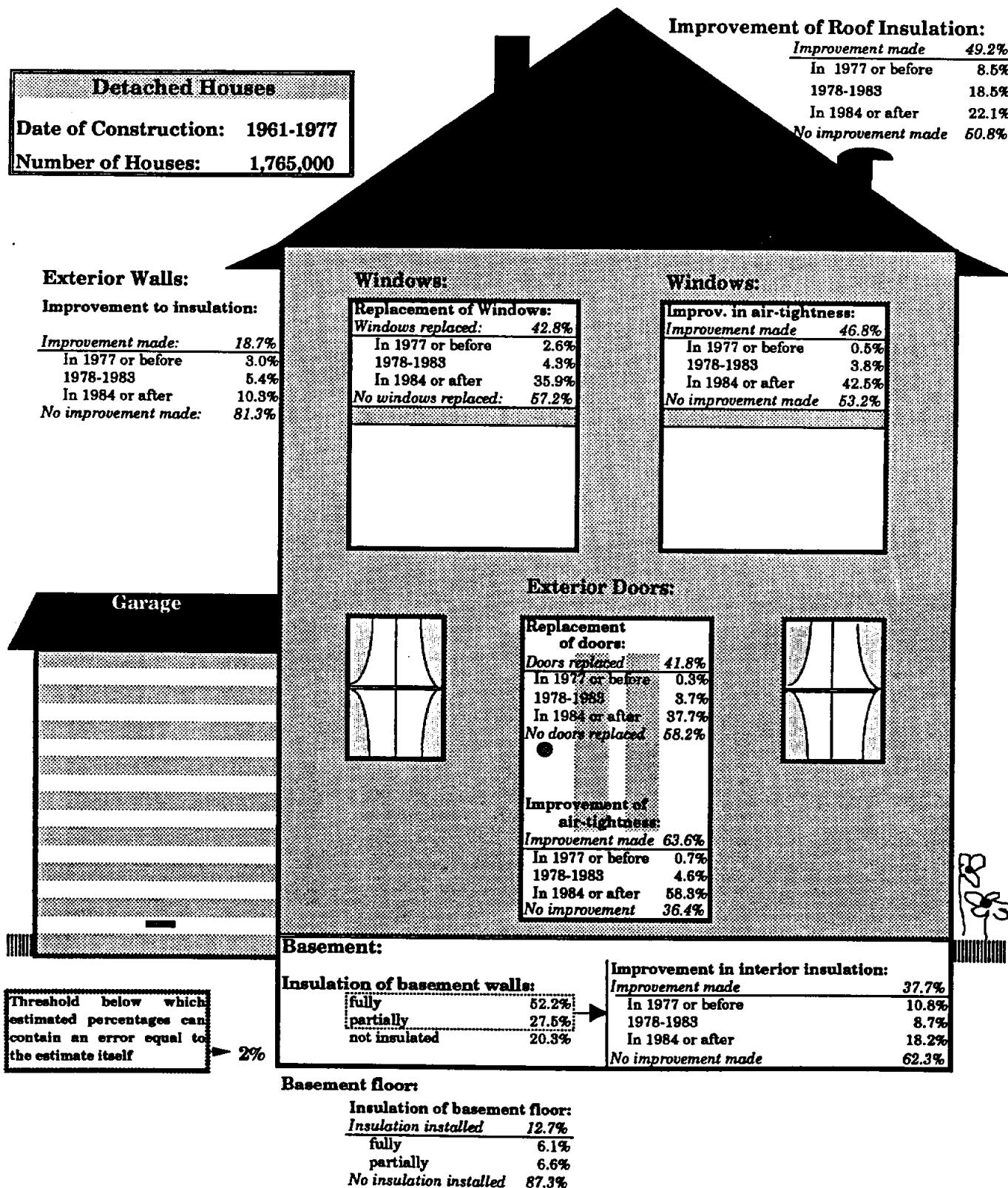
**Diagram 2.2.8**  
**Improvement of the Thermal Envelope**



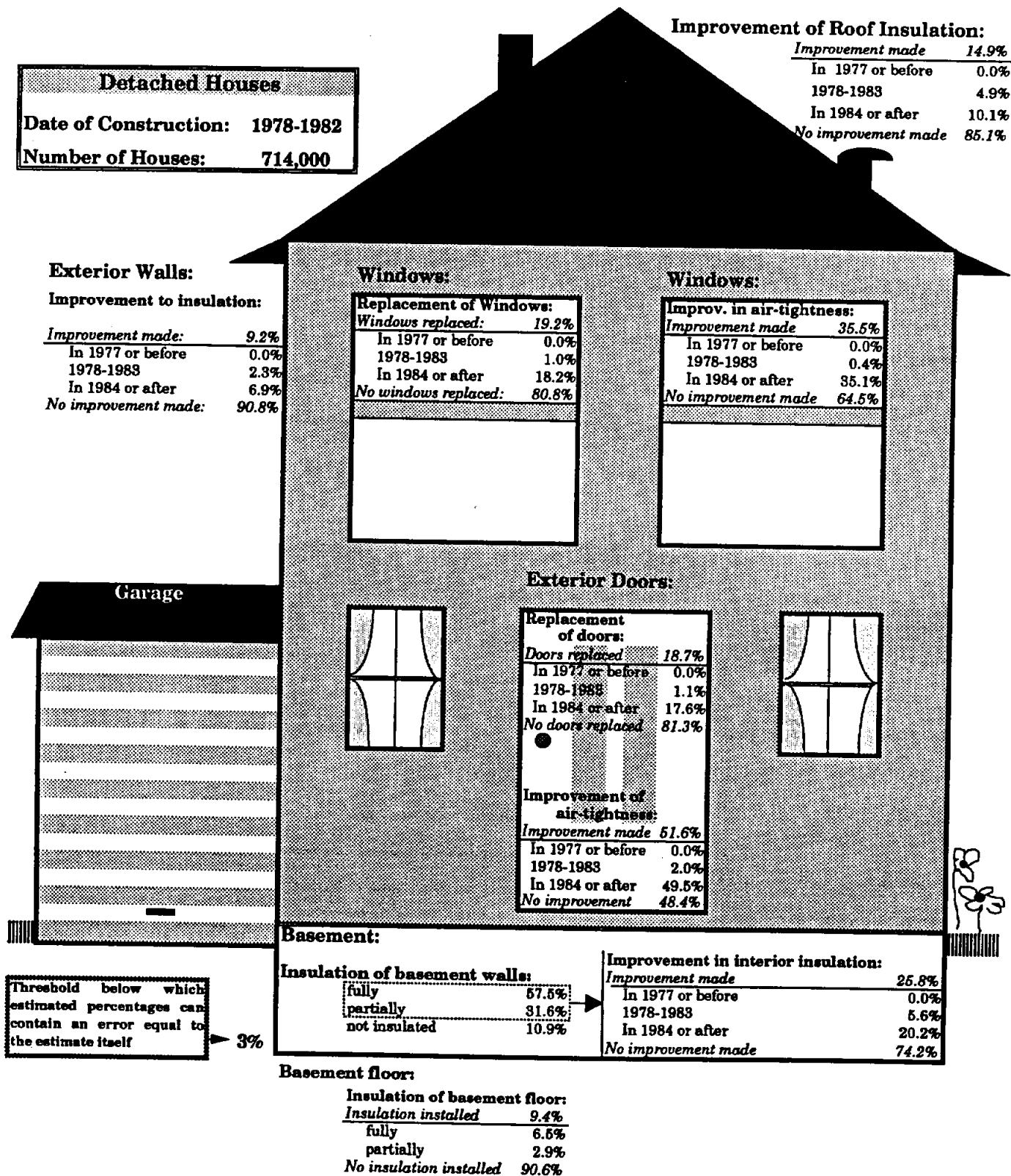
**Diagram 2.2.9  
Improvement of the Thermal Envelope**



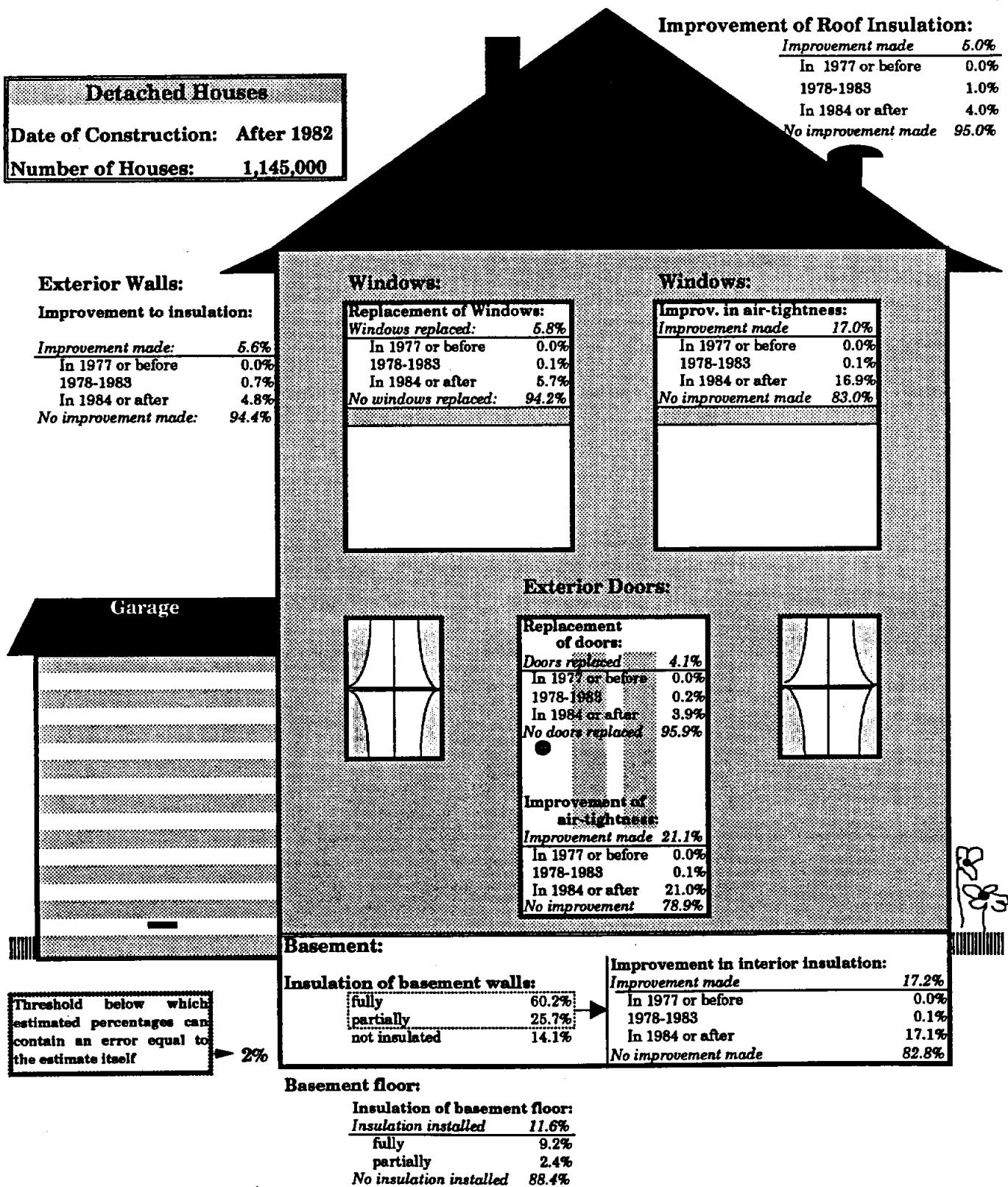
**Diagram 2.2.10**  
**Improvement of the Thermal Envelope**



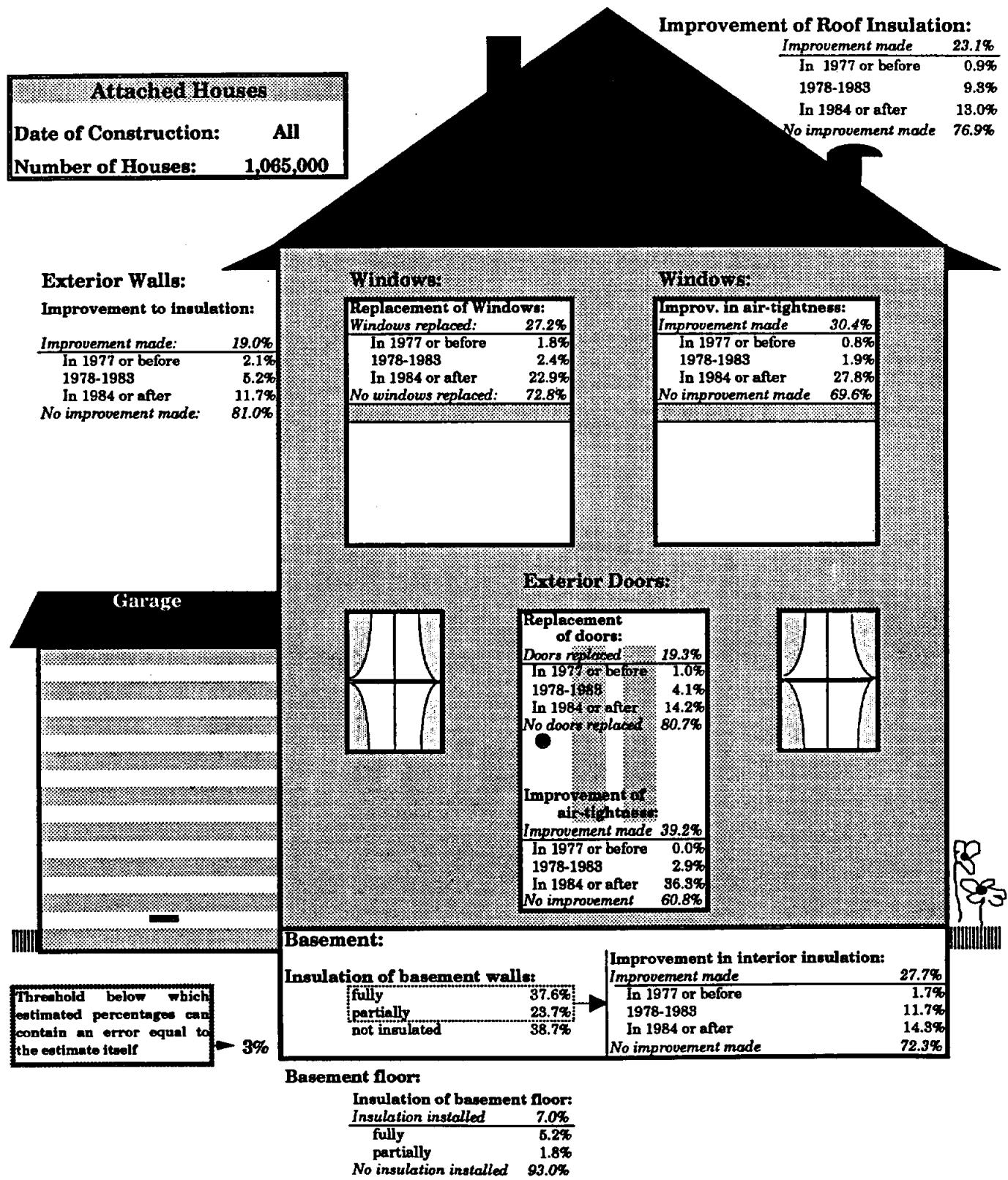
**Diagram 2.2.11  
Improvement of the Thermal Envelope**



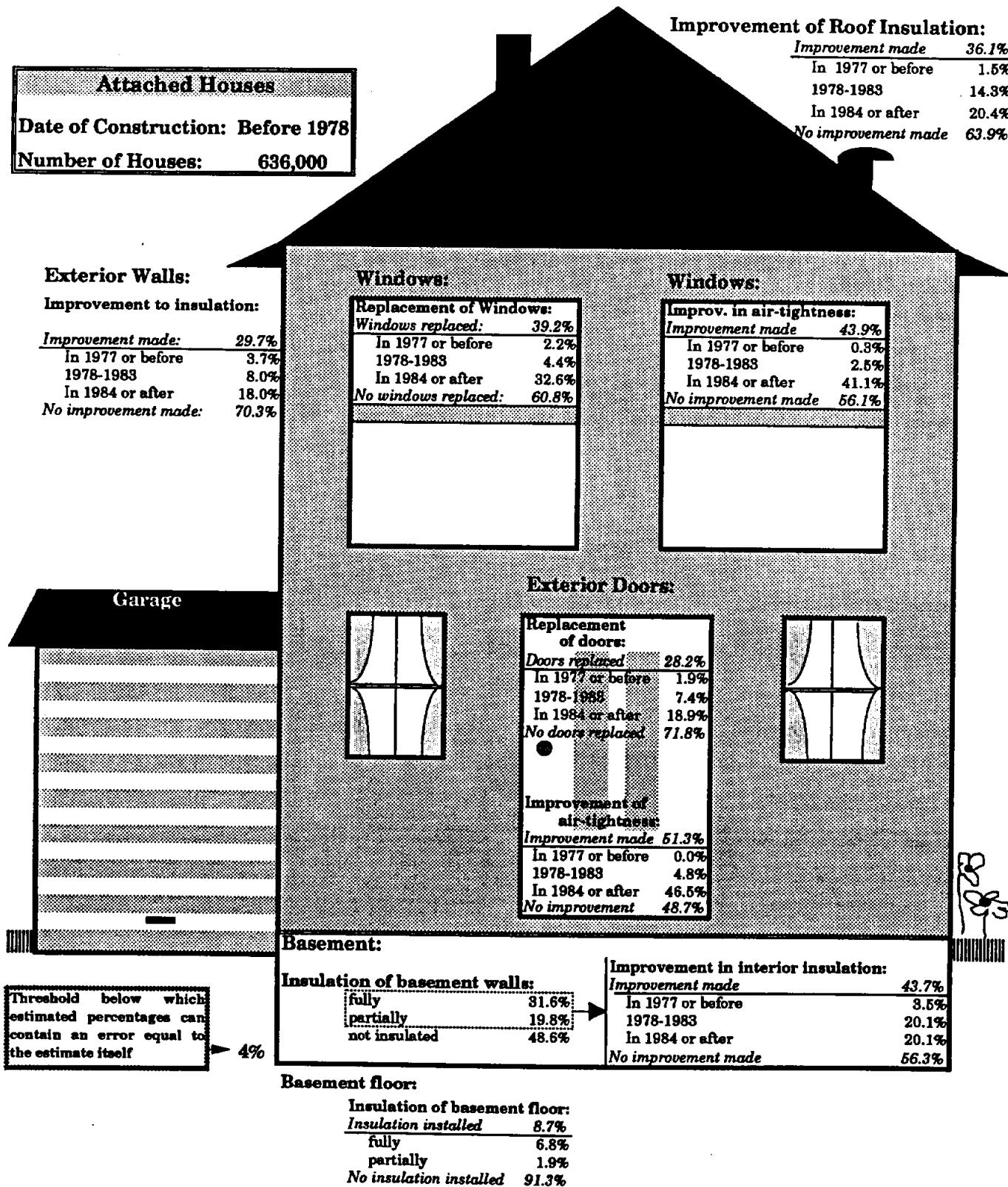
**Diagram 2.2.12  
Improvement of the Thermal Envelope**



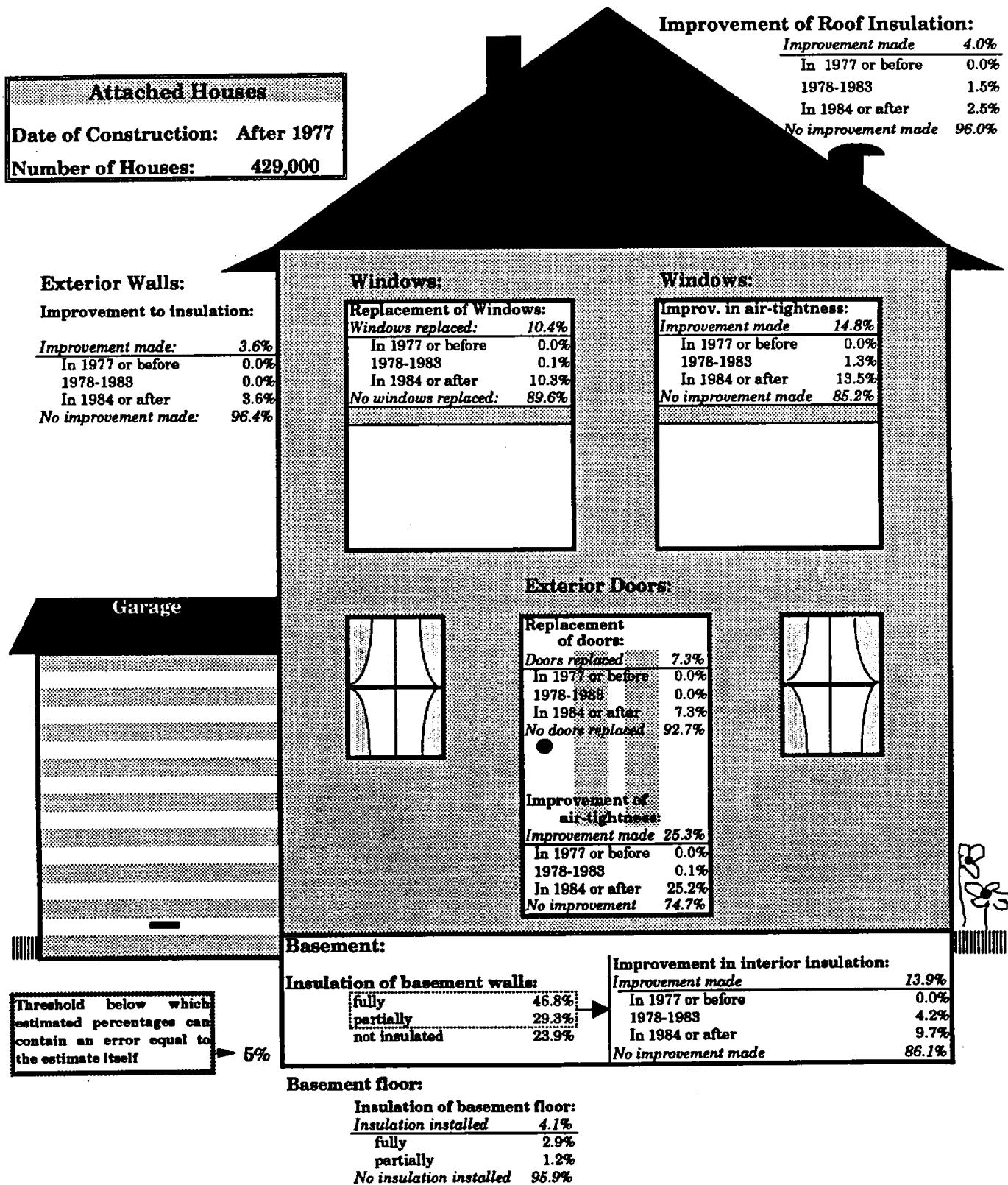
**Diagram 2.2.13  
Improvement of the Thermal Envelope**



**Diagram 2.2.14**  
**Improvement of the Thermal Envelope**

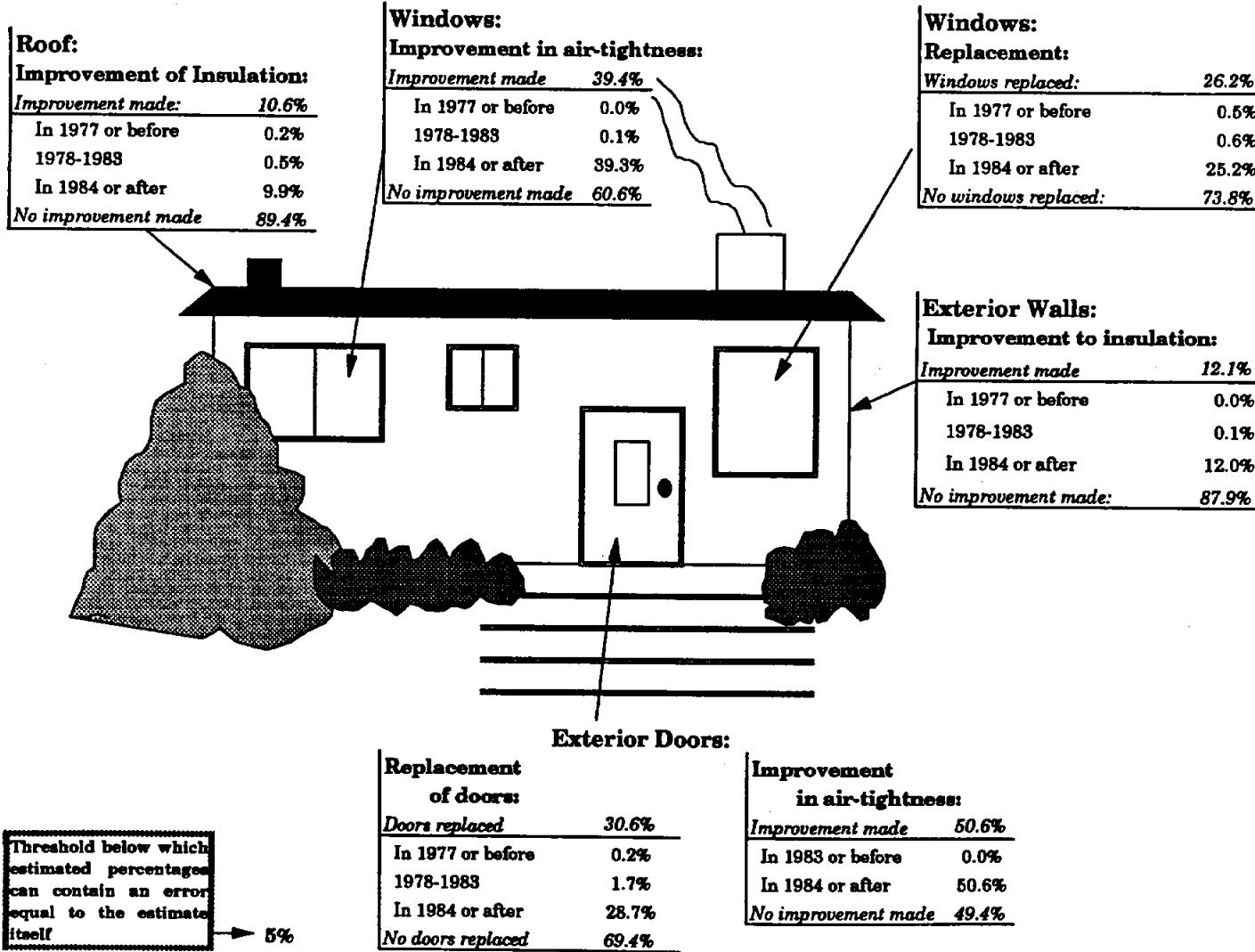


**Diagram 2.2.15  
Improvement of the Thermal Envelope**

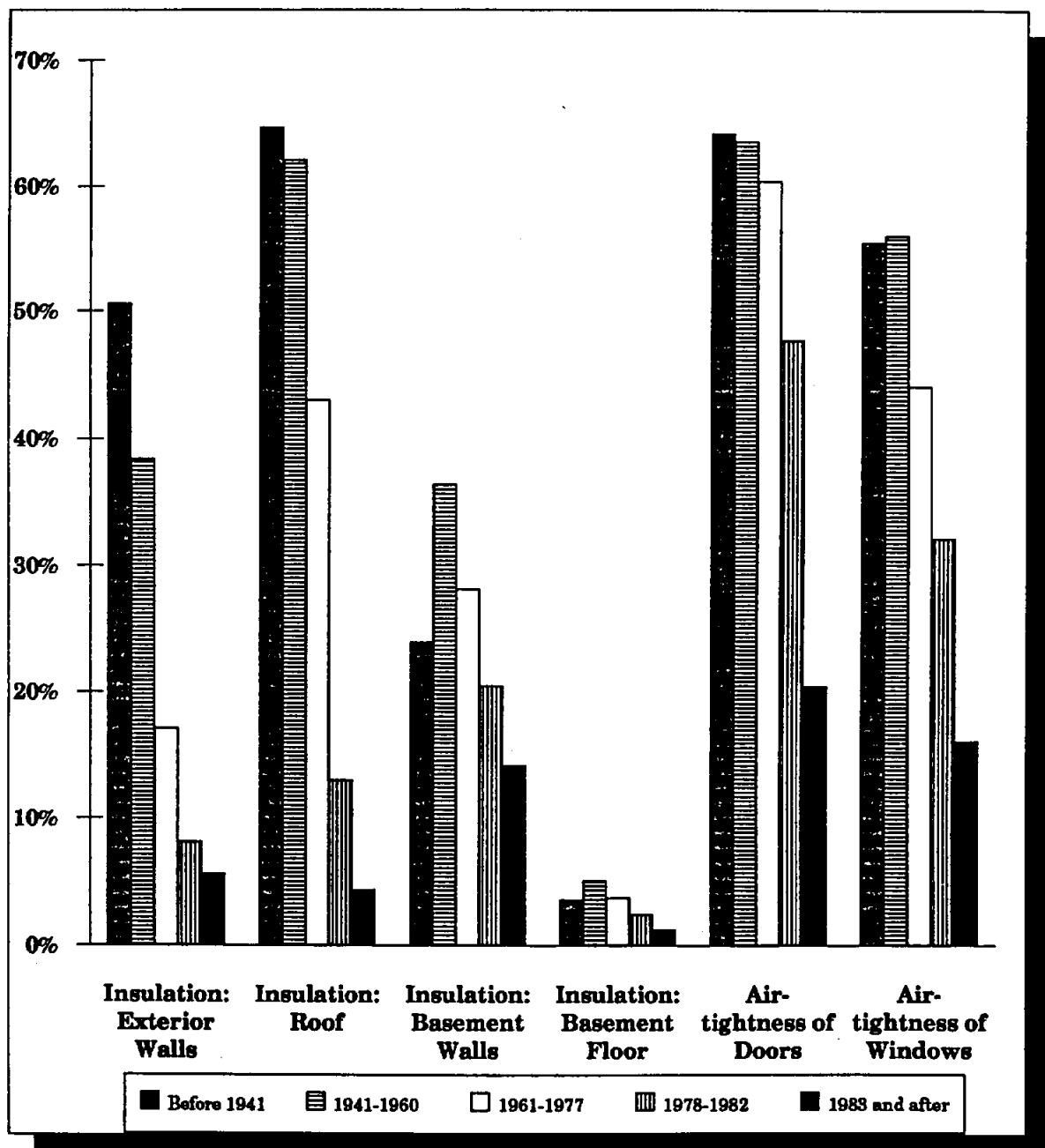


**Diagram 2.2.16**  
**Improvement of the Thermal Envelope**

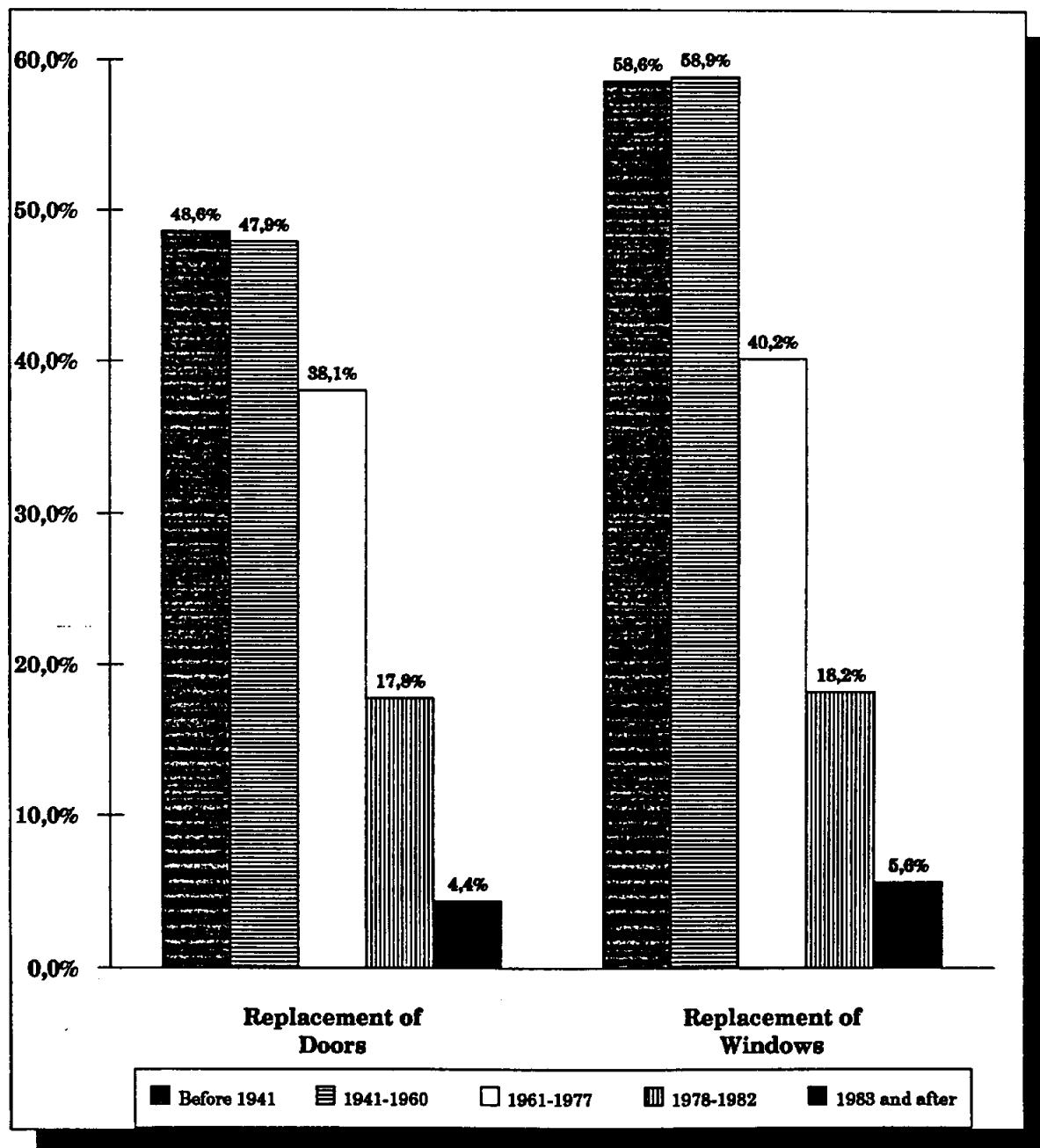
<b>Mobil Homes</b>	
<b>Date of Construction:</b>	All
<b>Number of Houses:</b>	247,000



**Graph 2.2.1**  
**Improvement Made to Thermal Envelope**  
**According to Period of Construction**  
**- All Dwellings -**



**Graph 2.2.2**  
**Replacement of Doors and Windows**  
**According to Period of Construction**  
**- All Houses -**



## **CHAPTER 3 : HEATING**

## CHAPTER 3 : HEATING

### 3.1 THE HEATING SYSTEM

The central hot air furnace is the most common type of principal heating system in Canadian dwellings, used in 45.8% of residences. Where this system exists, the major source of energy, in 70% of the cases, is natural gas. This is followed by oil and electricity, at 16% and 8% respectively.

Electric baseboards are also quite popular; they heat one in four dwellings (26.7%).

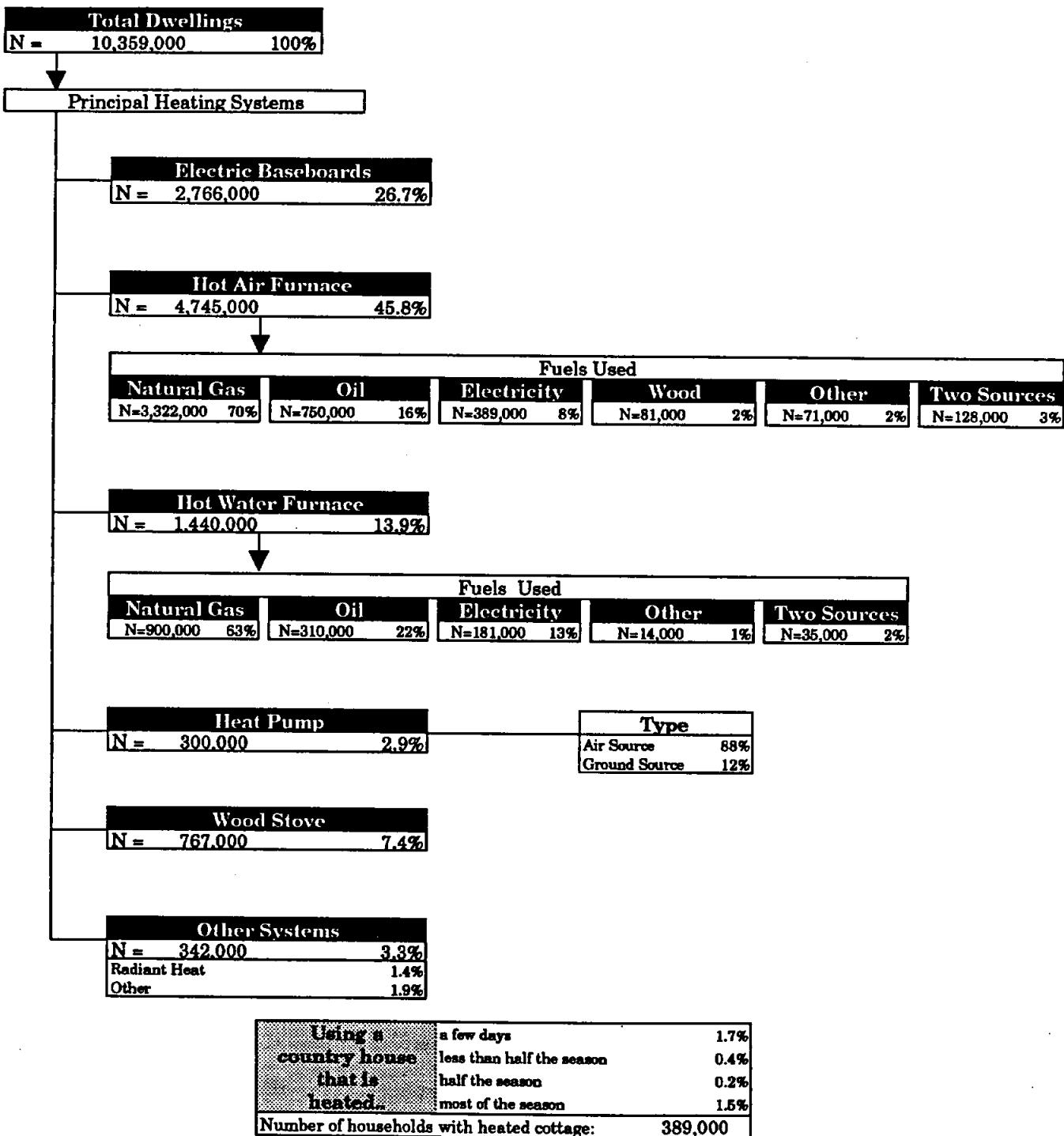
The central hot water furnace owns 13.9% of the market. Here again, natural gas is the fuel most often used (63%), followed by oil (22%) and electricity (13%).

An estimated 7.4% of households use a wood stove as the principal heating source for most of the house. Heat pumps are found in 2.9% of dwellings.

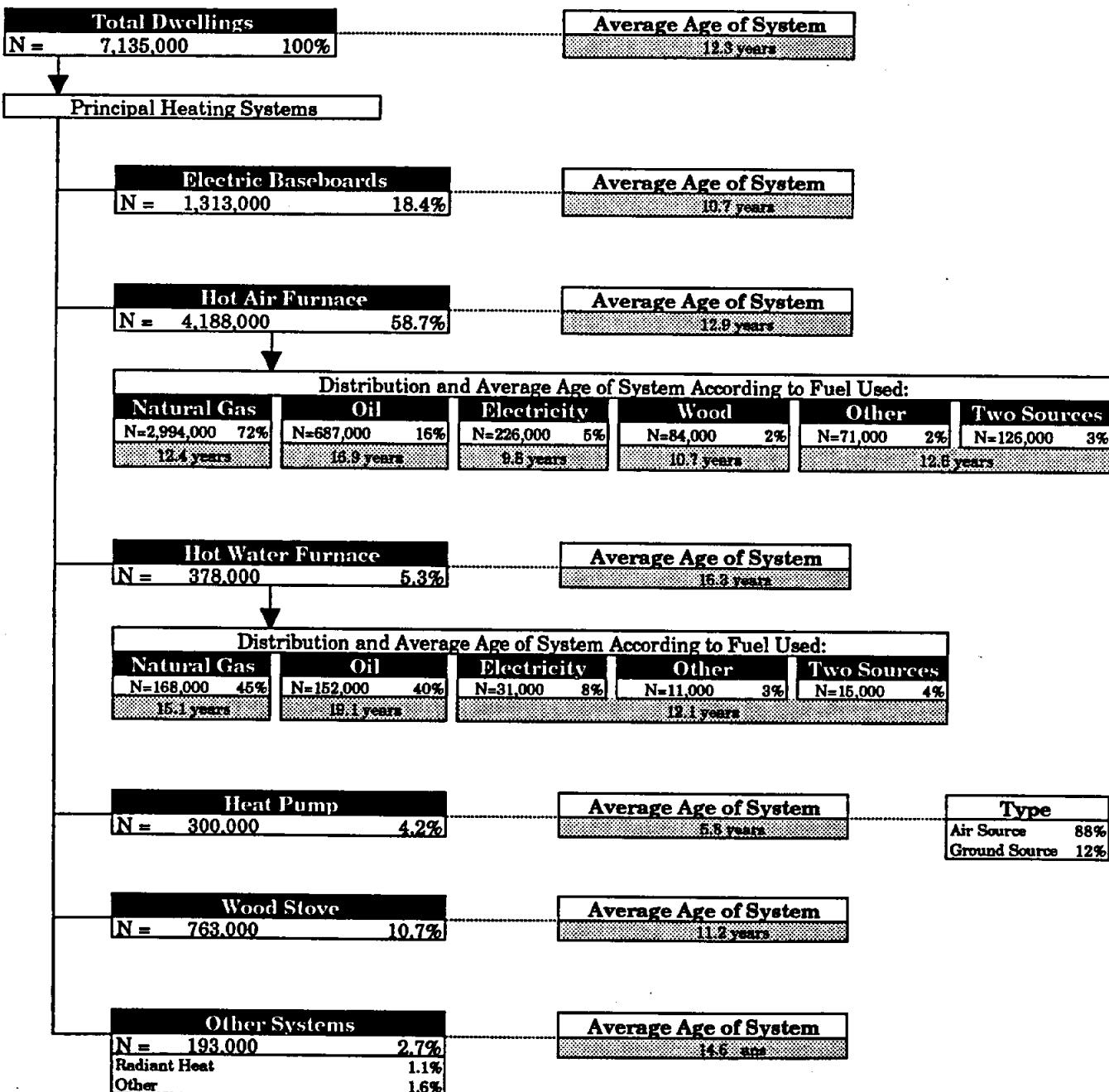
When houses are compared to apartments, there is a considerable discrepancy in heating systems. While central hot air furnaces with vents have clearly dominated the heating market in houses (58.7%), apartments are more often heated by electric baseboards (44.8%) or hot water furnaces with radiators (32.5%).

Finally, a study of principal heating systems according to year of construction (Graphs 3.1.1 and 3.1.2) shows that electric baseboards are growing in popularity compared to central hot air or hot water systems.

**Diagram 3.1.1  
Principal Heating System**

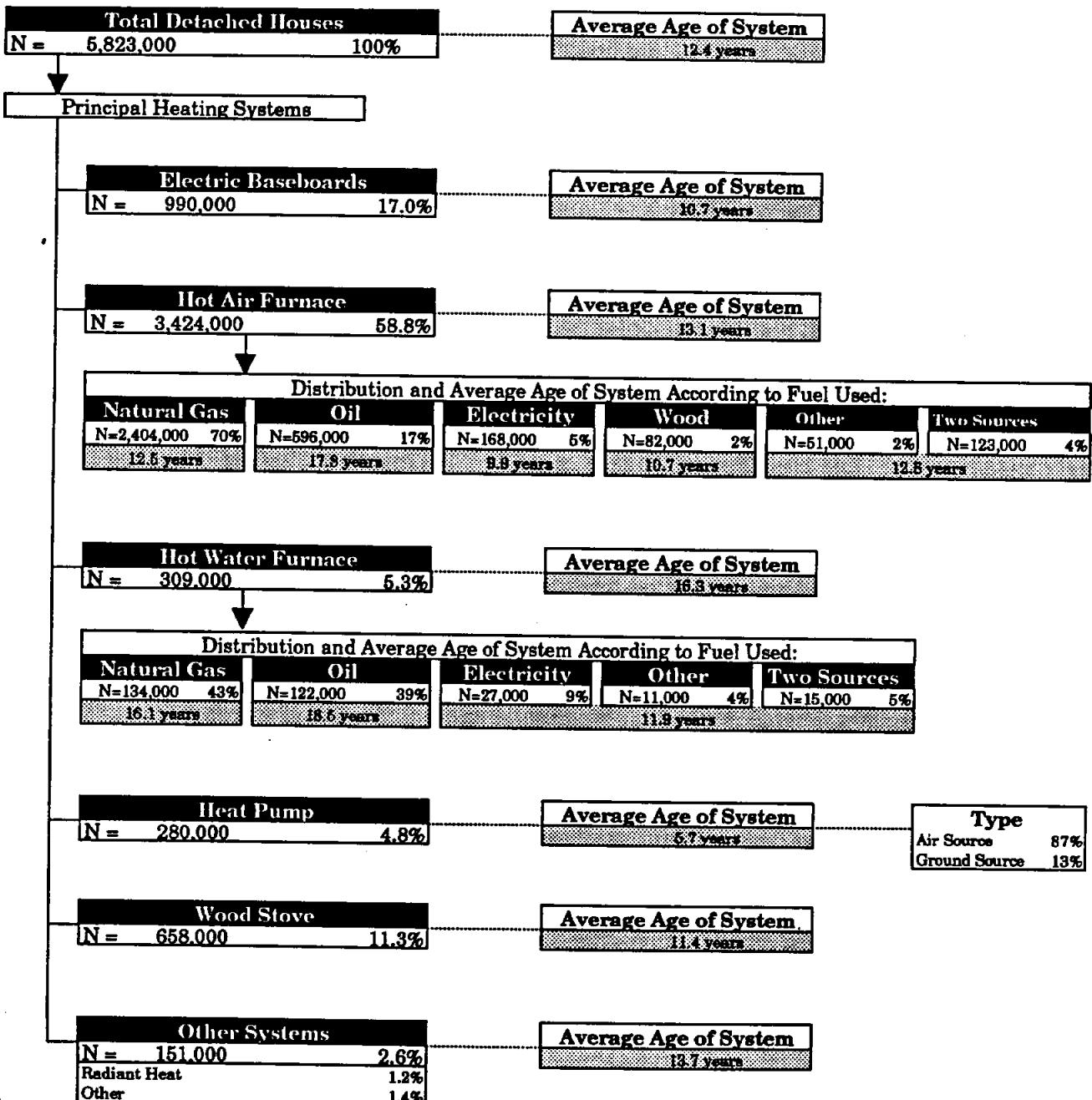


**Diagram 3.1.2  
Principal Heating System**



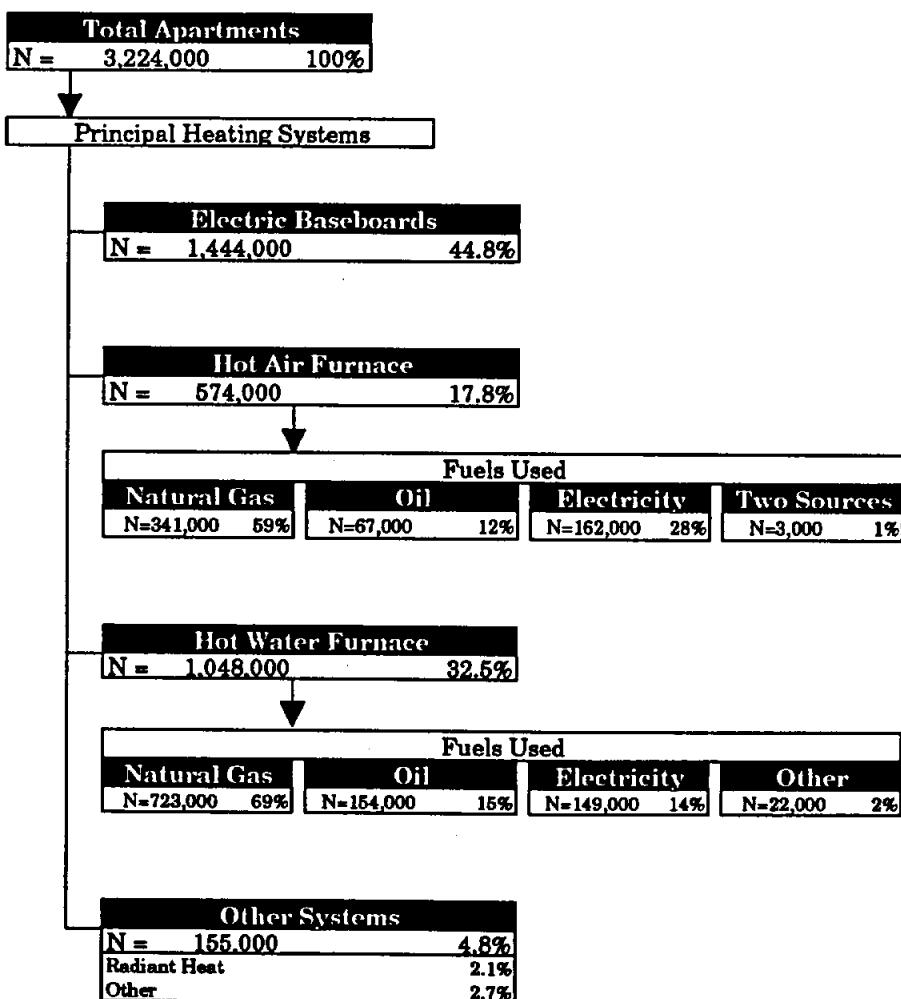
N.B.: Where the sampling is too limited, the average age of systems is shown by grouping categories together.

**Diagram 3.1.3  
Principal Heating System**

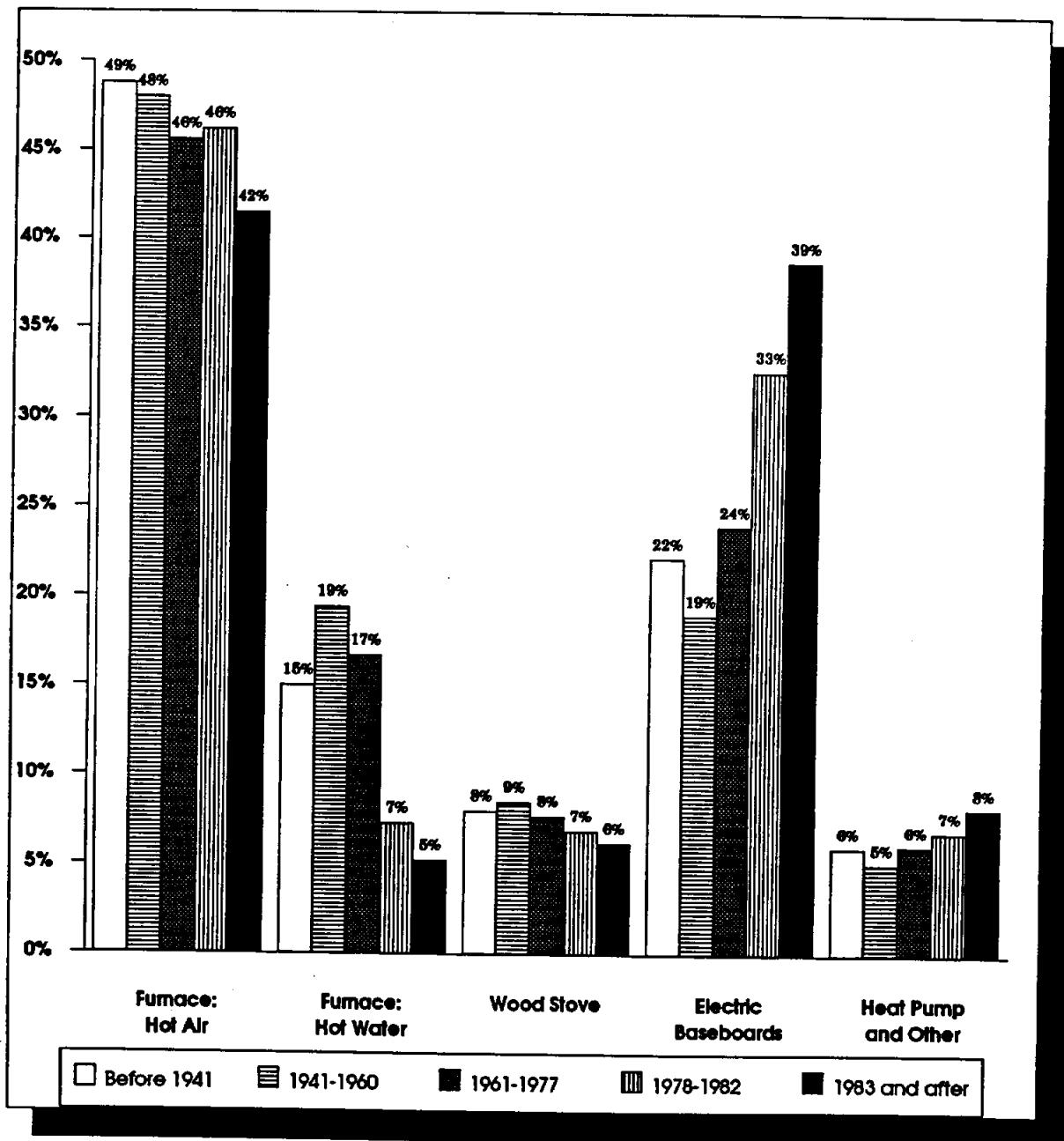


N.B.: Where the sampling is too limited, the average age of systems is shown by grouping categories together.

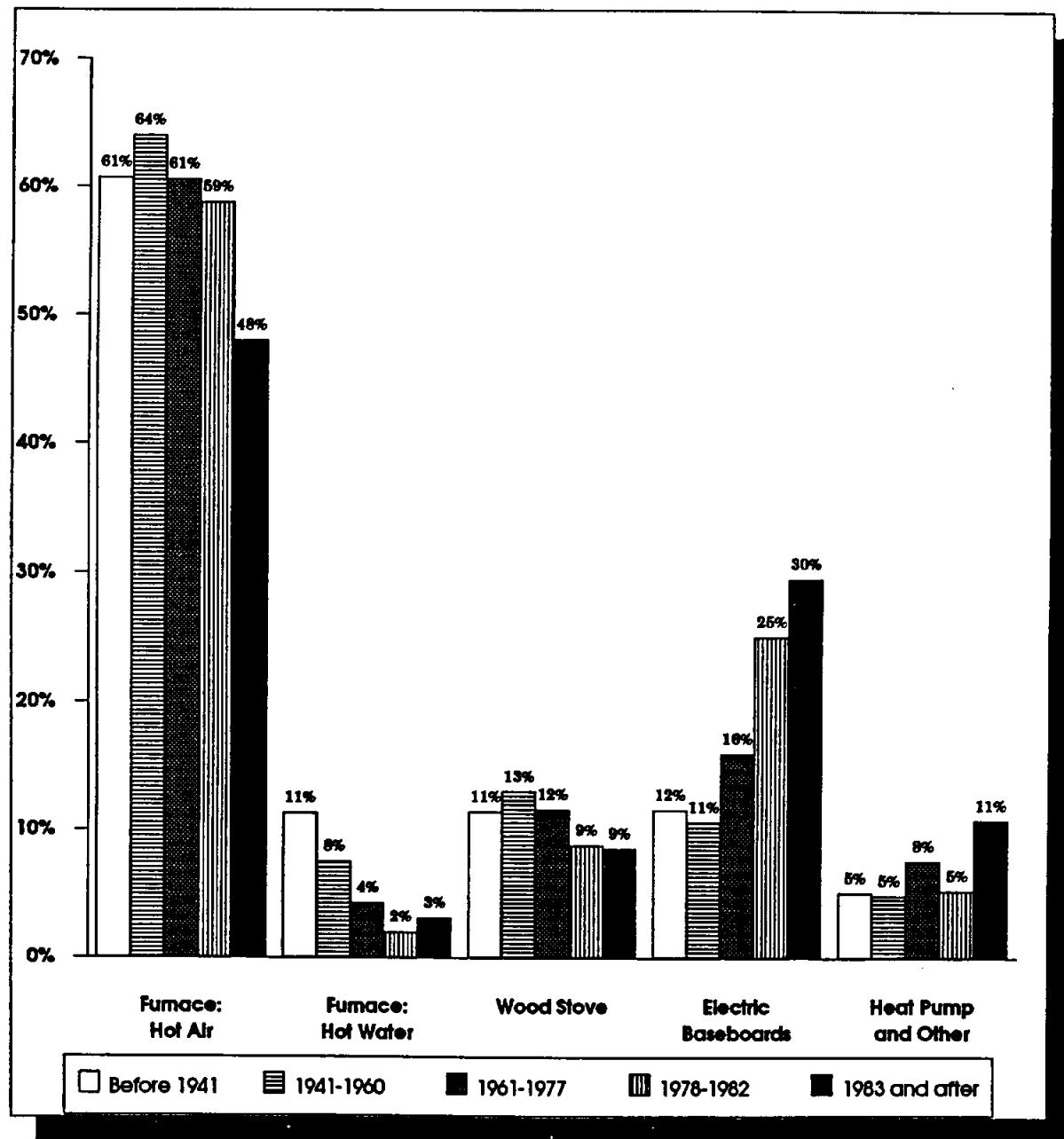
**Diagram 3.1.4  
Principal Heating System**



**Graph 3.1.1**  
**Percentage of Dwellings**  
**with Specific Type of Principal Heating System**  
**By Year of Construction**  
**- all dwellings -**



Graph 3.1.2  
Percentage of Houses  
with Specific Type of Principal Heating System  
By Year of Construction  
- all houses -



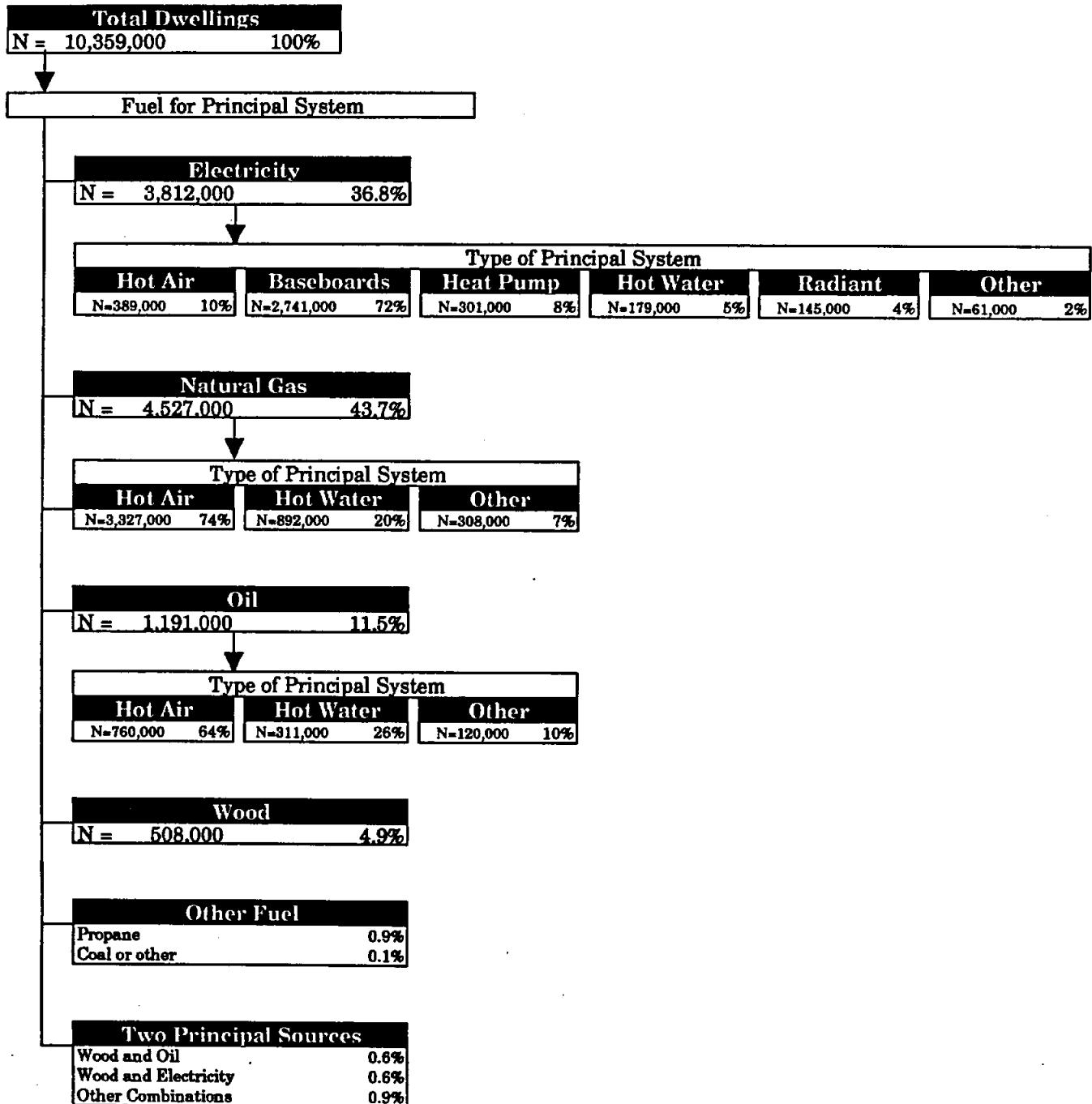
### **3.2 PRINCIPAL ENERGY SOURCE FOR PRINCIPAL HEATING SYSTEM**

As central systems in general run on natural gas, this is the most commonly used fuel for residential heating in Canada, regardless of heating equipment (43.7%). Slightly more than one in three households are heated by electricity (36.8%). The rest of the market is composed of oil (11.5%) and wood (4.9%).

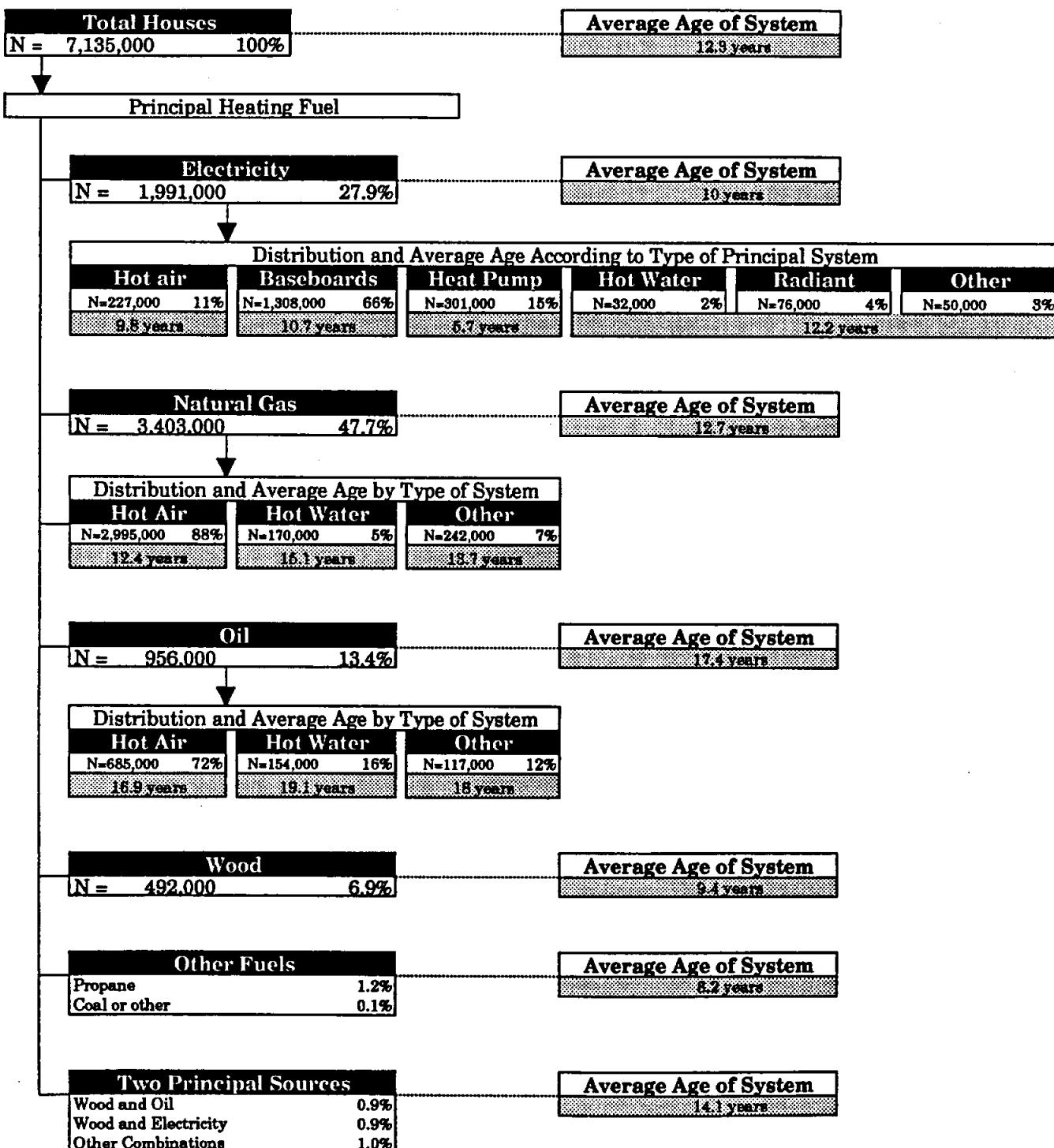
This picture changes slightly when comparing houses and apartments. While nearly one house in two is heated by natural gas (47.7%), the opposite is true for apartments; three out of five of which have electricity as the main energy source (58.8%). And, while virtually no apartments are heated by wood, about 8.7% of houses use wood as their main source, either alone (6.9%) or with other fuels (1.8%).

A study according to year of construction (Graphs 3.2.1 and 3.2.2) shows that electric baseboards are taking over more of the heating market. The use of oil is clearly declining.

**Table 3.2.1  
Principal Energy Source for Heating**

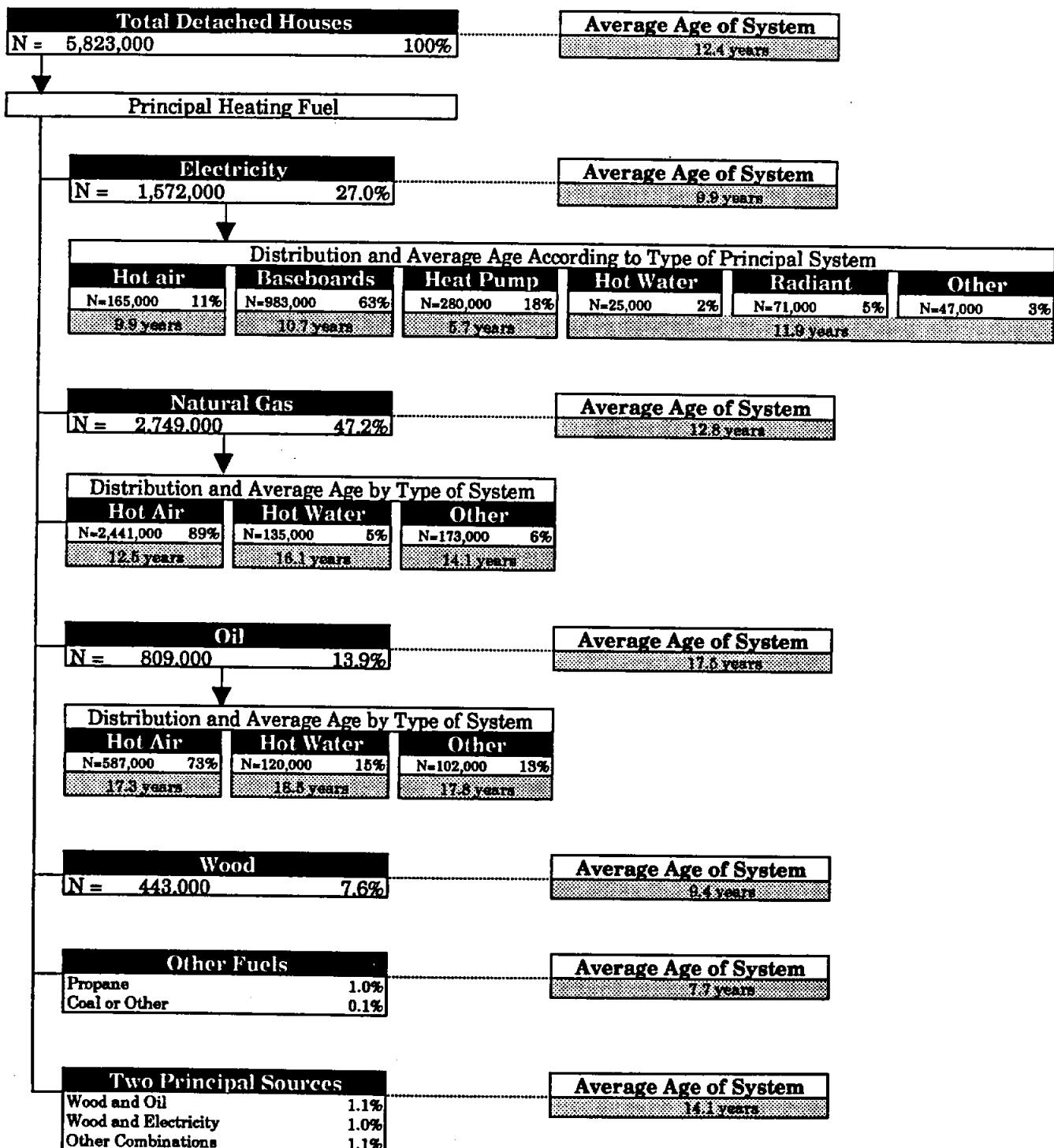


**Table 3.2.2  
Principal Energy Source for Heating**



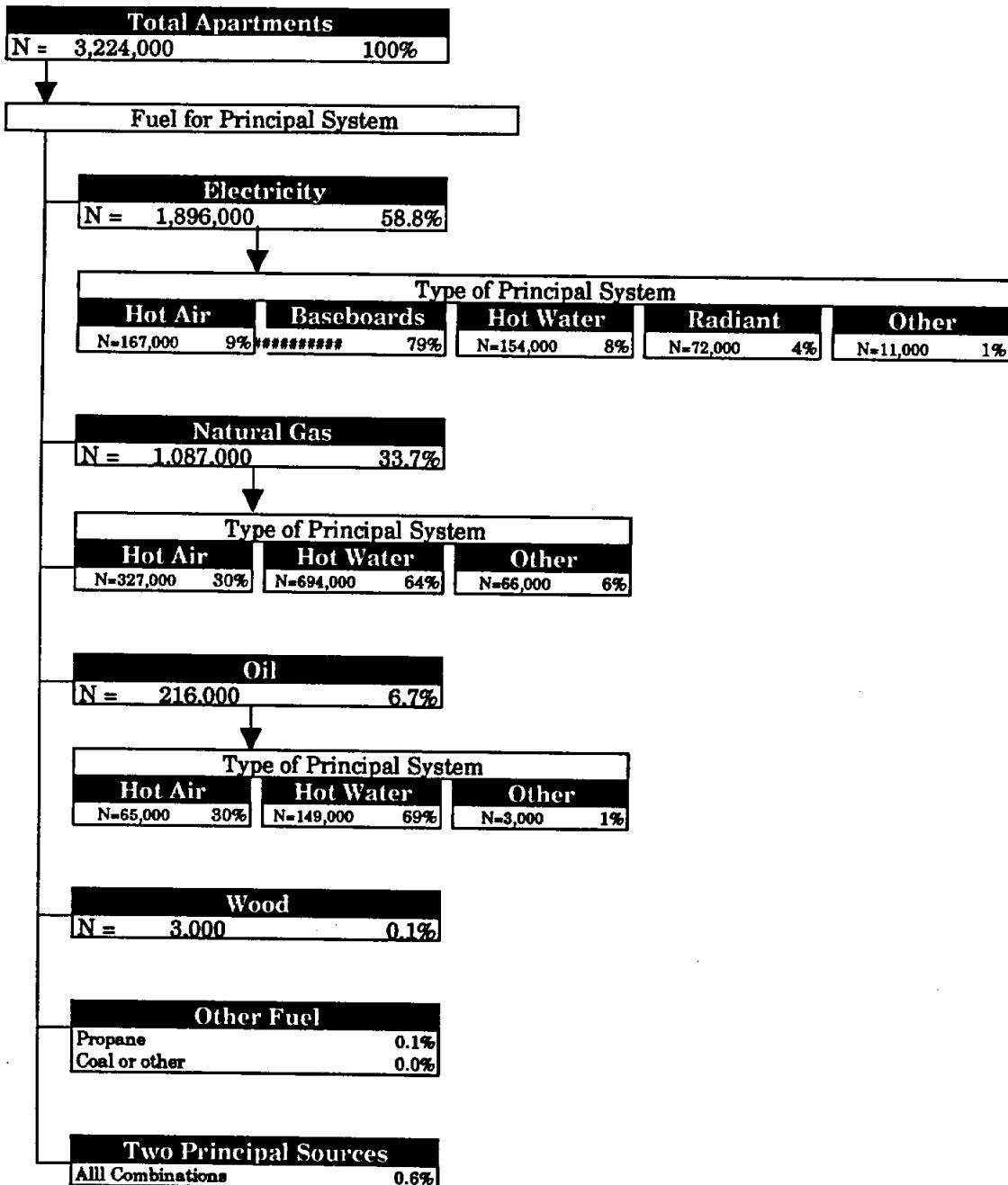
N.B.: Where the sampling is too limited, the average age of systems is shown by grouping categories together.

**Table 3.2.3  
Principal Energy Source for Heating**

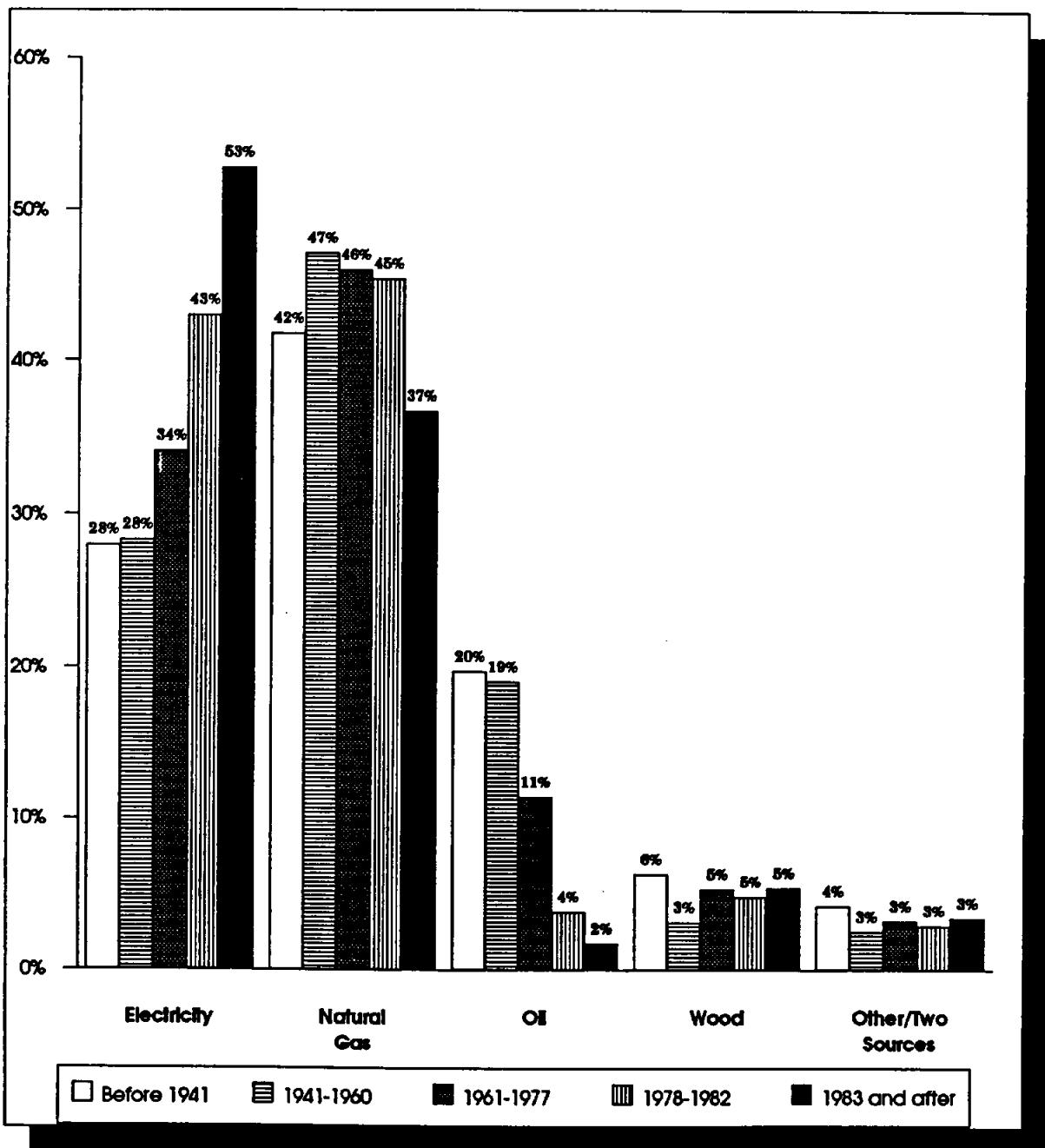


N.B.: Where the sampling is too limited, the average age of systems is shown by grouping categories together.

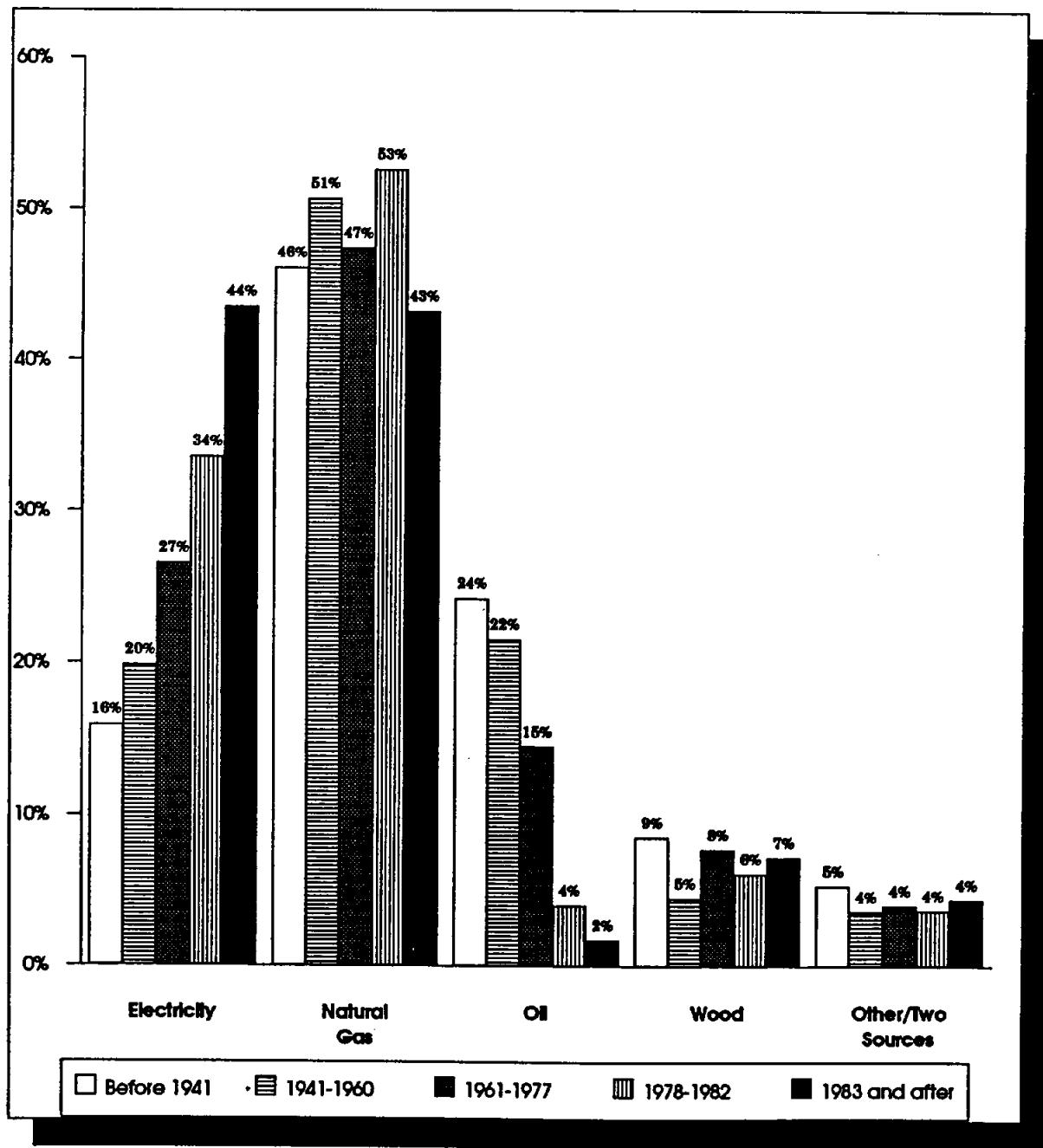
**Table 3.2.4  
Principal Energy Source for Heating**



**Graph 3.2.1**  
**Percentage of Houses Using Specific Type of Fuel for**  
**Principal Heating System By Year of Construction**  
**- all dwellings -**



**Graph 3.2.2**  
**Percentage of Houses Using Specific Type of Fuel for**  
**Principal Heating System By Year of Construction**  
**- all houses -**



### **3.3 USE OF CERTAIN HEATING APPLIANCES IN HOUSES**

Close to one in four houses (23.9%) has a central humidifier. This proportion grows to one in three (33.6%) for central hot air systems.

Programmable thermostats with timers are used in almost one in five houses (18.4%). This percentage is higher in homes with furnaces with hot-air outlets (22.1%). A cross-examination of the data shows that the number of programmable thermostats varies only slightly in relation to the year the house was built. The rate in Ontario, however, was the highest (22%).

About 13.3% of houses have electronic central air filters. Here again, the proportion increases in houses with hot air systems (16.7%).

Central dehumidifiers are still relatively rare, appearing in only 3.3% of residences.

Finally, these devices, even programmable thermostats, seem to have no measurable effect on average room temperature compared to the effect of other factors on the temperature maintained in the dwelling.

**Table 3.3**  
**Use of Certain Special Features Related to Heating System**  
**According to Type of System and Heating Fuel**  
**and Average House Temperature**  
**According to Presence or Absence of These Special Features**

Principal System Fuel	Number of Dwellings ('000)	Central Electronic Air Filter	Central Humidi- fier	Central Dehumidi- fier	Programmable Thermostat with Timer
All Houses	7,135	18.3%	23.9%	3.3%	18.4%
Furnace: Hot Air	4,188	16.7%	35.6%	4.3%	22.1%
Natural Gas	2,994	17.9%	37.5%	4.8%	22.1%
Oil	687	11.5%	24.0%	2.7%	22.9%
Electricity and Other	507	17.0%	24.0%	3.0%	22.8%
Furnace: Hot Water	378	1.5%	2.3%	0.3%	17.8%
Wood Stove**	763	6.4%	14.2%	0.8%	12.3%
Electric Baseboards	1,313	n.a.	n.a.	n.a.	8.6%
Heat Pump and Other	493	36.9%	33.3%	7.0%	19.8%
<b>Fuel (All Principal Systems Combined)</b>					
Natural Gas	3,403	16.3%	36.0%	4.2%	21.7%
Oil	956	9.6%	18.8%	1.9%	21.5%
Wood	492	3.7%	5.2%	1.6%	5.6%
Electricity	1,991	12.4%	11.0%	3.0%	13.6%
Other	293	***	***	***	***
<b>Average House Temperature (°C) According to Presence or Absence of Special Features</b>					
With Special Feature		20.1	19.9	20.3	19.7
Without Special Feature		19.8	19.8	19.8	19.9

\*\* Wood stove as principal system.

\*\*\* Sampling too limited for an estimate.

### **3.4 DISTRIBUTION OF DWELLINGS BY TYPE OF PRINCIPAL HEATING SYSTEM AND FUEL ACCORDING TO TYPE OF DWELLING, YEAR OF CONSTRUCTION AND AGE OF SYSTEM**

Nearly three out of four dwellings with central hot water heating (Table 3.4.1: 73.6%) are apartments. On the other hand, nine out of ten dwellings with central hot air heating systems are houses (87.8%). Among residences heated by electric baseboards (Table 3.4.1), there are slightly more apartments (53%) than houses (47%).

Natural gas is used as a principal heating fuel from dwellings from all periods of housing construction (Table 3.4.2); as well, the percentage of houses heated this way is close to that of all dwellings in general.

Oil is used more in older buildings; for example, while buildings constructed before 1941 represent no more than one-sixth of all dwellings, nearly 30% of all buildings heated by oil are from this period (26.9% by hot-air furnaces). Electricity has been used in buildings from all periods of construction, but more frequently in newer buildings. For example, 42.5% of electric baseboard systems used as the principal heating system are in dwellings built in 1978 or later.

These trends appear when dwellings are analyzed according to age of heating system (Table 3.4.3: data available for houses only). Thus, 42% of oil-burning heating systems are more than 20 years old, while only 16.6% of electrically-operated systems are more than 15 years old.

**Table 3.4.1**  
**Distribution of Dwellings**  
**According to Type of Construction**  
**by Type of Principal System and Heating Fuel**

Principal System Fuel**	Number of Dwellings ('000)	All Houses	All Detached Houses	All Attached Houses	All Apartments
<b>All Dwellings</b>	<b>10,359</b>	<b>68.9%</b>	<b>58.2%</b>	<b>10.7%</b>	<b>31.1%</b>
<b>Furnace: Hot Air</b>	<b>4,745</b>	<b>37.8%</b>	<b>74.9%</b>	<b>12.9%</b>	<b>12.2%</b>
Natural Gas	3,322	90.7%	75.7%	15.0%	9.3%
Oil	750	91.8%	83.5%	8.3%	8.2%
Electricity and Other	673	83.3%	75.1%	8.2%	16.7%
<b>Furnace: Hot Water</b>	<b>1,440</b>	<b>28.4%</b>	<b>21.8%</b>	<b>4.8%</b>	<b>73.6%</b>
<b>Wood Stove</b>	<b>767</b>	<b>99.7%</b>	<b>90.6%</b>	<b>9.1%</b>	<b>0.3%</b>
<b>Electric Baseboards</b>	<b>2,766</b>	<b>47.2%</b>	<b>37.3%</b>	<b>9.9%</b>	<b>52.8%</b>
<b>Heat Pump and Other</b>	<b>642</b>	<b>75.8%</b>	<b>68.1%</b>	<b>7.7%</b>	<b>24.2%</b>
<b>Fuel (All Systems Combined)</b>					
Natural Gas	4,527	77.8%	64.4%	13.4%	22.2%
Oil	1,191	83.3%	74.4%	8.9%	16.7%
Wood	508	99.5%	94.9%	4.6%	0.5%
Electricity	3,812	54.0%	44.8%	9.2%	46.0%
Other	321	***	***	***	***

\*\* Sampling size only allows for division according to fuel for hot air system.

\*\*\* Sampling too limited for an estimate.

**Table 3.4.2**  
**Distribution of Dwellings According to Year of Construction**  
**by type of Principal System and Heating Fuel**

Principal System Fuel**	Number of Dwellings ('000)	Before 1941	1941 - 1960	1961 - 1977	1978 - 1982	1983 and after
<b>All Dwellings</b>	<b>10,359</b>	<b>17.0%</b>	<b>19.0%</b>	<b>32.9%</b>	<b>12.4%</b>	<b>18.8%</b>
<b>Furnace: Hot Air</b>	<b>4,745</b>	<b>18.2%</b>	<b>20.9%</b>	<b>32.2%</b>	<b>12.5%</b>	<b>16.3%</b>
Natural Gas	3,322	16.1%	19.1%	31.7%	14.6%	18.5%
Oil	750	26.9%	31.5%	35.2%	4.3%	2.1%
Electricity and Other	673	18.5%	10.8%	30.4%	12.9%	27.4%
<b>Furnace: Hot Water</b>	<b>1,440</b>	<b>18.9%</b>	<b>27.6%</b>	<b>39.7%</b>	<b>6.7%</b>	<b>7.9%</b>
<b>Wood Stove</b>	<b>767</b>	<b>18.7%</b>	<b>31.8%</b>	<b>33.1%</b>	<b>11.3%</b>	<b>15.5%</b>
<b>Electric Baseboards</b>	<b>2,786</b>	<b>14.4%</b>	<b>13.9%</b>	<b>29.3%</b>	<b>15.9%</b>	<b>27.2%</b>
<b>Heat Pump and Other</b>	<b>642</b>	<b>16.2%</b>	<b>15.6%</b>	<b>30.9%</b>	<b>13.4%</b>	<b>23.9%</b>
<b>Fuel (All Systems Combined)</b>						
Natural Gas	4,527	16.1%	20.5%	34.6%	13.1%	15.7%
Oil	1,191	28.9%	31.5%	32.6%	4.2%	2.8%
Wood	508	21.1%	11.9%	34.5%	12.2%	20.3%
Electricity	3,812	12.9%	14.7%	30.7%	14.9%	26.9%
Other	321	***	***	***	***	***

\*\* Sampling size only allows for division according to fuel for hot air system.

\*\*\* Sampling too limited for an estimate.

**Table 3.4.3**  
**Distribution of Houses According to Age of System**  
**by Type of Principal System and Heating Fuel**

Principal System Fuel**	Number of Houses ('000)	1 Year or less	2 to 5 Years	6 to 10 Years	11 to 15 Years	16 to 20 Years	More than 20 Years
All Houses	7,135	6.6%	20.2%	23.1%	19.7%	13.1%	17.3%
Furnace: Hot Air	4,188	6.4%	18.7%	22.1%	18.6%	14.3%	20.0%
Natural Gas	2,994	6.8%	19.1%	22.8%	19.6%	14.8%	17.0%
Oil	687	5.3%	13.2%	12.5%	12.5%	17.0%	39.5%
Electricity and Other	507	4.8%	22.7%	29.7%	20.8%	9.0%	13.0%
Furnace: Hot Water	878	7.1%	14.0%	13.7%	13.1%	13.4%	38.8%
Wood Stove	763	8.7%	21.8%	27.0%	16.9%	12.2%	13.4%
Electric Baseboards	1,319	4.5%	21.1%	27.4%	28.1%	12.5%	6.4%
Heat Pump and Other	493	9.7%	36.0%	28.8%	12.7%	4.4%	13.4%
<b>Fuel (All Systems Combined)</b>							
Natural Gas	3,403	7.1%	18.5%	20.8%	20.3%	15.4%	17.9%
Oil	956	5.0%	13.5%	10.3%	11.6%	17.7%	42.0%
Wood	492	8.1%	24.2%	37.6%	17.5%	4.3%	8.3%
Electricity	1,991	5.4%	25.4%	28.7%	23.9%	10.0%	6.6%
Other	293	***	***	***	***	***	***

\*\* Sampling size only allows for division according to fuel for hot air system.

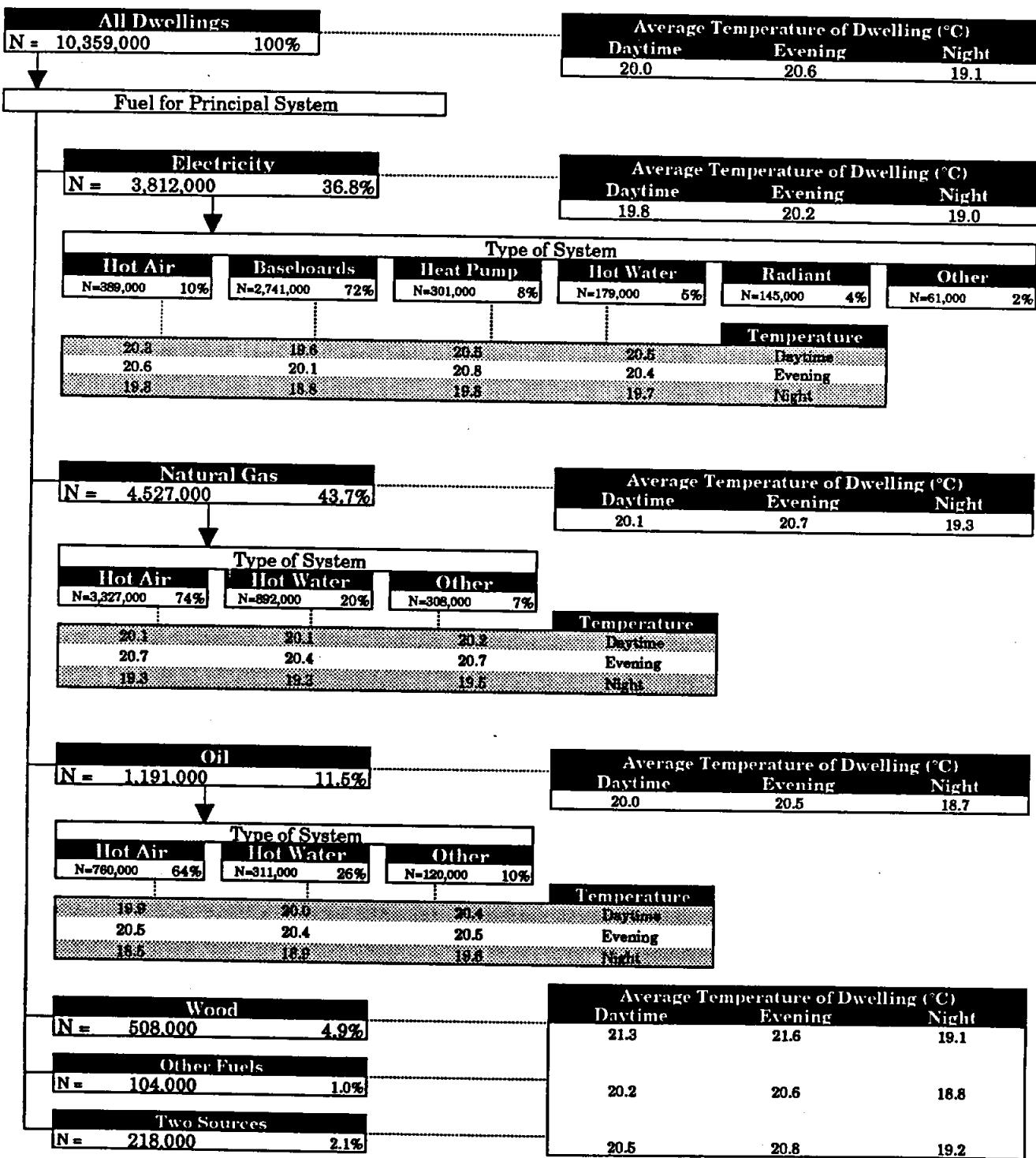
\*\*\* Sampling too limited for an estimate.

### **3.5 TEMPERATURE MAINTAINED IN DWELLINGS**

Participants in the survey were invited to indicate at what temperature they maintained their dwellings at different times of the day during the heating period. This is not strictly technical data, but this information allows us to discover certain trends. We have thus found out that the average daytime temperature was 20 degrees Celsius, climbing to 20.6 degrees in the evening and falling to 19.1 degrees during the night.

There is little difference in these averages in relation to principal fuel and system. Moreover, we can say that dwellings heated by electric baseboards have a lower room temperature than other dwellings.

**Diagram 3.5  
Temperature maintained in Dwellings  
according to Energy Source and Type of Principal System**



### **3.6 USE AND FEATURES OF SUPPLEMENTARY HEATING**

Nearly one-third of all dwellings (32.1%) use a supplementary heating system; only 13.1% of dwellings use this supplementary system for a large percentage of their requirements (more than 25% of the time).

The systems used range from wood stoves (9.7% of dwellings), certain types of electric baseboards (13.5%), portable heaters (12.4%) or other devices (2.8%). Sometimes more than one supplementary system is used.

Supplementary heating is used more often where the principal source is oil heat (Table 3.6.1: 42.2%) or 'other' sources, including wood (75.7%). In the latter case, close to one in two dwellings (47.8%) supplements its heating with electric baseboards. In addition, the combination of wood stove and electric baseboards is present in approximately 725,000 houses, or 10% of all houses (Table 3.6.2).

The year of construction has little effect on whether a supplementary heating system is used or not (Table 3.6.3). Supplementary heating is clearly much more prevalent in houses (Table 3.6.4; 40.1%) than in apartments (13.4%).

**Table 3.6.1  
Use and Features of Supplementary Heating  
According to Fuel of Principal System**

All Dwellings N (100%)	Fuel of Principal System				
	All	Natural Gas	Oil	Electricity	Other
<b>Use Supplementary Heating System</b>					
<b>Heating System</b>	<b>32.1%</b>	<b>24.4%</b>	<b>42.2%</b>	<b>31.5%</b>	<b>75.7%</b>
Less than 25% of the time	19.0%	17.0%	22.0%	14.3%	57.0%
25-75% of the time	7.7%	5.3%	11.1%	8.7%	13.5%
More than 75% of the time	5.4%	2.2%	9.1%	8.5%	5.2%
<b>A) Wood Stove</b>	<b>9.7%</b>	<b>3.3%</b>	<b>18.5%</b>	<b>14.6%</b>	<b>14.4%</b>
<b>Age of Stove</b>					
0-5 years	2.6%	0.7%	3.0%	4.6%	4.8%
6-10 years	3.3%	1.4%	7.1%	4.6%	3.8%
11 years or more	3.8%	1.1%	8.5%	5.4%	5.8%
<b>Rooms Heated</b>					
Entire House	4.5%	1.0%	8.0%	7.1%	9.0%
Basement	3.4%	1.6%	5.5%	5.7%	1.3%
Others	1.8%	0.7%	5.0%	1.8%	4.1%
<b>Frequency of Use</b>					
More than 4 hours a day	5.9%	1.4%	10.2%	9.5%	10.7%
1-4 hours a day	1.5%	0.6%	1.9%	2.4%	1.7%
Less than 1 hour a day	0.9%	0.4%	2.7%	1.1%	1.1%
Less than 1 hour a week	1.4%	0.9%	3.7%	1.6%	0.9%
<b>Number of Cords of Wood Per Year</b>					
Less than 1 cord	3.0%	1.7%	5.2%	4.6%	0.9%
1-3 cords	2.8%	1.2%	5.1%	4.1%	4.4%
4-6 cords	2.5%	0.4%	5.5%	3.9%	5.1%
More than 6 cords	1.3%	0.0%	2.7%	2.0%	4.0%
<b>B) Electric Baseboards</b>	<b>13.5%</b>	<b>8.9%</b>	<b>15.1%</b>	<b>13.4%</b>	<b>47.8%</b>
<b>Rooms Heated</b>					
Entire house	5.8%	0.7%	2.6%	7.8%	33.0%
Basement	3.6%	4.0%	4.1%	3.7%	2.4%
Others	4.1%	4.2%	8.3%	1.9%	12.3%
<b>C) Portable Radiators</b>	<b>12.4%</b>	<b>14.1%</b>	<b>15.9%</b>	<b>8.1%</b>	<b>16.1%</b>
<b>Rooms Heated</b>					
Entire house	3.4%	2.7%	4.1%	3.1%	1.7%
Basement	2.9%	4.2%	2.4%	1.7%	1.5%
Others	6.1%	7.2%	9.3%	3.2%	12.9%
<b>Energy Source</b>					
Electricity	11.9%	13.9%	14.5%	7.4%	15.5%
Other	0.5%	0.2%	1.4%	0.7%	0.6%
<b>D) Other Equipments</b>	<b>2.8%</b>	<b>1.6%</b>	<b>2.1%</b>	<b>2.6%</b>	<b>14.9%</b>
<b>Rooms Heated</b>					
Entire house	1.4%	0.2%	0.9%	1.4%	12.1%
Basement	0.5%	0.5%	0.7%	0.3%	0.4%
Others	0.9%	0.9%	0.5%	0.9%	2.5%
<b>Energy Source</b>					
Electricity	0.9%	0.5%	0.7%	1.1%	3.8%
Other	1.9%	1.1%	1.4%	1.5%	11.1%

**Table 3.6.2**  
**Use and Features of Supplementary Heating**  
**According to Type of Principal System**

All Dwellings N (100%)	Type of Principal System				
	All	Hot Air	Hot Water	Wood Stove	Baseboards
<b>Use Supplementary Heating System</b>					
<b>A) Wood Stove</b>	<b>32.1%</b>	<b>31.3%</b>	<b>23.2%</b>	<b>60.7%</b>	<b>26.8%</b>
Less than 25% of the time	19.0%	20.1%	14.9%	45.5%	10.5%
25-75% of the time	7.7%	7.4%	4.6%	10.2%	8.5%
More than 75% of the time	5.4%	3.8%	3.7%	5.0%	7.8%
<b>B) Electric Baseboards</b>	<b>13.5%</b>	<b>11.4%</b>	<b>9.2%</b>	<b>41.0%</b>	<b>n.s.</b>
Rooms Heated					
Entire House	4.5%	3.6%	1.2%	5.6%	7.5%
Basement	3.4%	2.2%	1.9%	2.3%	5.8%
Others	1.8%	1.9%	0.8%	2.8%	1.5%
<b>C) Portable Radiators</b>	<b>12.4%</b>	<b>15.6%</b>	<b>12.5%</b>	<b>13.1%</b>	<b>5.7%</b>
Rooms Heated					
Entire house	3.4%	2.3%	9.4%	1.3%	2.9%
Basement	2.9%	4.6%	0.9%	1.3%	0.8%
Others	6.1%	8.7%	2.2%	10.5%	2.1%
<b>D) Other Equipments</b>	<b>2.8%</b>	<b>2.4%</b>	<b>1.5%</b>	<b>9.6%</b>	<b>1.9%</b>
Rooms Heated					
Entire house	1.4%	1.0%	1.1%	7.4%	0.9%
Basement	0.5%	0.6%	0.1%	0.4%	0.4%
Others	0.9%	0.8%	0.3%	1.8%	0.5%
Energy Source					
Electricity	11.9%	15.1%	12.2%	12.3%	5.1%
Other	0.5%	0.5%	0.3%	0.8%	0.6%

**Table 3.6.3  
Use and Features of Supplementary Heating  
According to Year of Construction**

All Dwellings N (100%)	Year of Construction of Dwelling				
	Before 1941	1941-1960	1961-1977	1978-1982	1983 and after
Use Supplementary Heating System	35.3%	30.6%	31.3%	30.9%	35.6%
Less than 25% of the time	18.8%	20.8%	18.4%	18.6%	20.6%
25-75% of the time	8.7%	6.5%	7.4%	6.1%	9.3%
More than 75% of the time	7.8%	3.2%	5.5%	6.2%	5.8%
<b>A) Wood Stove</b>	<b>11.3%</b>	<b>8.9%</b>	<b>9.8%</b>	<b>10.9%</b>	<b>9.9%</b>
Age of Stove					
0-5 years	2.5%	0.8%	2.3%	2.3%	5.6%
6-10 years	3.1%	2.8%	3.3%	4.7%	3.8%
11 years or more	5.7%	5.3%	4.2%	3.9%	0.5%
Rooms Heated					
Entire House	5.7%	2.9%	4.5%	5.6%	5.2%
Basement	1.6%	4.6%	4.2%	3.8%	2.8%
Others	3.9%	1.4%	1.0%	1.5%	2.0%
Frequency of Use					
More than 4 hours a day	7.4%	3.8%	6.4%	6.2%	6.5%
1-4 hours a day	0.9%	1.8%	1.7%	1.5%	1.5%
Less than 1 hour a day	1.8%	0.5%	0.8%	1.9%	0.5%
Less than 1 hour a week	1.2%	2.8%	0.9%	1.4%	1.4%
Number of Cords of Wood Per Year					
Less than 1 cord	2.5%	3.9%	3.0%	3.1%	3.1%
1-3 cords	2.4%	2.5%	3.3%	3.1%	2.9%
4-6 cords	4.0%	2.0%	2.0%	2.5%	3.2%
More than 6 cords	2.4%	0.5%	1.5%	2.3%	0.6%
<b>B) Electric Baseboards</b>	<b>15.8%</b>	<b>12.5%</b>	<b>11.8%</b>	<b>19.7%</b>	<b>16.7%</b>
Rooms Heated					
Entire house	6.0%	4.3%	4.8%	7.3%	7.6%
Basement	1.6%	3.1%	3.8%	4.5%	5.7%
Others	8.0%	5.1%	3.2%	2.0%	3.4%
<b>C) Portable Radiators</b>	<b>13.6%</b>	<b>14.3%</b>	<b>12.8%</b>	<b>8.5%</b>	<b>11.2%</b>
Rooms Heated					
Entire house	4.1%	4.4%	3.7%	1.1%	2.2%
Basement	2.4%	3.0%	3.7%	2.4%	2.9%
Others	7.1%	6.9%	5.4%	5.0%	6.2%
Energy Source					
Electricity	12.8%	13.8%	12.3%	8.0%	10.8%
Other	0.8%	0.5%	0.5%	0.5%	0.4%
<b>D) Other Equipments</b>	<b>2.1%</b>	<b>2.1%</b>	<b>3.0%</b>	<b>2.1%</b>	<b>4.8%</b>
Rooms Heated					
Entire house	0.9%	1.2%	1.7%	0.7%	2.3%
Basement	0.4%	0.4%	0.7%	0.7%	0.3%
Others	0.8%	0.5%	0.6%	0.7%	2.1%
Energy Source					
Electricity	0.3%	0.4%	1.1%	0.9%	2.0%
Other	1.8%	1.7%	1.9%	1.2%	2.6%

**Table 3.6.4  
Use and Features of Supplementary Heating  
According to Type of Dwelling**

Type of Dwelling N (100%)	All Dwellings 10,359,000	All Houses 7,135,000	All Detached Houses 5,823,000	All Other Houses 1,312,000	* All Apartments 3,224,000
<b>Use Supplementary Heating System</b>					
<b>Heating System</b>	<b>32.1%</b>	<b>40.1%</b>	<b>42.4%</b>	<b>30.1%</b>	<b>13.4%</b>
Less than 25% of the time	19.0%	23.9%	25.3%	17.9%	7.7%
25-75% of the time	7.7%	9.7%	10.6%	5.7%	3.0%
More than 75% of the time	5.4%	6.6%	6.6%	6.6%	2.7%
<b>A) Wood Stove</b>	<b>9.7%</b>	<b>13.5%</b>	<b>14.9%</b>	<b>7.1%</b>	<b>1.0%</b>
<b>Age of Stove</b>					
0-5 years	2.6%	3.4%	3.7%	1.9%	**
6-10 years	3.3%	4.8%	5.4%	2.2%	**
11 years or more	3.8%	5.3%	5.8%	3.0%	**
<b>Rooms Heated</b>					
Entire House	4.5%	6.0%	6.5%	4.0%	**
Basement	3.4%	4.9%	5.6%	1.6%	**
Others	1.8%	2.6%	2.8%	1.5%	**
<b>Frequency of Use</b>					
More than 4 hours a day	5.9%	8.1%	8.9%	4.4%	**
1-4 hours a day	1.5%	2.0%	2.2%	1.3%	**
Less than 1 hour a day	0.9%	1.3%	1.5%	0.4%	**
Less than 1 hour a week	1.4%	2.1%	2.3%	1.1%	**
<b>Number of Cords of Wood Per Year</b>					
Less than 1 cord	3.0%	4.2%	4.8%	1.3%	**
1-3 cords	2.8%	4.1%	4.6%	1.8%	**
4-6 cords	2.5%	3.5%	3.7%	2.5%	**
More than 6 cords	1.3%	1.8%	1.8%	1.5%	**
<b>B) Electric Baseboards</b>	<b>13.5%</b>	<b>16.9%</b>	<b>18.3%</b>	<b>10.7%</b>	<b>4.9%</b>
<b>Rooms Heated</b>					
Entire house	5.8%	6.0%	6.5%	3.7%	4.9%
Basement	3.6%	5.1%	5.6%	2.9%	0.0%
Others	4.1%	5.8%	6.2%	4.0%	0.0%
<b>C) Portable Radiators</b>	<b>12.4%</b>	<b>14.2%</b>	<b>14.1%</b>	<b>14.4%</b>	<b>8.2%</b>
<b>Rooms Heated</b>					
Entire house	3.4%	1.1%	1.0%	1.8%	8.2%
Basement	2.9%	4.2%	4.8%	3.6%	0.0%
Others	6.1%	8.9%	8.8%	9.0%	0.0%
<b>Energy Source</b>					
Electricity	11.9%	18.5%	18.3%	14.0%	8.1%
Other	0.5%	0.7%	0.8%	0.4%	0.1%
<b>D) Other Equipments</b>	<b>2.8%</b>	<b>3.7%</b>	<b>4.1%</b>	<b>2.0%</b>	<b>0.8%</b>
<b>Rooms Heated</b>					
Entire house	1.4%	1.7%	1.8%	1.2%	0.8%
Basement	0.5%	0.7%	0.8%	0.2%	0.0%
Others	0.9%	1.3%	1.5%	0.6%	0.0%
<b>Energy Source</b>					
Electricity	0.9%	1.3%	1.4%	0.5%	0.2%
Other	1.9%	2.4%	2.7%	1.5%	0.6%

\* 'Other houses' includes detached houses and mobile homes.

\*\* Sampling size too limited for an estimate.

### 3.7 USE OF WOOD AS FUEL IN DWELLINGS

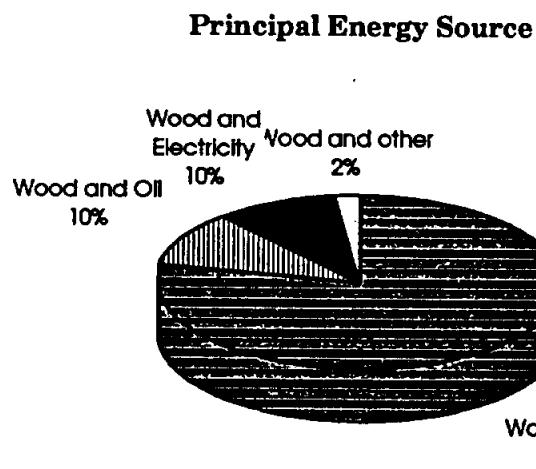
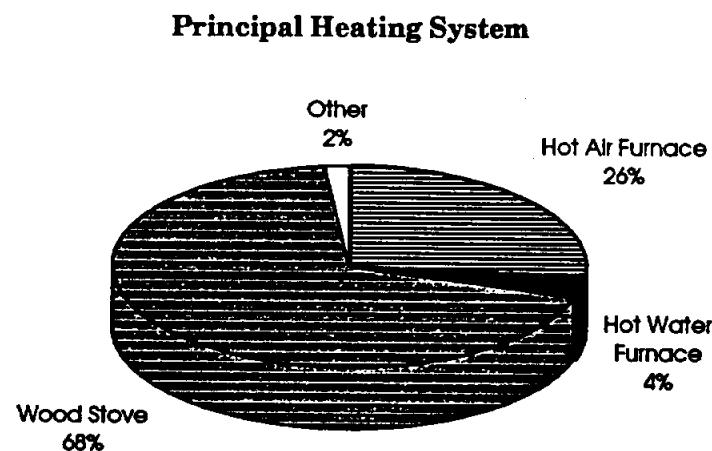
An estimated 619,000 dwellings (6%) use wood as the principal heating fuel. For some of these households, the difference between principal heating and supplementary heating is not evident, as 22% of these households (Graph 3.7.1) are said to be heated by wood and another source, usually oil (10%) or electricity (10%). Thus it can be stated that nearly one-third (32%) of dwellings which used wood as the principal heating fuel have a main heating system other than a wood stove.

When the wood stove is used as a supplementary heating system, the main source of energy for heating is most often electricity (Graph 3.7.2: 52%) but oil is also popular (22%), while the main heating system is a central hot air furnace (37%) or decentralized (electric baseboards). The use of wood as a supplementary heating system is present in dwellings from all periods of construction, but two out of five households use it less than 25% of the time during the heating season.

As well, wood stoves used as a supplementary heating system are, in general, relatively new; only 38% of these stoves (Graph 3.7.3) are 11 years old or more. These stoves are generally used to heat either the entire house (47%) or the basement (35%). Three out of five stoves are used more than four hours a day. According to the estimates derived from the responses, the average wood stove used as supplementary heating burns 2.4 cords of wood annually.

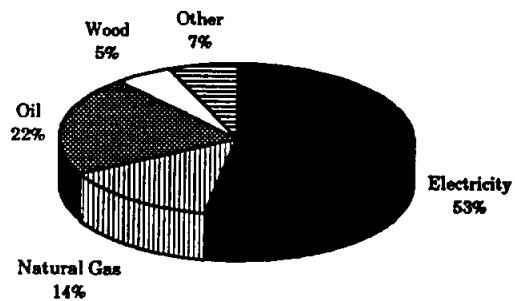
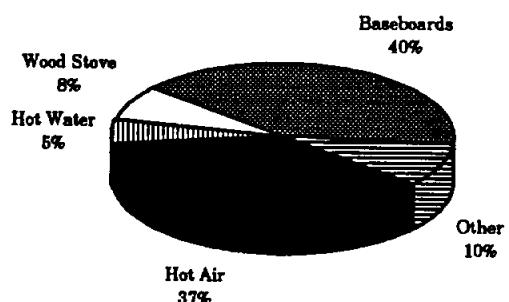
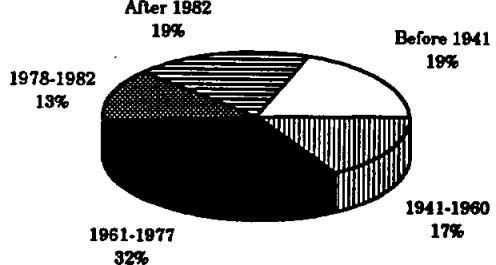
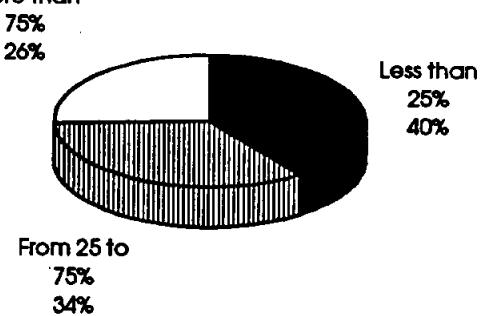
About one third of houses possess a wood-burning fireplace (Table 3.7: 31.2%). Among these households, only 38.4% use them at least once a week during the heating season. This type of system is more prevalent, and more often used, in houses built after 1960. One out of two fireplaces (53.1%) have glass doors while one out of four (25.3%) is a fireplace insert.

**Graph 3.7.1**  
**Distribution of Dwellings Using Wood**  
**as Principal Energy Source for Heating**



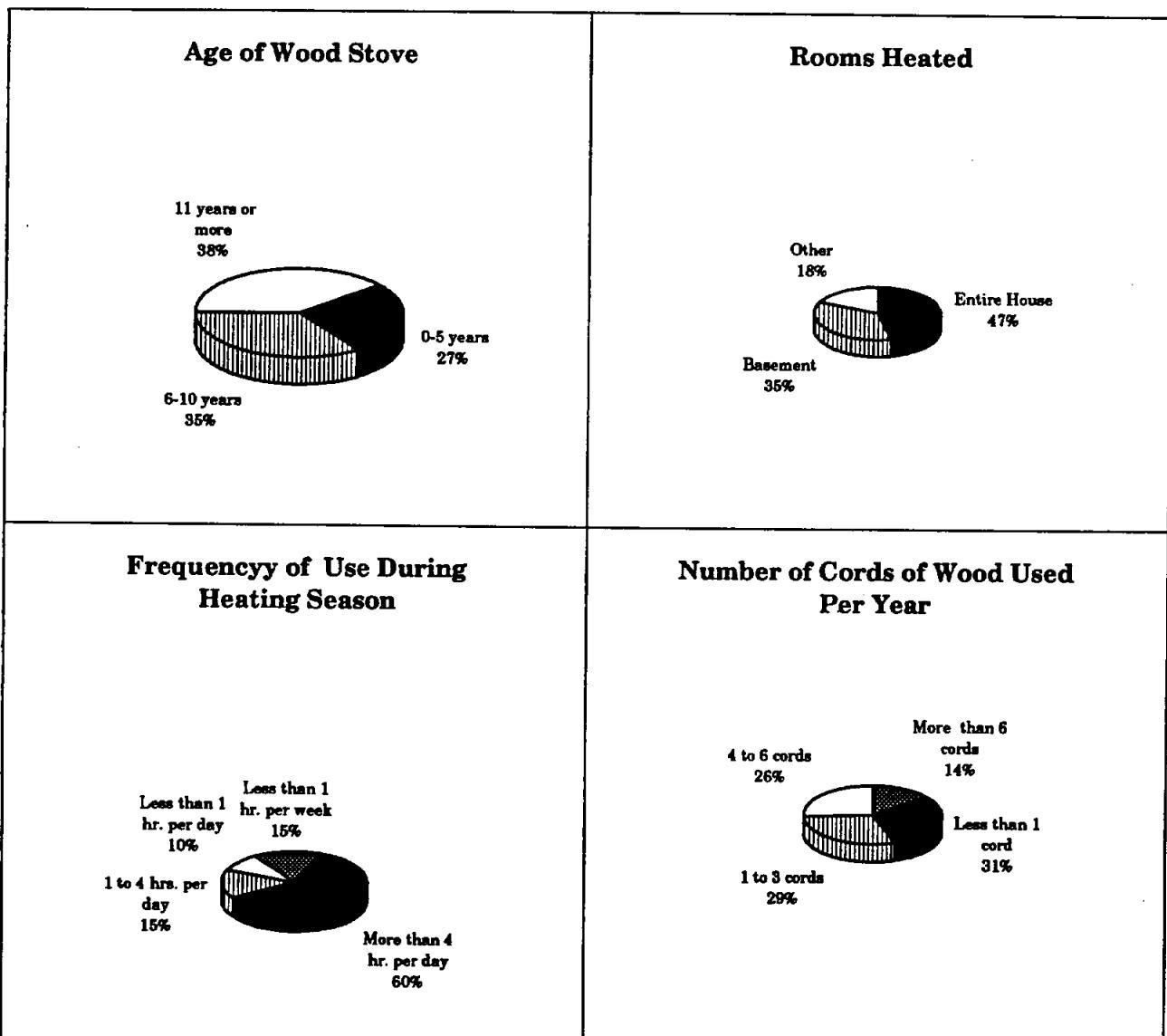
A total of 6% of all households (619,000) use wood as the principal energy source for heating; 22% of those also mention using another principal fuel.

**Graph 3.7.2**  
**Among Households Using Wood Stoves**  
**for Supplementary Heating,**  
**Distribution according to...**

**Principal Energy Source****Principal Heating System****Year of Construction****Percentage of Time Used**

**Among the 970,000 households using wood stoves as supplementary heating, 87% occupy detached houses.**

**Graph 3.7.3**  
**Age of Wood Stove and Habits of Use**  
**as Supplementary Heating**



On average, households using wood stoves as a supplementary heating system use 2.4 cords of wood per year. For those households which have and use a fireplace, the average is 1.3 cords. Appendix 3 provides certain qualifications for these estimates.

**Table 3.7**  
**Presence and Features of Fireplace**  
**According to Year of Construction of House**

All Houses	Year of Construction of House					
	All	Before 1941	1941-1960	1961-1977	1978-1982	After 1982
N (100%) ➤ 7,135,000	1,223,000	1,266,000	2,262,000	991,000	1,394,000	
<b>Fireplace Present</b>						
Gas fireplace	5.1%	2.1%	2.8%	6.1%	3.3%	9.9%
Wood-burning fireplace	31.2%	20.4%	24.1%	35.5%	43.5%	34.4%
<b>Houses with Wood-burning Fireplace</b>						
N (100%) ➤ 2,230,000	249,000	304,000	802,000	431,000	479,000	
<b>Number of Fireplaces</b>						
One	86.8%	81.3%	92.3%	85.1%	87.4%	88.7%
Two or more	13.2%	18.7%	7.7%	14.9%	12.6%	11.3%
<b>Age of Fireplace</b>						
0-5 years	16.2%	5.7%	9.4%	6.8%	2.3%	52.1%
6-10 years	22.2%	12.0%	8.5%	16.8%	17.2%	45.9%
11 years or more	61.6%	82.4%	82.1%	76.3%	80.5%	1.9%
<b>Frequency of use</b>						
Never	25.6%	36.7%	36.6%	26.3%	18.3%	19.5%
Less than once a week	35.9%	34.8%	36.1%	35.3%	46.6%	27.7%
1-3 times a week	25.0%	20.0%	22.8%	19.7%	23.7%	37.7%
More than 3 times a we	13.4%	8.5%	4.4%	18.8%	11.5%	15.1%
<b>Fireplace Features</b>						
Glass doors	53.1%	27.2%	40.6%	46.8%	56.9%	84.5%
Fireplace insert	25.3%	16.8%	19.3%	27.5%	25.3%	31.2%

An estimated 4% of apartments have a wood-burning fireplace.

## **CHAPTER 4 : AIR-CONDITIONING**

## CHAPTER 4 : AIR-CONDITIONING

### 4.1 GENERAL DESCRIPTION OF EQUIPMENT

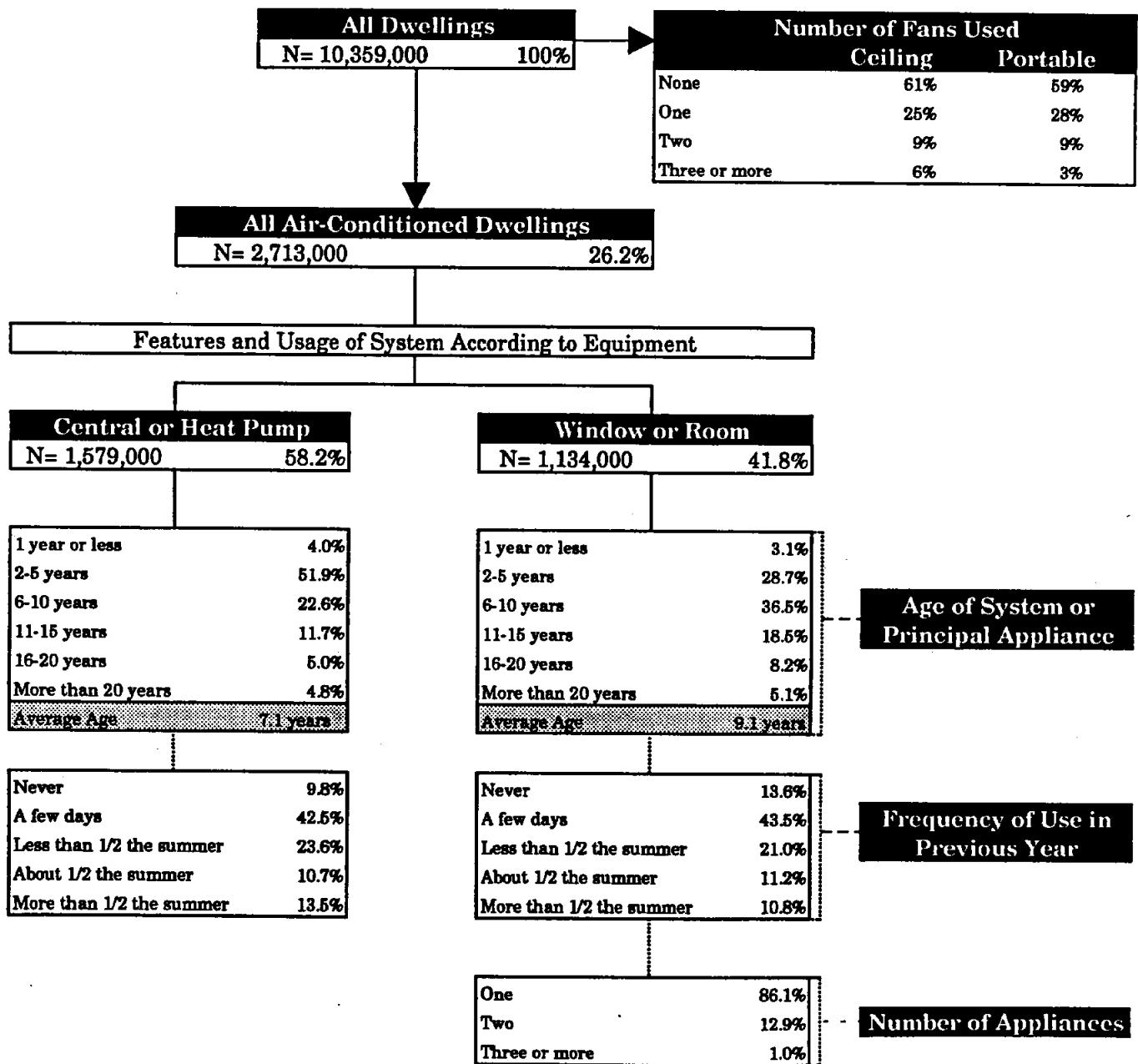
Approximately one-quarter of all households (26.2%) use air conditioning during the summer season. This percentage is slightly higher for houses (28.6%) than for apartments (20.8%).

Generally, this air conditioning system, which includes the heat pump, is frequently centralized (58.2%) rather than a window or room unit (41.8%). But the type of equipment depends on the type of dwelling; two-thirds of air-conditioned houses have a central system while the reverse is true for apartments; two out of three air-conditioned apartments have window or room units.

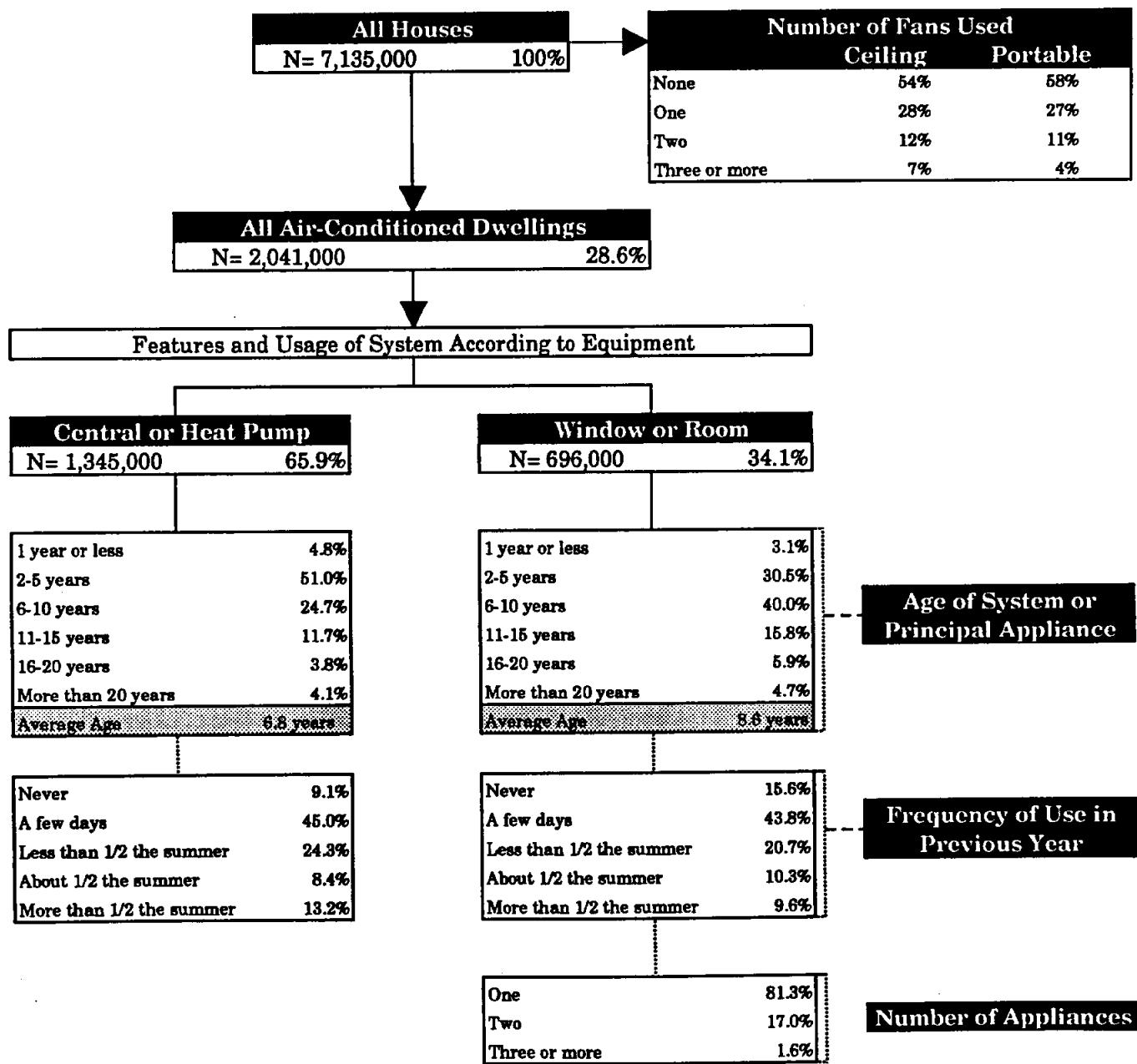
The average central air conditioning system is 6.8 years old and is thus generally newer than the window or room unit which, according to owners, is on average 8.6 years old.

It appears that air conditioning systems were used infrequently during the summer 1992, as 9.1% of central systems and 15.6% of window or room units were not used at all. As well, nearly half of these systems (45% of central systems and 43.8% of window or room units) were only used for a few days. Environment Canada data confirms that the summer of 1992 was not a particularly warm one.

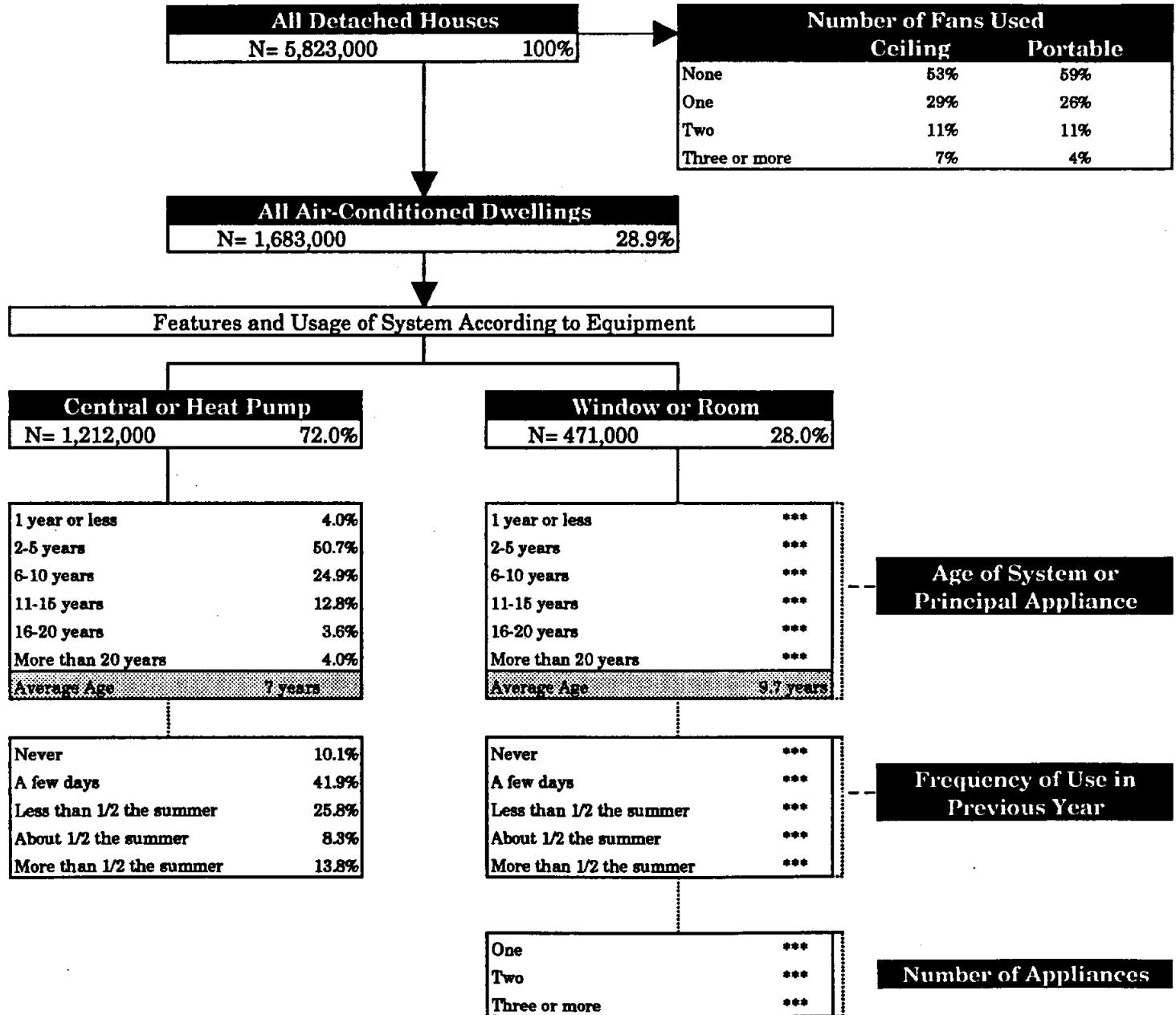
**Diagram 4.1.1  
Air Conditioning**



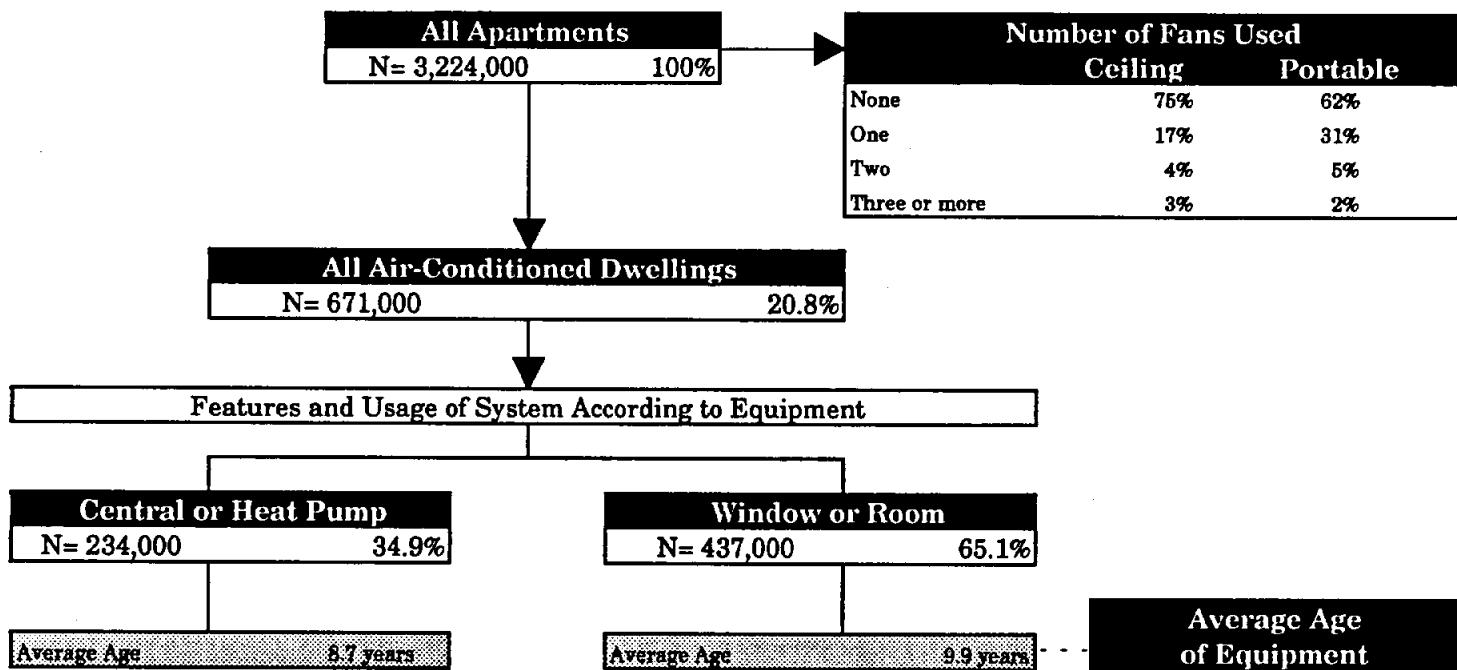
**Diagram 4.1.2  
Air Conditioning**



**Diagram 4.1.3  
Air Conditioning**

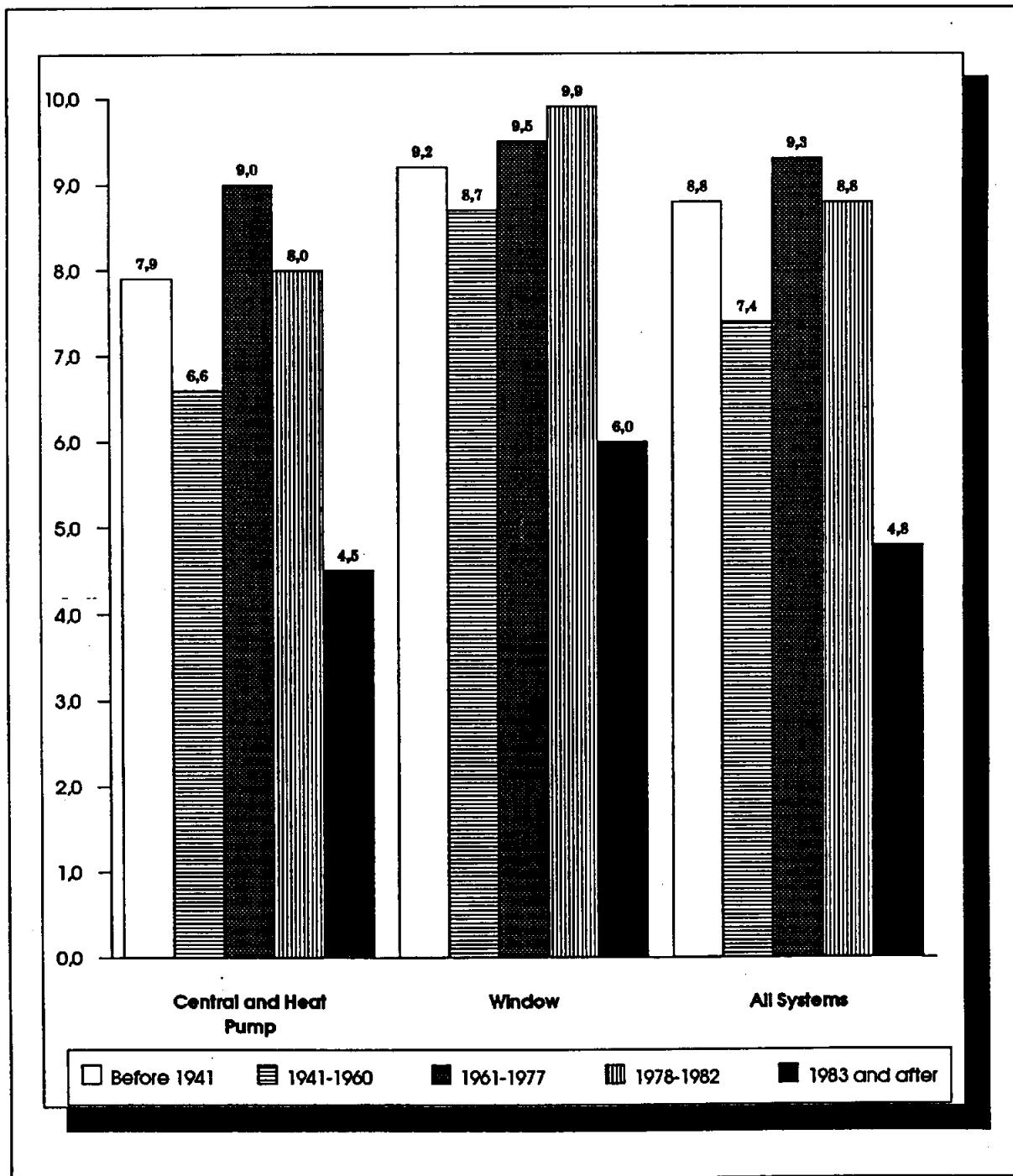


**Diagram 4.1.4  
Air Conditioning**

**Note:**

Because of limited sampling size, the age and number of systems, as well as frequency of use, cannot be shown here.

**Graph 4.1**  
**Average Age of Air Conditioning Systems**  
**According to Period of Construction of Dwellings**  
**- All Dwellings -**



#### **4.2 DISTRIBUTION OF DWELLINGS BY AIR CONDITIONING EQUIPMENT ACCORDING TO HOUSEHOLD PROFILE**

The proportion of air-conditioned dwellings increases noticeably with household income, from 13.2% in households with incomes under \$20,000 to 43.5% in households with incomes at or above \$80,000 per year. There is another less noticeable trend here, related to population density: in urban areas with populations over 100,000, 31% of dwellings are air-conditioned, while that average falls to 10% in rural sectors.

Dwellings that were built more recently are more likely to have air-conditioning systems than older buildings: for example, only 18.7% of dwellings built before 1941 are air-conditioned, while the percentage grows to 31.2% in residences built in 1983 or later. This trend can only be explained by the ever-growing presence of central systems in recently-constructed dwellings.

**Table 4.2**  
**Distribution of Dwellings**  
**According to Air-Conditioning Equipment**  
**as a Function of Certain Dwelling or Household Profiles**

	Number of Dwellings ('000)	Non-air-conditioned Dwellings	All	Air-Conditioned Dwellings	
				Central Systems	Window or Room
<b>All Dwellings</b>	10,359	73.6%	26.2%	15.2%	11.0%
<b>Year of Construction</b>					
Before 1941	1,762	81.3%	18.7%	5.6%	13.1%
1941 - 1960	1,972	76.0%	24.0%	14.5%	9.5%
1961 - 1977	3,413	72.4%	27.6%	14.3%	13.3%
1978 - 1982	1,285	68.2%	31.8%	19.4%	12.4%
1983 and after	1,928	68.8%	31.2%	26.0%	5.2%
<b>Type of Region (population in '000)</b>					
500 and over	4,713	69.1%	30.9%	18.2%	12.7%
100 - 500	1,549	68.8%	31.2%	17.3%	13.9%
30 - 100	983	75.2%	24.8%	15.9%	8.9%
15 - 30	422	84.2%	15.8%	8.5%	7.3%
Less than 15	1,136	79.4%	20.6%	11.2%	9.4%
Rural Region	1,556	85.0%	15.0%	8.6%	6.4%
<b>Household Income</b>					
Less than \$20,000	2,811	86.8%	13.2%	5.4%	7.8%
\$20 - \$30,000	1,960	75.5%	24.5%	10.3%	14.2%
\$30 - \$40,000	1,389	75.6%	24.4%	12.2%	12.2%
\$40 - \$60,000	2,173	68.6%	31.4%	18.2%	13.2%
\$60 - \$80,000	1,059	68.1%	31.9%	20.0%	11.9%
\$80,000 and over	967	56.5%	43.5%	33.5%	10.0%
<b>Occupants</b>					
Own	6,571	67.8%	32.2%	21.8%	10.4%
Rent	3,788	84.1%	15.9%	4.0%	11.9%

## **CHAPTER 5 : APPLIANCES**

## CHAPTER 5 : APPLIANCES

### 5.1 GENERAL DESCRIPTION OF APPLIANCES

The principal refrigerator (Diagram 5.1.1) is on average 9.6 years old; more than half of principal refrigerators (53.9%) are between two and 10 years old. The majority of these appliances are considered average size (between 12.5 and 16.4 cu. ft.: 48.9%) or large (16.5 to 20 cu. ft.: 39.2%). In nearly three-quarters of the households, the refrigerators have top and bottom doors (72.7%), and four out of five (80.9%) are frost-free.

Close to one in five households (18.3%) have a second, much older, refrigerator (average 18.1 years). These refrigerators are generally smaller; one-third are less than 12.5 cu. ft. The majority of second refrigerators (51.8%) are single-door, and most are manually defrosted (55.2%).

Cooking appliances (Diagram 5.1.2) are on average 10.9 years old. The typical appliance is a regular stove (91.3%) that runs on electricity (95.6%). Built-in ovens with separate cook tops tend to be slightly newer (9.6 years). Among those households with an electric oven, 19.3% have a self-cleaning feature that is used at least occasionally. Convection ovens occupy a very small part of the market (4.9%).

Nearly four out of five households (79%) use a microwave oven. Two-thirds of these households use them every day to reheat food. More than half (51.4%) use them at least a few days a week for defrosting; however, two out of five households (39.8%) never use these ovens for actual cooking.

Two out of three households (67%) have range hoods either with (45.3%) or without (21.7%) an exhaust to the outside.

Dishwashers (Diagram 5.1.3) appear in 44.1% of households. The average appliances is 8.3 years old. Only a few (7.5%) are more than 15 years old. Four out of five dishwashers are built in (78.8%) and have a switch that turns off the drying cycle to let

dishes dry without hot air. Half of all households with dishwashers use them four times a week (48.4%); less than one in five households (18.7%) dry their dishes without hot air. Among those whose dishwashers can be turned off during the drying cycle, 61% use this option to dry their dishes, either by leaving the door closed (44%) or open (17%).

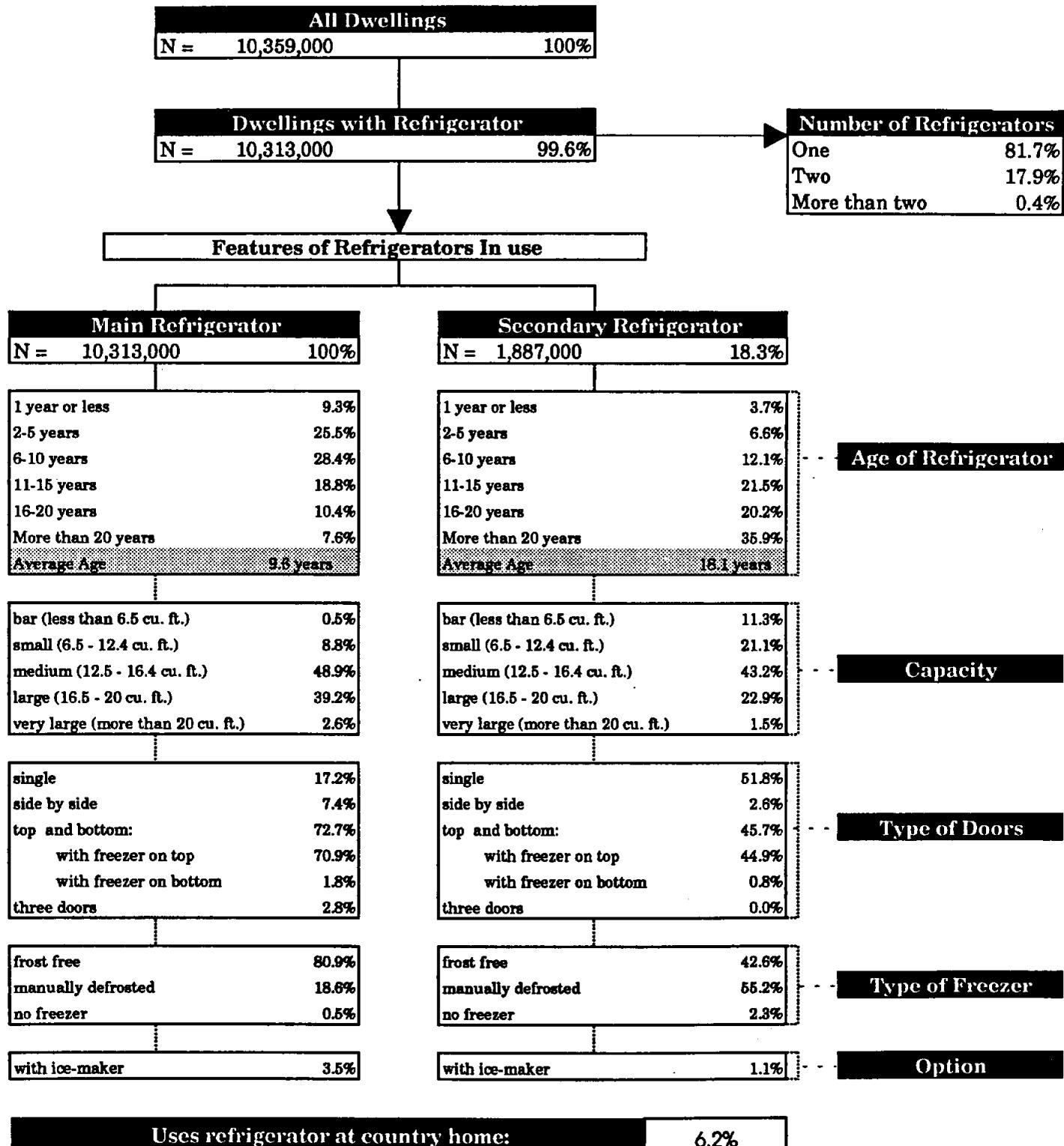
Three out of five households (60.1%) own a freezer (Diagram 5.1.4); some households (8.5%) have two or more. The principal freezer is on average 11.9 years old; one-third (32.6%) are more than 15 years old. About two out of three freezers are considered either small (31.7%) or medium size (37.8%). Most (86.5%) are chest freezers. Where there is a second freezer, it is generally the same type as the main freezer, although it tends to be older; 26.5% of them are more than 20 years old.

Four out of five households (79%) own washing machines (Diagram 5.2.5). They are mostly standard automatic machines (96.6%), or automatic washer/dryer combinations (1.4%). The average automatic washer is 8.8 years old; only 14.7% of machines are more than 15 years old. Generally (81.4% of the time), the machines are standard capacity rather than large (12.9%) or small (5.7%). Nine out of ten washing machine owners can adjust water levels to their needs, and do so; only 5.5% of machines do not have this option. Nearly all machines (98.5%) have a cold-water wash or rinse option, but only one-third (32.3%) of owners do most of their washing in cold water, although 76% generally rinse their clothes in cold water. The number of laundry loads done per week rarely varies between winter and summer; generally two out of five households do three loads or less per week, another two do four to seven loads, and one does eight or more loads.

Nearly three-quarters of all households (73.9%) own a dryer (Diagram 5.1.6). Most are standard size (86.1%) and use electricity (96.4%). The average age is 9.7 years, although 18% are more than 15 years old. Nearly all dryers (96.7%) have a manual timer and 70% of owners use this option. The automatic shut-off option is available on 62.1% of machines, but barely more than half of all residents who have this option use it (54.5%). The cool-down or "permapress" option, although present on 85.3% of dryers, is used by only 28.7% of users. As

might be expected, dryers are used less frequently in summer than in winter: while only 13.4% of dryer owners do only one load a week in the winter, this percentage rises to 36.3% in the summer.

**Diagram 5.1.1  
Refrigerator**



**Diagram 5.1.2  
Cooking Applications**

<b>All Dwellings</b>	
N = 10,359,000	100%

**Households Using Stove/Oven**

N=	10,359,000	100.0%
----	------------	--------

**Ventilation**

With range hood	67.0%
with exhaust	45.3%
without exhaust	21.7%
Without range hood	33.0%

**Age of Stove/Oven**

1 year or less	7.1%
2- 5 years	21.8%
6-10 years	26.6%
11-15 years	20.2%
16-20 years	11.8%
More than 20 years	12.5%
Average Age	10.9

**Type of Appliance****Average Age**

Regular stove	91.3%	11.0 years
Built-in oven with separate cook top	8.0%	9.6 years
electric cook top	7.6%	9.6 years
gas cook top	0.4%	
Other	0.7%	

**Fuels Used****Average Age**

Electricity	95.6%	10.8 years
Electricity and natural gas	0.8%	
Natural gas only	2.5%	13.3 years
Oil	0.1%	
Wood	0.2%	
Propane	0.8%	
Other	0.0%	

**Use of Self-Cleaning Feature**

No self-cleaning feature	77.5%
Feature never used	3.2%
Feature used	19.3%
once a year or less	3.1%
every 4 - 6 months	5.9%
every 2 - 3 months	5.9%
at least once a month	4.5%

**Use of Convention Oven**

Yes	4.9%
No	95.1%

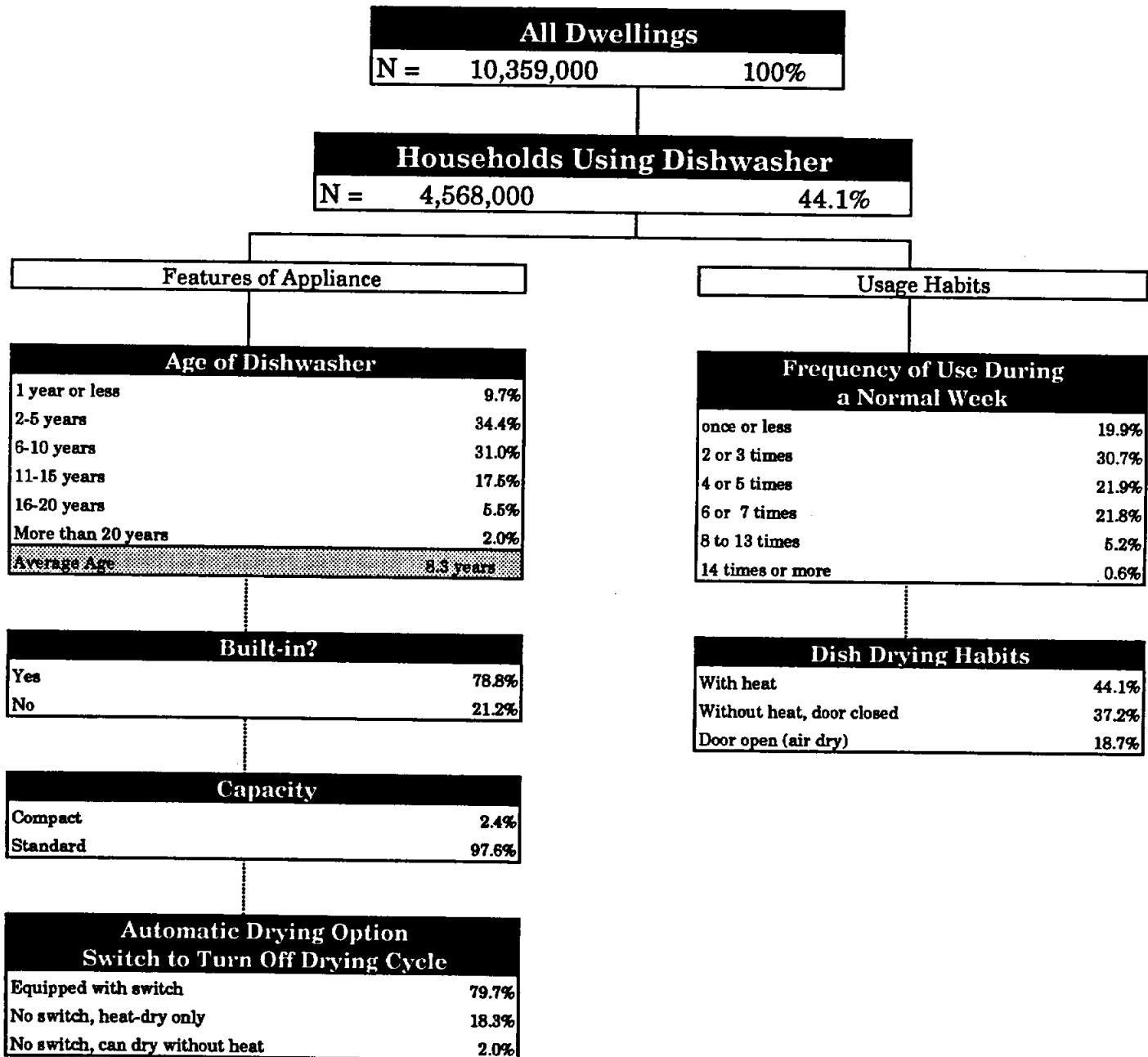
**Households Using a Microwave Oven**

N=	8,184,000	79.0%
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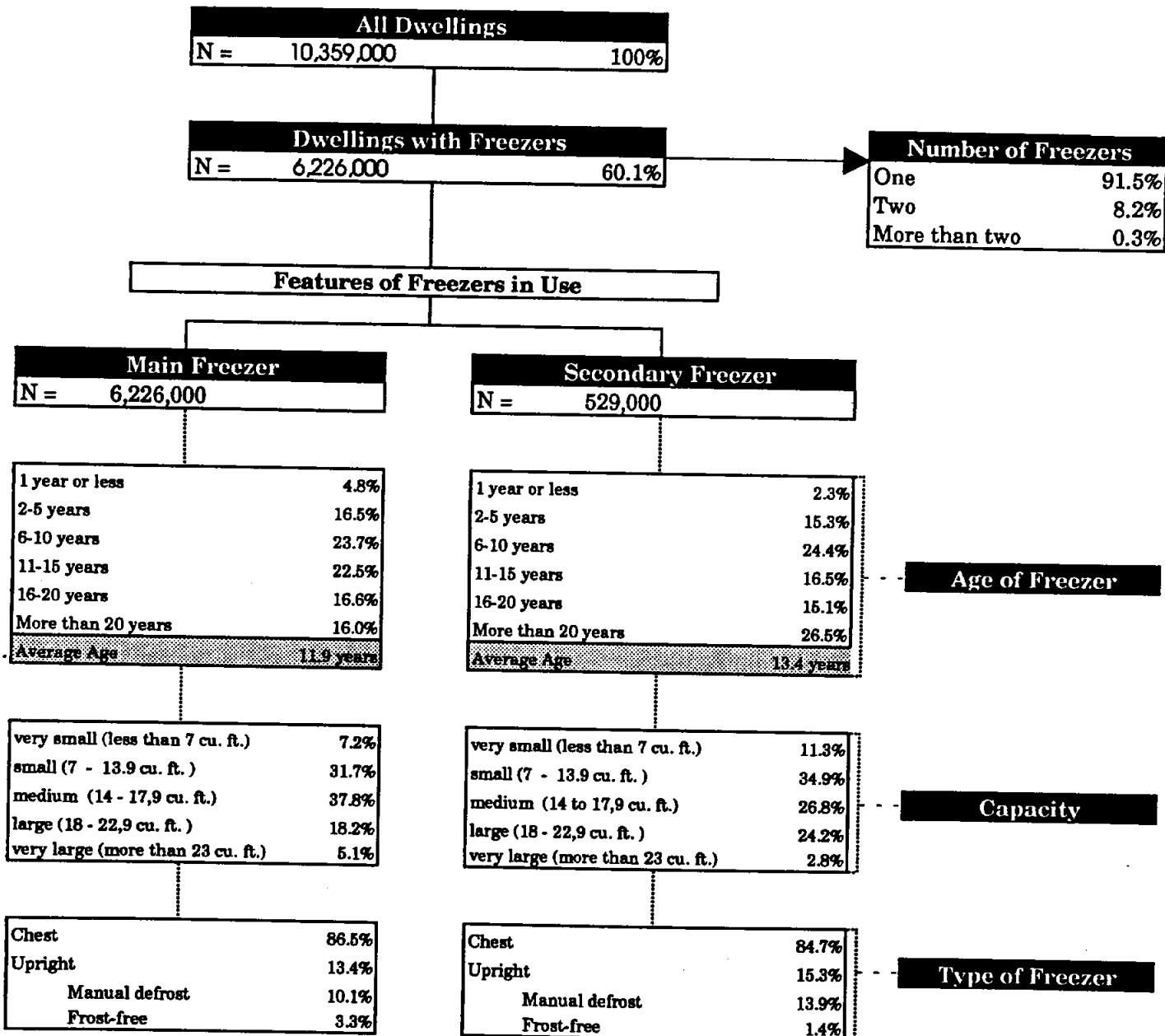
**Use of Microwave Oven for:**

	reheating	defrosting	cooking
Everyday	66.0%	18.0%	16.0%
A few times a week	27.4%	38.4%	21.0%
Once a week or less	5.7%	28.9%	23.3%
Never	1.0%	19.7%	39.8%
Total use	99.1%	80.3%	60.3%

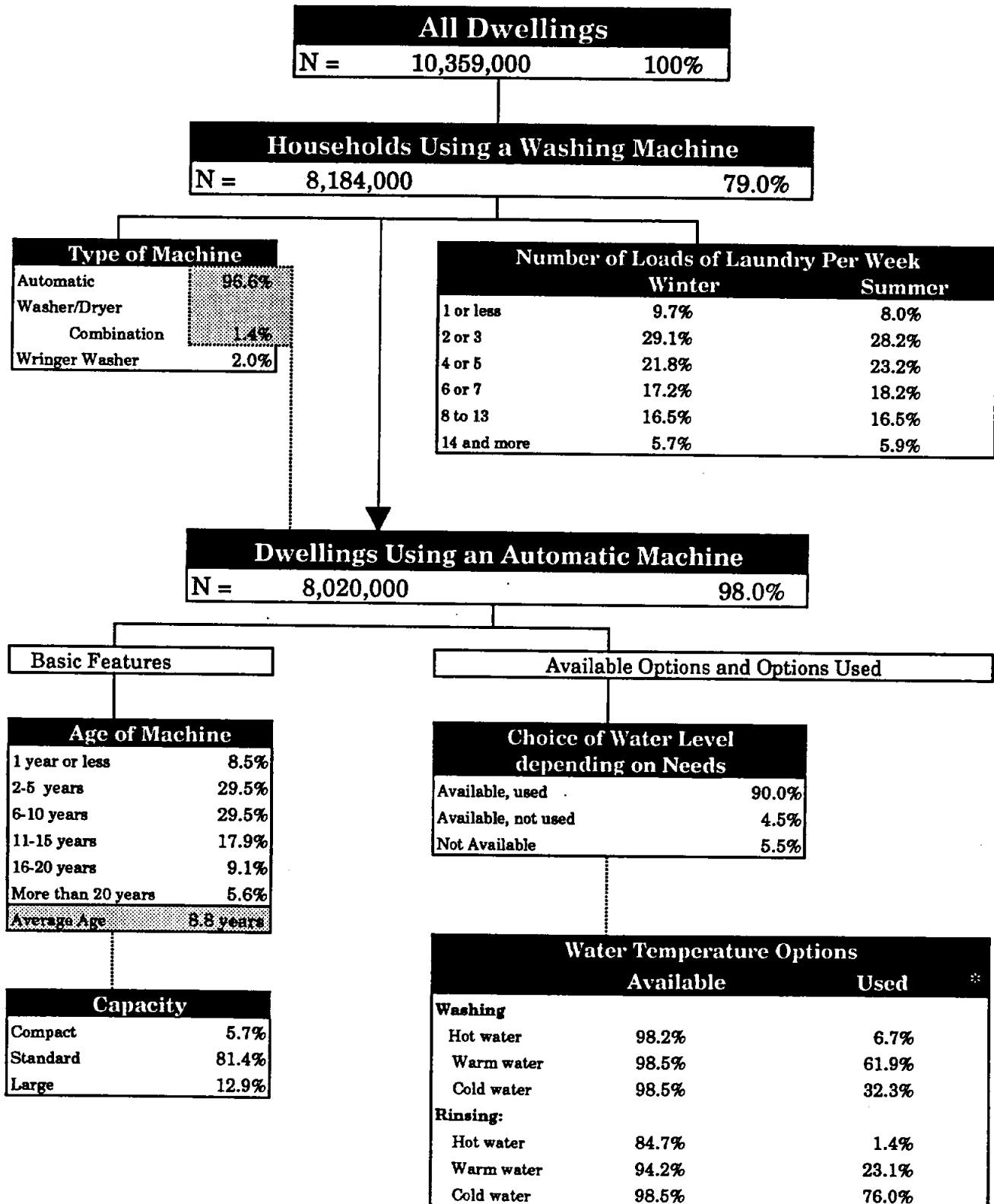
**Diagram 5.1.3  
Dishwasher**



**Diagram 5.1.4  
Freezer**

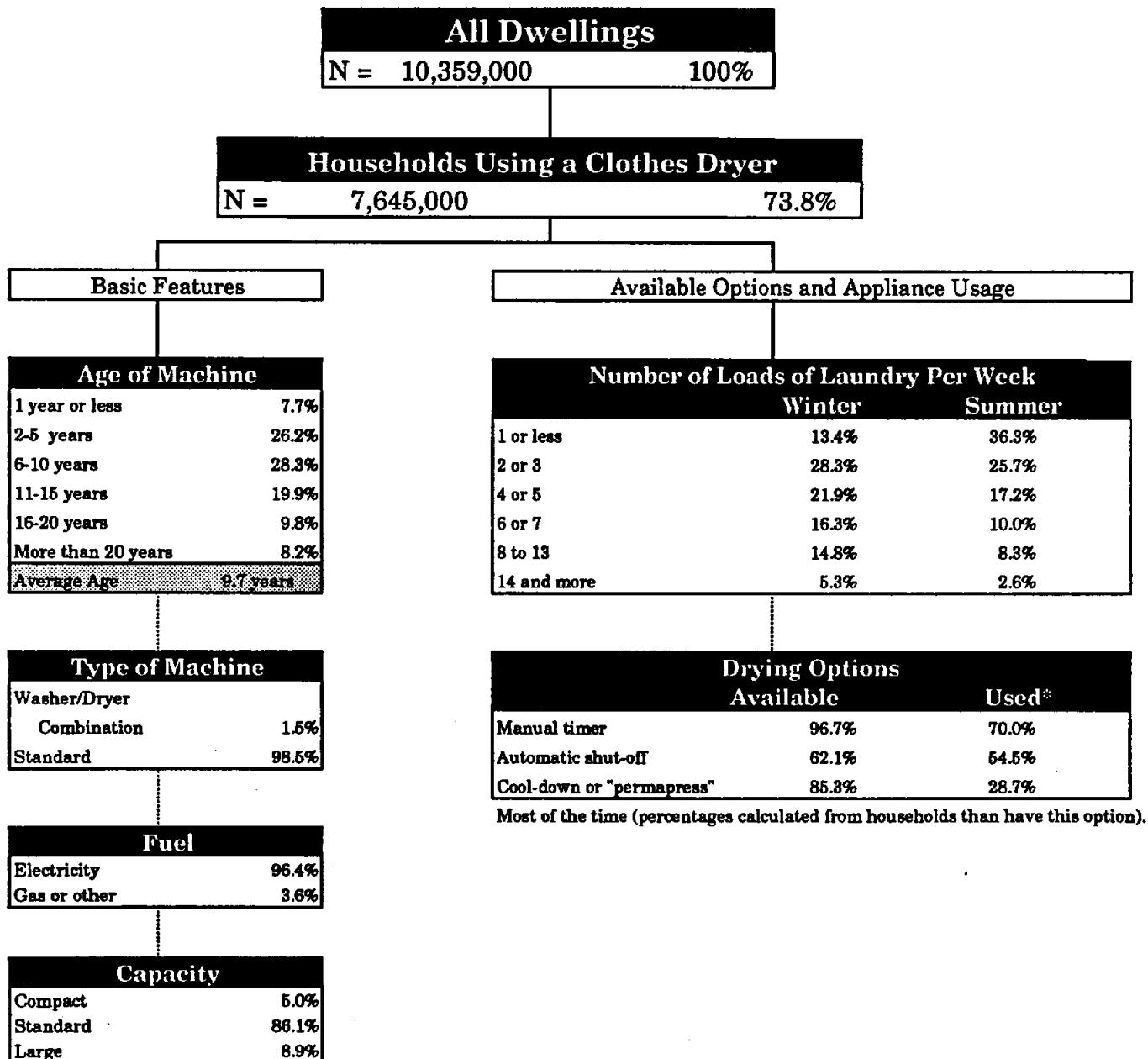


**Diagram 5.1.5**  
**Washing Machine**



\* Most of the time (percentages calculated from households that have this option).

**Diagram 5.1.6  
Clothes Dryer**



## **5.2 DISTRIBUTION RATE OF HOUSEHOLD APPLIANCES**

In general, when we study the availability of household appliances (other than refrigerators and stoves) according to household profile, we find that the ownership rate grows along with household revenue, the number of persons per household, and the number of children. The highest rate of ownership is among residents of houses, and even more so in detached houses; conversely, large appliances such as washers, dryers or freezers are rarely found in apartments located in buildings of five storeys or more.

**Table 5.2.1**  
**Distribution Rate of Household Appliances**  
**According to Household or Dwelling Profile**

	Number of Dwellings ('000)	Microwave Oven	Dish-washer	Freezer	Washing Machine	Dryer
<b>ALL DWELLINGS</b>	10,359	79.0%	44.1%	60.1%	79.0%	73.8%
<b>Houses</b>	7,135	85.7%	53.6%	75.2%	96.0%	90.6%
Detached	5,823	86.3%	57.1%	78.1%	97.4%	91.9%
Attached*	1,065	83.1%	38.4%	61.5%	88.9%	84.1%
Mobile Homes	247	84.1%	36.6%	66.5%	94.3%	89.5%
<b>Apartments</b>	3,224	64.2%	23.2%	26.5%	41.8%	36.6%
1-4 storeys	2,288	66.6%	20.3%	27.1%	47.8%	41.1%
5 storeys and over	936	58.2%	30.2%	25.0%	25.5%	25.7%
<b>Size of Household</b>						
1 person	2,406	61.9%	20.2%	32.9%	52.4%	46.7%
2 people	3,208	79.1%	43.1%	59.4%	79.4%	72.3%
3 people	1,820	81.8%	48.6%	69.0%	90.4%	85.7%
4 or more	2,925	91.3%	62.2%	77.6%	93.2%	90.5%
<b>Number of Children</b>						
None	6,963	74.3%	39.1%	54.8%	73.7%	67.8%
1 child	1,492	85.5%	44.3%	61.9%	85.3%	79.5%
2 or more	1,904	91.4%	62.3%	77.8%	93.3%	91.7%
<b>Household Income</b>						
Less than 20,000\$	2,811	63.2%	17.1%	44.2%	62.2%	53.3%
\$20-\$30,000	1,960	76.6%	32.0%	56.8%	71.0%	65.4%
\$30-\$40,000	1,389	82.5%	40.5%	59.7%	82.8%	79.1%
\$40-\$60,000	2,173	90.1%	59.0%	67.8%	89.1%	86.9%
\$60-\$80,000	1,059	92.6%	68.5%	72.2%	94.2%	92.5%
\$80,000 and over	967	95.9%	85.6%	68.9%	95.6%	93.0%
<b>Occupants</b>						
Own	6,571	86.1%	58.6%	74.9%	96.6%	91.0%
Rent	3,788	66.7%	19.4%	34.7%	48.8%	44.4%
<b>Type of Region (population in '000)</b>						
500 and over	4,713	75.0%	45.8%	49.4%	70.5%	64.9%
100-500	1,549	82.1%	43.5%	61.7%	76.3%	73.2%
30-100	983	80.3%	44.0%	57.5%	84.6%	81.0%
15-30	422	81.6%	36.0%	68.5%	84.4%	79.5%
Less than 15	1,136	83.1%	45.3%	72.2%	89.0%	84.4%
Rural region	1,556	83.7%	41.1%	81.2%	94.8%	87.6%
<b>Type of Household</b>						
One person	2,406	61.9%	20.2%	32.9%	52.4%	46.7%
Family	7,300					
Couple with children	2,373	81.8%	49.2%	66.9%	86.4%	78.9%
Single parent	956	73.9%	27.4%	48.0%	75.2%	68.1%
Couple with children	3,971	90.1%	60.5%	77.7%	93.3%	90.3%
Multiple households	654	72.0%	38.5%	45.6%	68.3%	63.7%

\* Double houses, row houses and duplexes owned by the occupant.

### **5.3 AGE OF HOUSEHOLD APPLIANCES**

The age of household appliances is quite closely linked to the year the dwelling was occupied by the current residents (Graph 5.3). For example, if the residents moved in before 1960, the stove is on average about 15 years old; however, if the residents moved in after 1980, this appliance is usually less than 10 years old. This trend occurs in all large appliances except for the second freezer, where one exists.

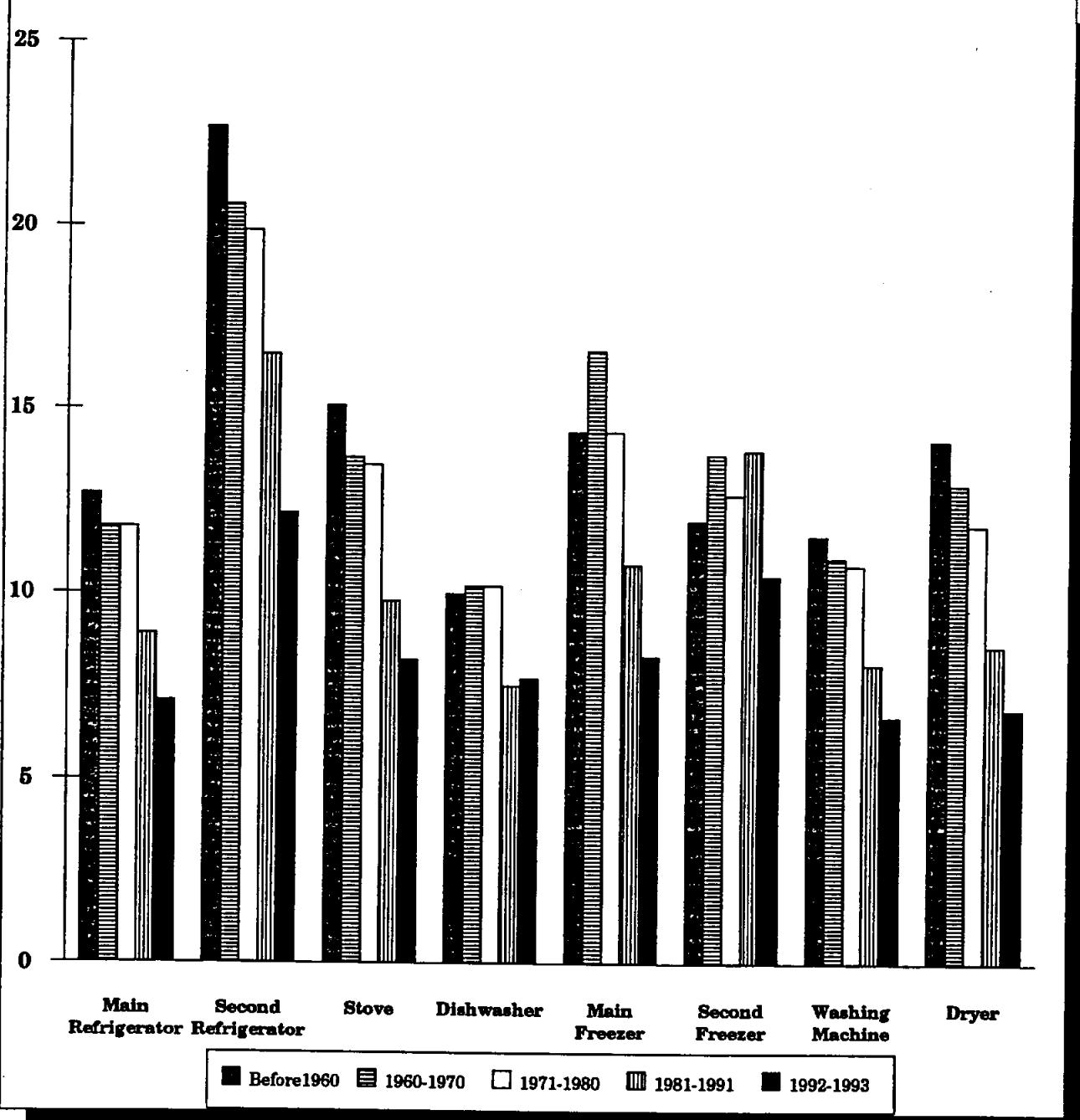
The connection between the age of appliances and the year of construction of the dwelling is less obvious (Table 5.3). The average age of appliances is generally lower in dwellings built in 1983 or later.

**Table 5.3  
Average Age of Household Appliances  
According to Type  
and Year of Construction of Dwellings**

	Main Refrigerator	Stove/ Oven	Dishwasher	Main Freezer	Washing Machine	Clothes Dryer
<b>ALL DWELLINGS</b>	9,6	10,9	8,3	11,9	8,9	9,7
Before 1941	11,0	12,6	8,6	13,1	9,5	10,2
1941 - 1960	10,0	12,0	8,8	12,1	9,9	11,0
1961 - 1977	10,9	12,2	9,7	12,3	9,4	10,4
1978 - 1982	9,6	10,5	10,1	12,1	8,8	9,8
1983 and after	6,0	6,4	5,1	10,6	7,2	7,5
<b>Houses</b>	9,6	10,7	8,5	12,5	9,0	9,9
Before 1941	11,4	12,8	8,9	13,2	9,6	10,4
1941 - 1960	10,6	12,3	9,5	12,9	10,4	11,5
1961 - 1977	10,1	11,5	9,8	13,1	9,2	10,3
1978 - 1982	9,6	10,3	9,9	12,4	8,9	9,8
1983 and after	6,4	6,7	5,2	11,1	7,4	8,0
<b>Detached</b>	9,7	10,9	8,5	12,8	9,1	10,3
Before 1941	11,7	13,2	8,9	13,4	9,7	10,7
1941 - 1960	10,7	12,6	9,5	12,7	10,3	11,7
1961 - 1977	10,1	11,6	9,6	13,8	9,3	10,7
1978 - 1982	9,8	10,6	10,1	13,1	9,0	10,2
1983 and after	6,6	6,9	5,3	11,0	7,7	8,2
<b>Attached*</b>	8,7	9,1	8,8	11,2	8,6	8,2
Before 1978	9,8	10,3	10,9	11,5	9,6	8,6
1978 and after	7,1	7,6	6,5	11,1	7,3	7,6
<b>Mobile Homes</b>	9,1	10,4	7,0	9,7	8,1	8,9
<b>Apartments</b>	9,7	11,3	7,4	8,4	8,2	8,4
Before 1961	9,2	11,6	5,1	9,2	8,3	8,7
1961 - 1977	12,7	13,9	9,4	8,4	10,2	11,1
1978 and after	6,5	7,4	6,9	7,4	6,4	6,6
<b>1 - 4 storeys</b>	9,6	10,9	8,8	8,5	8,3	8,7
Before 1961	9,4	11,4	5,1	9,4	8,3	8,7
1961 - 1977	12,8	13,1	9,3	8,4	9,9	11,3
1978 and after	5,8	6,9	5,7	7,5	6,8	6,5
<b>5 or more storeys</b>	9,9	12,4	8,3	8,2	7,6	7,6

\* Double houses, row houses and duplexes owned by the occupant.

**Graph 5.3**  
**Average Age of Household Appliances**  
**According to Year Residents Moved Into Dwelling**



#### **5.4 OTHER ENERGY-CONSUMING APPLIANCES**

Obviously, most households possess other energy-consuming appliances, such as televisions, stereo systems, waterbed heaters or engine block heaters. Again, the likelihood of a household owning these appliances increases for detached houses. As well, in such dwellings, we tend to find more unusual appliances or equipment which consume a great deal of energy, such as swimming pools (10%), one out of five of which are heated; sump pumps (14.9%); hot tubs (10.3%); and even saunas (1.1%).

**Table 5.4**  
**Distribution Rate**  
**of Selected Energy-Consuming Appliances**  
**According to Type of Dwelling**

Type of Dwelling	All Dwellings	All Houses	All Detached Houses	All Other Houses	* Apartments
N (100%) →	10,359,000	7,135,000	5,823,000	1,312,000	3,224,000
Colour TV set	**	89.5%	90.7%	84.1%	**
Black & white TV set	**	18.2%	18.4%	17.5%	**
VCR	76.8%	63.0%	83.0%	83.1%	62.9%
CD player	34.2%	37.5%	38.0%	35.3%	26.8%
Other stereo system	62.1%	66.7%	67.9%	61.5%	51.9%
Personal computer	24.5%	28.3%	29.1%	25.0%	16.1%
Electric blanket	8.8%	10.8%	11.2%	9.1%	4.5%
Waterbed heater	11.8%	14.9%	15.5%	12.3%	4.9%
Portable humidifier	20.3%	19.9%	20.5%	17.6%	21.0%
Portable dehumidifier	11.7%	15.4%	17.0%	8.3%	3.6%
Car block heater	27.0%	32.7%	33.6%	28.3%	14.4%
Interior car warmer	4.2%	5.0%	5.2%	4.0%	2.6%
Water cooler	4.1%	5.0%	5.5%	3.0%	2.2%
Fish tank with equipment	4.9%	5.7%	5.4%	7.1%	3.3%
Bathroom exhaust fan	48.2%	49.6%	47.1%	60.8%	45.2%
Central vacuum cleaner	not asked	19.5%	22.6%	5.2%	not asked
Sump Pump		14.9%	16.5%	8.4%	
Water softener	not asked	10.9%	12.4%	4.2%	not asked
Pool		10.0%	11.0%	5.3%	
Pool heater	not asked	2.2%	2.5%	0.5%	not asked
Hot tub or jacuzzi		10.3%	11.3%	5.2%	
Indoor	not asked	9.2%	10.0%	4.6%	not asked
Outdoor	not asked	1.4%	1.5%	0.6%	not asked
Sauna		1.1%	1.3%	0.2%	

\* Other houses' includes attached houses and mobile homes.

\*\* Data unreliable for apartments.

## **CHAPTER 6 : HOT RUNNING WATER**

## CHAPTER 6 : HOT RUNNING WATER

### 6.1 GENERAL DESCRIPTION OF EQUIPMENT

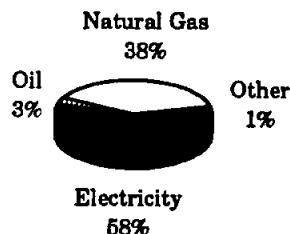
Nearly all dwellings (Diagram 6.1.1: 99.4%) have hot running water. About four in five households (78%) have a water heater. The majority of individual water heaters run on electricity (57.2%) but many use gas (38.4%). No matter what energy source is used, the average water heater is a little more than 7 years old; two out of three are medium capacity. However, many more large electric water heaters (60 or more gallons) are electric (20%) than gas (1.9%). When electricity is the energy source, one out of four heaters have add-on insulation (23.2%) as well as insulation around the pipes (25.7%). These energy-saving devices are more rare for gas heaters; only 18.7% have pipe insulation and 10.9% have add-on insulation.

No matter what the energy source for the water heater, almost one in two households (45%) have a water-saving shower head. Water faucet aerators are more rare, owned by only one out of four households with electric water heater (25.6%) and one out of six household with gas water heater (16.7%).

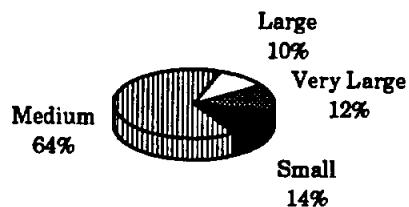
Two-thirds of apartment dwellers (Diagram 6.1.4: 65%) share their water heater with other apartments.

Graph 6.1  
General Characteristics  
of Individual Water Heaters

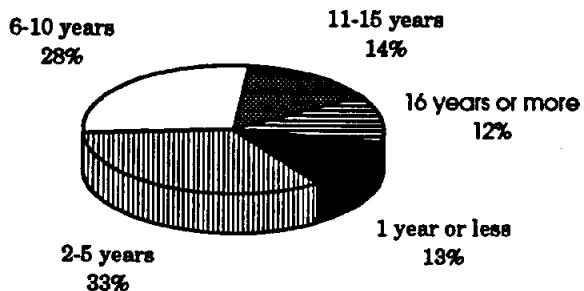
Energy Source



Capacity\*



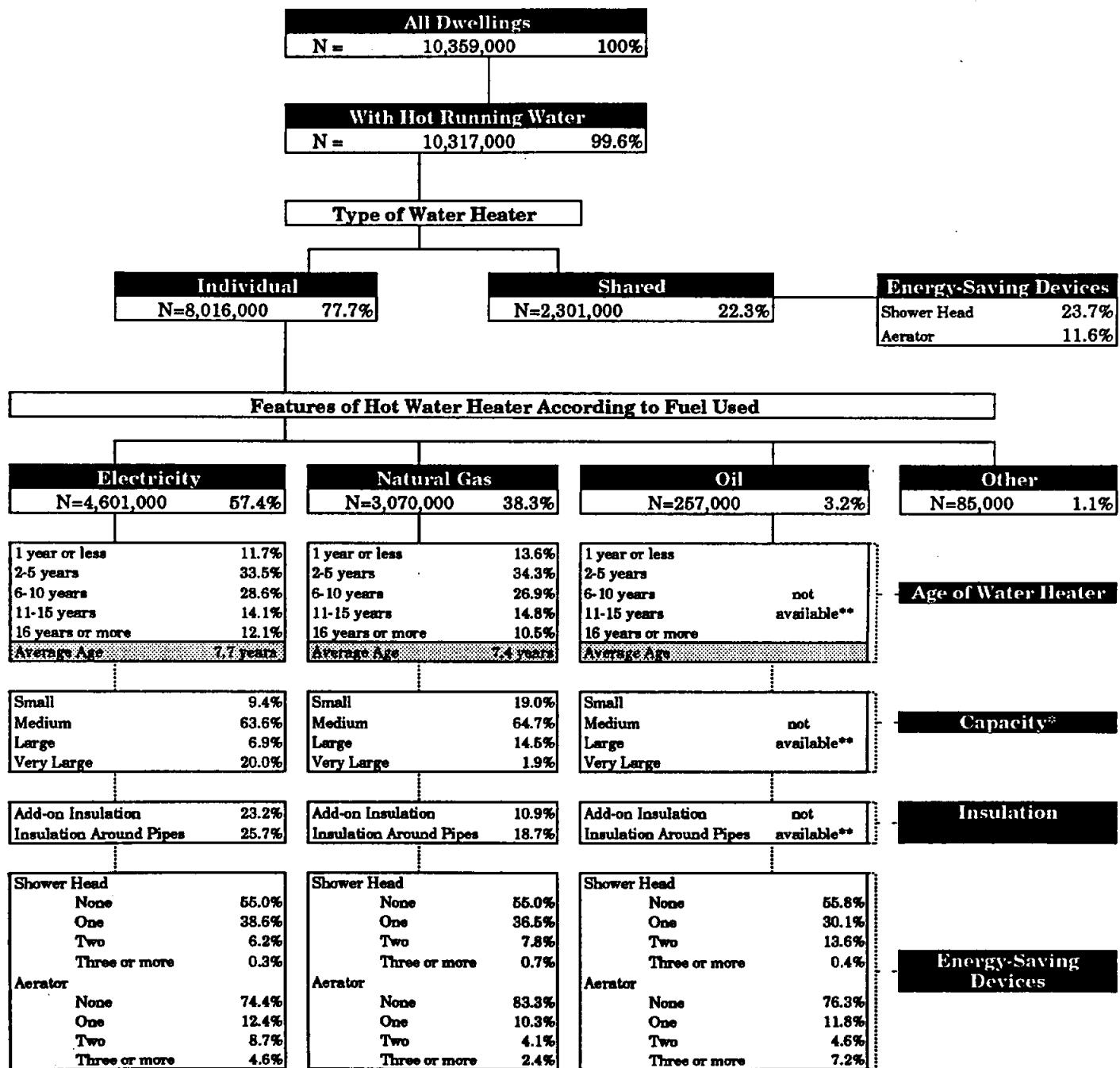
Age of Water Heater



The average water heater is 7.6 years old.

\*Capacity: small = 30 gal. or less; medium = 40 gal.; large = 50 gal.; very large = 60 gal. or more.

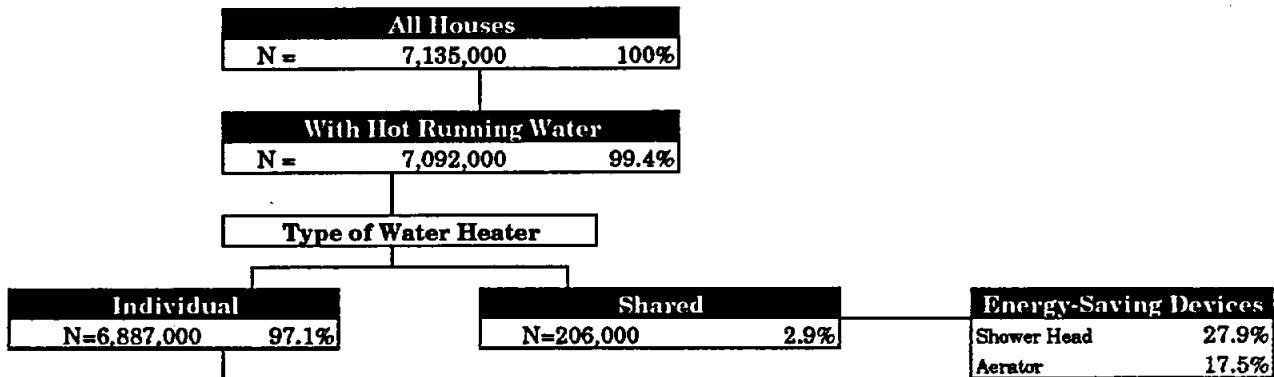
**Diagram 6.1.1  
Hot Running Water**



\*Small = 30 gal. or less; Medium = 40 gal.; Large = 50 gal.; Very Large = 60 gal. or more.

\*\*Small sampling size and high non-response rate.

**Diagram 6.1.2  
Hot Running Water**



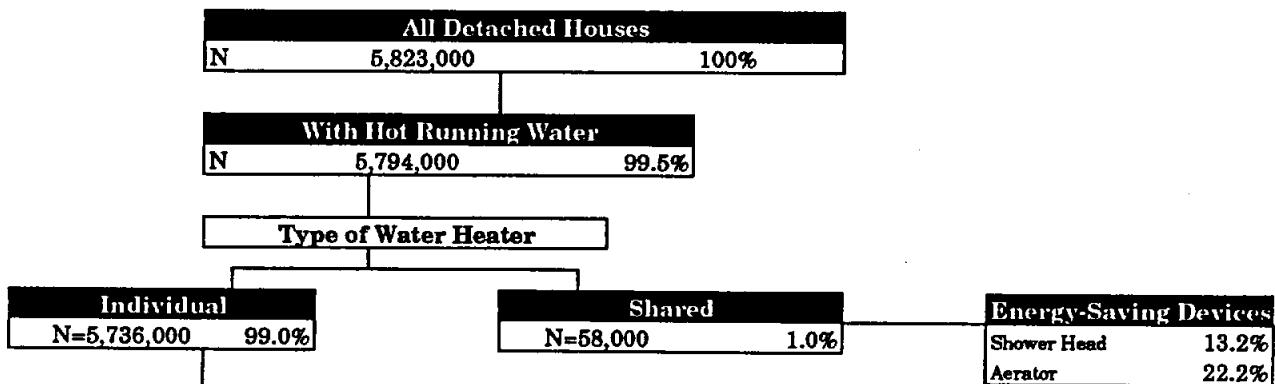
**Features of Hot Water Heater According to Fuel Used**

Electricity		Natural Gas		Oil		Other	
N=3,540,000	51.4%	N=3,010,000	43.7%	N=255,000	3.7%	N=83,000	1.2%
1 year or less	10.6%	1 year or less	13.5%	1 year or less		Age of Water Heater	
2-5 years	33.3%	2-5 years	34.5%	2-5 years		Capacity	
6-10 years	27.6%	6-10 years	27.0%	6-10 years		Insulation	
11-15 years	15.0%	11-15 years	14.8%	11-15 years		Energy-Saving Devices	
16 years or more	13.4%	16 years or more	10.1%	16 years or more		Devices	
All together	100.0%	All together	100.0%	All together		Devices	
Small	6.4%	Small	18.6%	Small		Devices	
Medium	63.1%	Medium	65.0%	Medium		Devices	
Large	8.1%	Large	14.6%	Large		Devices	
Very Large	22.4%	Very Large	1.9%	Very Large		Devices	
Add-on Insulation	25.1%	Add-on Insulation	10.9%	Add-on Insulation		Devices	
Insulation Around Pipes	28.1%	Insulation Around Pipes	18.8%	Insulation Around Pipes		Devices	
Shower Head		Shower Head		Shower Head		Devices	
None	54.4%	None	54.8%	None		Devices	
One	37.0%	One	36.4%	One		Devices	
Two	7.6%	Two	7.9%	Two		Devices	
Three or more	0.3%	Three or more	0.7%	Three or more		Devices	
Aerator		Aerator		Aerator		Devices	
None	74.0%	None	83.0%	None		Devices	
One	11.8%	One	10.3%	One		Devices	
Two	8.9%	Two	4.1%	Two		Devices	
Three or more	5.0%	Three or more	2.3%	Three or more		Devices	

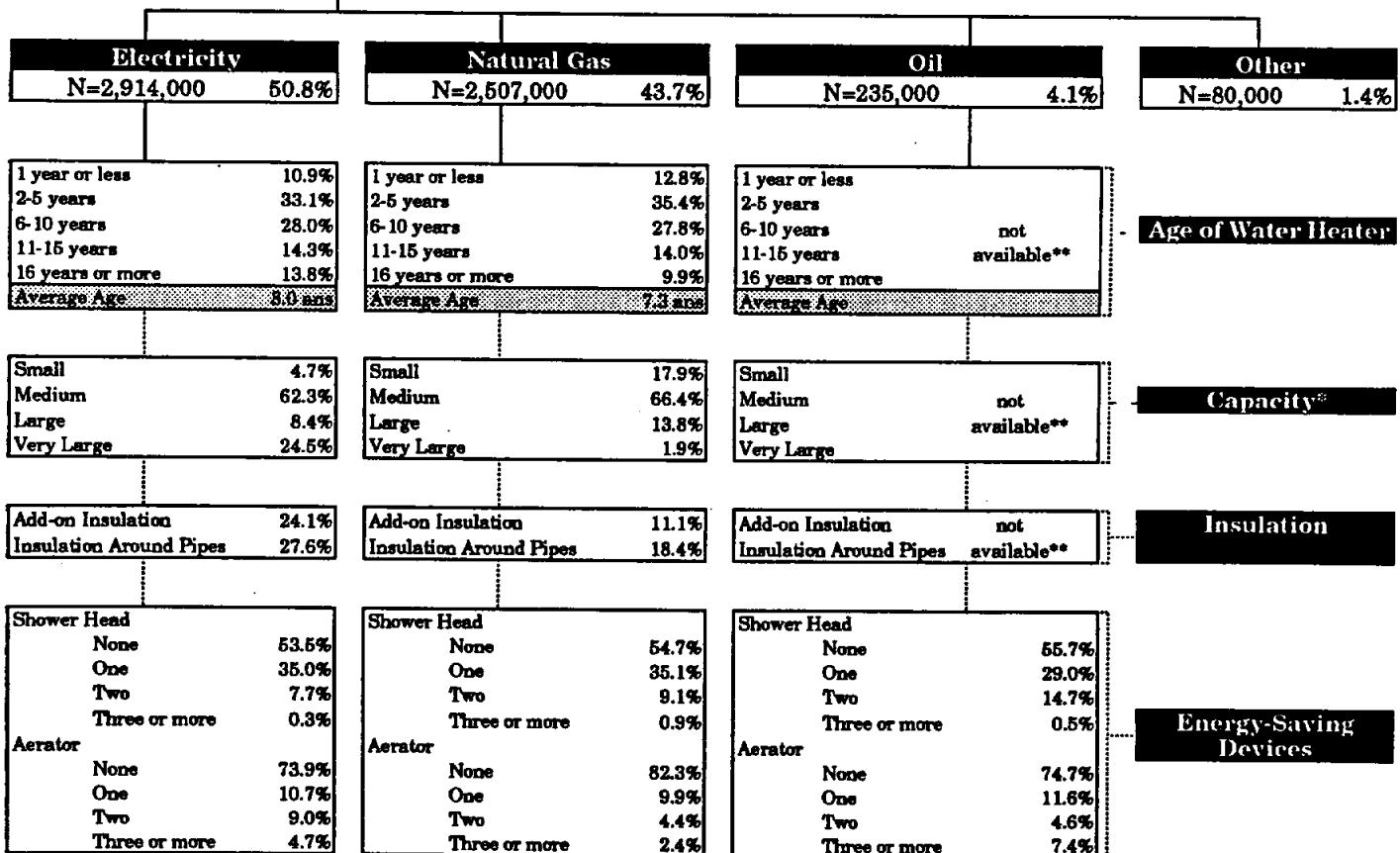
\*Small = 30 gal. or less; Medium = 40 gal.; Large = 50 gal.; Very Large = 60 gal. or more.

\*\*Small sampling size and high non-response rate.

**Diagram 6.1.3  
Hot Running Water**

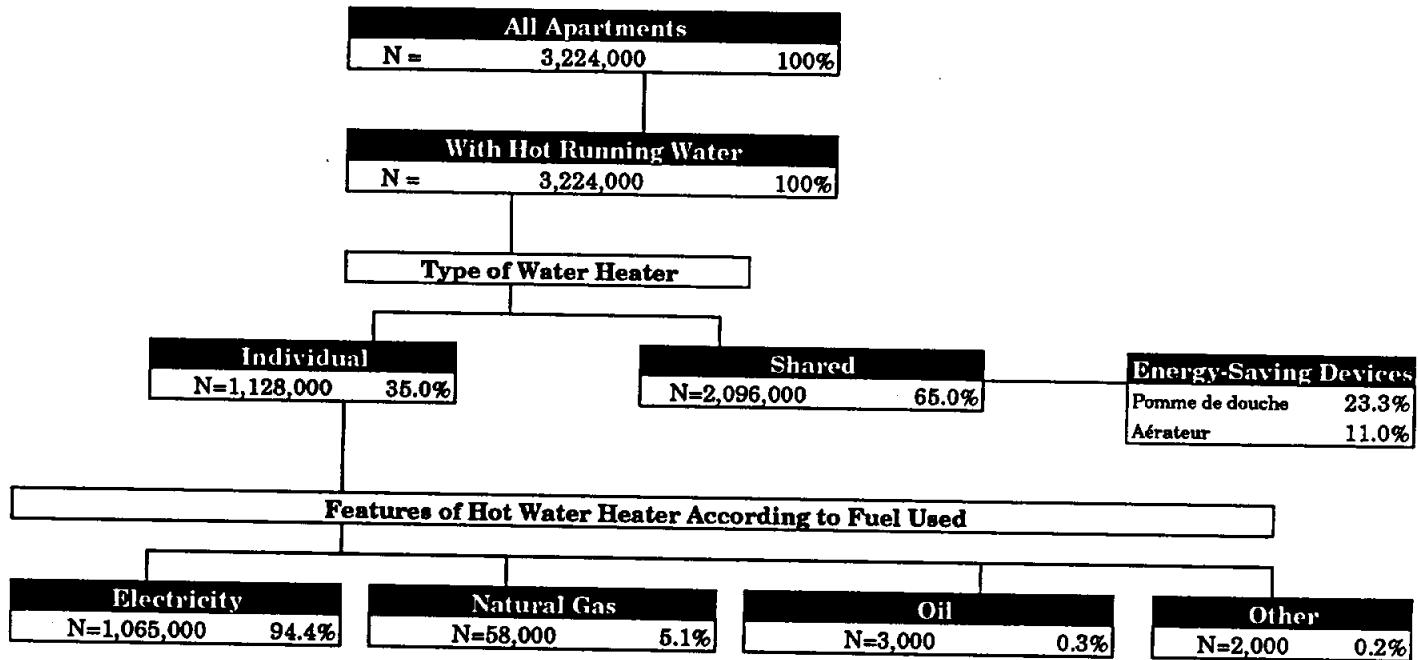


**Features of Hot Water Heater According to Fuel Used**



\*Small = 30 gal. or less; Medium = 40 gal.; Large = 50 gal.; Very Large = 60 gal. or more.

**Diagram 6.1.4  
Hot Running Water**

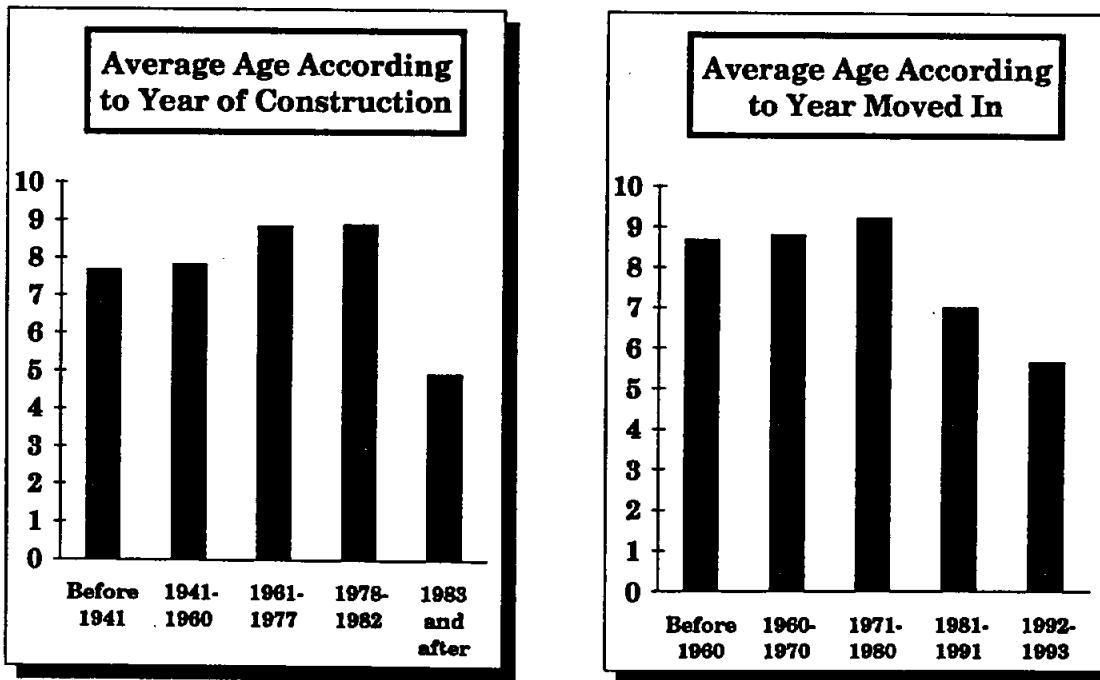
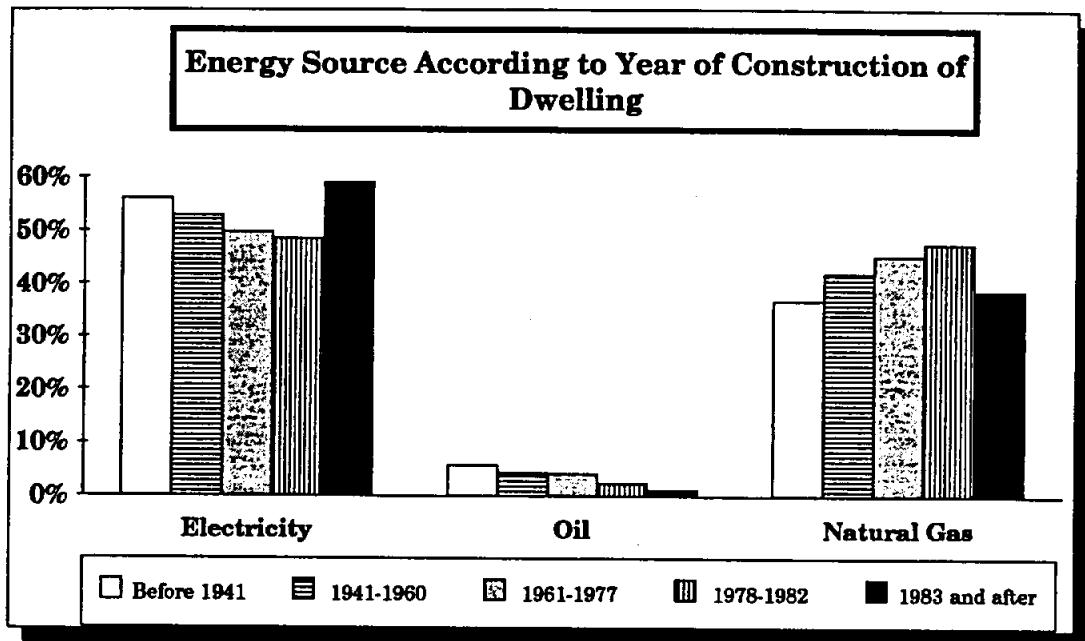
**Note:**

Age and capacity of water heater, as well as the presence of insulation or energy-saving devices were not available because of small sampling size and high non-response rate.

## **6.2 CHARACTERISTICS OF WATER HEATERS ACCORDING TO YEAR OF CONSTRUCTION AND YEAR OF OCCUPATION OF RESIDENCE**

The percentage of households with natural gas water heaters increases with the year of construction of the dwelling, up to 48% for 1982; after that year, the trend reverses (39%). For the period between 1978-1982, there were almost as many gas water heaters as electric (49%), but the gap reappears after this period. As might be expected, the average age of the water heater corresponds to the average age of the dwelling when it was recently constructed; as for appliances in general, a more recently occupied residence means, on average, newer equipment.

**Graph 6.2**  
**Selected Water Heater Features**  
**According to Year of Construction of Dwelling**  
**and Year Moved In**



## **CHAPTER 7 : LIGHTING**

## CHAPTER 7 : LIGHTING

### 7.1 DISTRIBUTION RATE OF LIGHT BULBS AND AVERAGE NUMBER USED

The average household uses a total of 27.1 light bulbs; 24.5 for indoor use and 2.7 for outdoor use. These figures vary noticeably depending on the type of dwelling. For example, detached houses use an average of 35 bulbs (31 indoors); the average for apartments is only 14.5 bulbs, with practically none of them used outdoors.

More than one out of two dwellings uses fluorescent bulbs (54%); they are used more frequently in houses (62.6%) than in apartments (34.9%). Halogen bulbs, a recent arrival, have yet to become a major market force; less than one-quarter of households (22.2%) use them either indoors (17.7%) or outdoors (6.5%).

**Table 7.1**  
**Average Number of Light Bulbs**  
**According to Type**  
**and Area of Use and Distribution Rate**  
**of Halogen or Fluorescent Light Bulbs**

Area of Use Type of Bulb	All Dwellings	All Houses	All Detached Houses	All Other Houses	* All Apartments
	N (100%) →	10 359 000	7 135 000	5 823 000	1 312 000
Average Number of Light Bulbs					
<b>Indoor</b>					
Halogen	0,5	0,5	0,6	0,4	0,4
Fluorescent	2,2	2,8	3,1	1,5	0,8
Incandescent	21,8	25,9	27,4	19,4	12,7
<b>Total indoor</b>	<b>24,5</b>	<b>29,2</b>	<b>31,0</b>	<b>21,3</b>	<b>13,9</b>
<b>Outdoor</b>					
Halogen	0,1	0,2	0,2	0,1	0,0
Fluorescent	0,2	0,2	0,2	0,1	0,1
Incandescent	2,4	3,2	3,5	2,0	0,5
<b>Total outdoor</b>	<b>2,7</b>	<b>3,6</b>	<b>4,0</b>	<b>2,1</b>	<b>0,6</b>
<b>Indoor and outdoor</b>					
Halogen	0,6	0,7	0,7	0,5	0,4
Fluorescent	2,3	3,0	3,3	1,6	0,9
Incandescent	24,2	29,2	30,9	21,4	13,2
<b>Total dwelling</b>	<b>27,1</b>	<b>32,8</b>	<b>35,0</b>	<b>23,4</b>	<b>14,5</b>
Percentage of Dwellings Using One or More Halogen or Fluorescent Light bulbs					
<b>Indoor</b>					
Halogen	17,7%	17,6%	17,8%	16,7%	18,0%
Fluorescent	52,8%	61,2%	64,6%	46,4%	34,0%
<b>Outdoor</b>					
Halogen	6,5%	9,0%	9,7%	5,8%	0,9%
Fluorescent	4,6%	5,7%	6,4%	2,5%	2,1%
<b>Indoor and outdoor</b>					
Halogen	22,2%	23,8%	24,5%	20,2%	18,7%
Fluorescent	54,0%	62,6%	66,0%	47,5%	34,9%

\* 'Other houses' includes attached houses and mobile homes.

## **7.2 AVERAGE NUMBER OF LIGHT BULBS PER DWELLING ACCORDING TO HOUSEHOLD PROFILE**

Of course, the number of lightbulbs of all types used increases with the square footage of the dwelling. In an area of more than 2,000 sq. ft., close to 50 lightbulbs may be in use, 10% of those outdoors. As well, the number of lightbulbs used increases with household income. Additionally, there is a clear trend of more lightbulbs being used in recently-constructed dwellings: this average increases from 22.9 in buildings from before 1941 to 34.8 in dwellings from after 1982.

**Table 7.2**  
**Average Number of Light Bulbs per Dwelling**  
**According to Type and Area of Use**

	All Types of Bulbs	Area		Type		
		Indoor	Outdoor	Incandescent	Halogen	Fluorescent
<b>ALL DWELLINGS</b>	<b>27.1</b>	<b>24.5</b>	<b>2.7</b>	<b>24.2</b>	<b>0.6</b>	<b>2.3</b>
<b>Year of Construction</b>						
Before 1941	22.9	20.8	2.1	20.6	0.5	1.8
1941 - 1960	23.4	21.2	2.2	20.8	0.5	2.1
1961 - 1977	27.5	24.8	2.7	24.5	0.6	2.4
1978 - 1982	30.6	27.4	3.2	27.3	0.6	2.7
1983 and after	34.8	31.1	3.7	30.8	1.0	3.1
<b>Livable and Heated Area</b>						
less than 600 sq. ft.	13.7	12.8	0.9	12.6	0.3	0.8
601 - 1000 sq. ft.	19.3	17.7	1.7	17.4	0.5	1.4
1001 - 1500 sq. ft.	31.0	27.9	3.1	27.6	0.7	2.8
1501 - 2000 sq. ft.	38.5	34.3	4.1	34.3	0.6	3.6
2001 - 2500 sq. ft.	46.5	41.3	5.2	41.1	1.0	4.4
2501 sq. ft. and more	49.6	43.6	6.1	42.5	1.7	5.3
<b>Household Income</b>						
Less than \$20,000	16.6	15.2	1.4	15.3	0.2	1.1
\$20-\$30,000	21.6	19.8	1.8	19.5	0.5	1.6
\$30-\$40,000	25.1	22.6	2.5	22.6	0.5	1.9
\$40-\$60,000	33.4	30.0	3.4	29.4	0.7	3.3
\$60-\$80,000	36.1	32.3	3.8	31.5	0.9	3.7
\$80,000 and more	44.8	39.9	4.9	39.3	1.7	3.9
<b>Occupants</b>						
Own	34.0	30.3	3.7	30.1	0.8	3.2
Rent	15.2	14.4	0.9	14.1	0.4	0.8

**APPENDIX 1 : METHODOLOGICAL SUMMARY OF THE SURVEY**

## METHODOLOGICAL SUMMARY OF THE SURVEY

The Survey of Household Energy Use (SHEU) was administered in February 1993 to a sub-sample of the dwellings participating in the Labour Force Survey (LFS). Its sample design is thus closely tied to that of the LFS.

The LFS is a monthly household survey whose sample of individuals is representative of the civilian, non-institutionalized population of Canada's ten provinces (Yukon and Northwest Territories excluded), 15 years of age and older. The LFS sample is based on a stratified and multi-stage design. Details on the methodology are available in the Statistics Canada publication entitled *Methodology of the Canadian Labour Force Survey, 1984-1990* (catalogue #71-526). The survey is stratified regionally by province, and the degrees of sampling established are a function of population density. The LFS uses a panel design whereby the entire monthly sample (approximately 73,000 dwellings) consists of 6 panels, or rotation groups of approximate equal size, and representative of the entire LFS population. This rotation pattern ensures that the sampling of dwellings constantly reflects changes in the current housing stock, and is a method of replacing dwellings after six months in the sample.

The SHEU used a subset of the six rotation groups in the February 1993 LFS sample; the number of groups surveyed varied from one-half to two groups, depending on the province. In addition, five provinces agreed to cover the financial costs of adding one or two rotation groups to the survey that had rotated out of previous months. The sample sizes thus varies considerably between provinces, and some provinces are represented disproportionately to their populations. The provinces indicated (\*) in the table below agreed to cover the financial costs of an increase in the sample size. Here is how each sample was distributed as chosen, and by actual sample respondents. The overall response rate was 72.3%

	SAMPLE SELECTED	SAMPLE OF RESPONDENTS	RESPONSE RATE
Newfoundland	1013	837	82.6 %
Prince Edward Island	947	732	77.3 %
Nova Scotia*	2165	1518	70.1 %
New Brunswick*	1878	1235	65.8 %
Quebec	914	720	78.8 %
Ontario*	1987	1407	70.8 %
Manitoba*	2065	1476	71.5 %
Saskatchewan*	2389	1704	71.3 %
Alberta	913	674	73.8 %
British Columbia	911	679	74.5 %
CANADA	15182	10982	72.3 %

In 97% of the households, the interview was conducted with the household head (50%) or partner (47%). Two out of three respondents (68%) were female, with an average age of 44 years. Survey participants were from all levels of education; 34% had not completed high school, 37% had at least one post-secondary diploma. For a more detailed profile of respondents, consult Appendix 4 (separate document) which presents the frequency distributions.

Data for the SHEU was collected by LFS interviewers in the field. Approximately one week before the collection, the selected households received in the mail a guide to help them prepare for the interview. These interviews are usually conducted over the telephone. However, to obtain better information, two categories of households were offered a visit of the interviewer; those categories being households where all members were at least 65 years old, and those where the highest level of education was grade eight. A total of 952 interviews were conducted in the household. In each household, the questionnaire was administered to the person who was most knowledgeable about household equipment and the house or apartment itself. The collection period was two weeks.

At the end of the interview in the households, the respondents were asked for authorization to consult their suppliers regarding their energy bills from the previous year. This was done to determine if there was a relationship between the household's energy characteristics and the actual consumption.

Data capture, editing and weighting were executed at Statistics Canada's Head Office.

## **APPENDIX 2 : GLOSSARY**

## GLOSSARY

### **DWELLING**

A structurally separate set of living premises with a private entrance from outside the building, or from a common hallway or stairway inside.

### **SINGLE DETACHED HOUSE**

A house containing one dwelling unit and not attached to any other building or construction. In some table headings, the shortened term "detached house" is used.

### **DOUBLE HOUSE**

Joined to only one other dwelling (side by side).

### **Row House**

Three or more dwellings sharing common walls extending from ground to roof but with no other dwellings either above or below.

### **ATTACHED HOUSE**

In this survey, the term "attached house" includes double houses, row houses and duplexes owned by one of the household members. The type "apartment in a building that has fewer than five storeys" therefore excludes this type of duplex, but includes the apartment rented within a duplex.

### **MOBILE HOME**

A single dwelling, designed and constructed to be transported on its own chassis.

### **DUPLEX**

Two dwellings one above the other, not attached to any other structure.

### **APARTMENT IN A BUILDING THAT HAS FEWER THAN FIVE STOREYS**

Dwellings in triplexes, quadruplexes or apartment buildings that have fewer than five storeys, as opposed to the following category (includes apartment rented within a duplex).

### **APARTMENT IN A BUILDING THAT HAS FIVE OR MORE STOREYS**

Any type of dwelling, owned or rented, in a building that has five or more storeys.

### **HOUSEHOLD**

A person or group of persons occupying one dwelling unit.

**FAMILY**

A family is defined as a group of two or more persons who are living together in the same dwelling and who are related by blood, marriage or adoption.

**URBAN - RURAL AREA**

An urban area is an area which has attained a population concentration of at least 1,000, and a population density of at least 400 per square kilometre, at the previous census. All territory lying outside urban areas is considered rural.

**THERMAL ENVELOPE**

The exterior surface surrounding a building, generally including exterior walls, roof, exterior doors, windows and basement floor.

**HOUSEHOLD INCOME**

Total income of household members in 1992, from all sources, before taxes and deductions.

**APPENDIX 3 : COMMENTS CONCERNING DATA PROCESSING**

## COMMENTS CONCERNING DATA PROCESSING

### 3.1 CAUTIONS

A survey of this magnitude conducted mainly by telephone is not without its pitfalls, and even a superficial data processing can reveal a number of weaknesses and lack of clarity.

First of all, it must be mentioned that the way some of the questions were formulated differed between the two languages: in the section regarding doors and windows (questions 126, 132 and 133), the French version asked the respondent what he or she has done (changing windows or doors), while in English, the respondent was asked if such changes were made (by themselves or by the previous owner). In the national analysis of the survey results, the English version of the question is the more appropriate version to follow, with the understanding that such changes could be underestimated. More caution should be taken for future regional analyses.

Some of the data had to be corrected, attributed elsewhere or eliminated altogether. Because of the effect of non-response, it appeared that some houses had no doors or fewer than three windows. These responses were eliminated from the section concerning doors and windows. Occasionally, the date that improvements were made to the thermal envelope preceded the year of construction (less than 1% of the time); the year of the improvements was therefore changed to another category, to correspond more closely to the year of construction. Data regarding the number of televisions in apartments was anomalous and therefore not published. Also in apartments, no question regarding the number of rooms heated by supplementary heating was asked; the survey results were presented assuming that the entire apartment was heated this way.

Non-response to certain questions is a considerable problem when the respondent was asked for a quantifiable answer: 5% to 15% of respondents could not give the age of an appliance, a phenomenon especially prevalent among renters. The distribution of appliance ages as given tends to be somewhat biased, as the older an appliance is, the more difficult it is to determine the age. Some of the most problematic questions were: heat pump characteristics (Q81 to Q83), efficiency of the heating system (Q86), basement area (Q111), age of water heater (Q177), household income (Q190) and number of cords of wood consumed. In the latter case, one must also consider the type of cord; if a small cord, the answer given was divided by 3. After the analysis, some of the data related to these questions were nevertheless reproduced in the report, but the reader should regard this data critically.

### 3.2 TREATMENT OF NON-RESPONSE TO SPECIFICS QUESTIONS

In general, the hypothesis put forward for each question is that the profile of responses from households that gave an admissible response was non-biased. Therefore the percentages totalled 100%, ignoring non-responses to specific questions, as is usually the case. From these, data estimates of how many thousands of households had a certain type of equipment were arrived at.

Because the non-response rate varies with the type of household or dwelling (homeowners, for example, gave better responses than renters), the estimates contained some inconsistencies. Some adjustments (mostly minor) were made to the data. The section regarding heating in dwellings was especially problematic because there was an attempt made to overlap the type of system with the principal energy source: some estimates which were made by describing the type of system first and the energy source second differed from those arrived at when the questions were reversed. The simple solution to the problem was to retain only those estimates from respondents who answered both questions; this eliminated a considerable portion of the sample (nearly 8%), assuming that, for example, the type of system used by those who did not answer the question about the energy source differed considerably from the general profile of those in the total population. The profile of responses obtained was therefore taken separately for each question, and the quotient iterative method was used as the point of reference to arrive at an estimate of overlapping frequencies; after four complete iterations, the data were consistent enough to be coherent.

The attentive reader will notice some minor fluctuations in the estimates as expressed by thousands of dwellings, depending on which table is consulted. These fluctuations are unimportant given the magnitude of error attributable to sampling (or other sources).

### 3.3 CALCULATION OF AVERAGE VALUES

For the area of the dwelling, another imputation procedure had to be applied, as some households gave the number of rooms rather than the total inhabited and heated area. After estimating the average areas for each of the five regions of the country from correctly given responses to the SHEU, the estimates were related to the average number of rooms in dwellings according to the 1991 Survey of Household Facilities Equipment (SHFE) by Statistics Canada, and the following imputation formula for households that gave the number of rooms was arrived at:

$$\text{area} = (\text{number of rooms} + 1) \times \text{Index} \times 161.7$$

where Index = 1.1 in Ontario and British Columbia, and 1 elsewhere.

---

The following are the data used for the calculations

REGION	AREA	NUMBER OF ROOMS	
		SHEU	SHE
Atlantic	1177	6,1	
Quebec	1048	5,4	
Ontario	1283	6,1	
Prairies	1146	6,1	
British Columbia	1268	6,0	

### 3.4 PUBLICATION GUIDELINES

This report contains three types of data: averages based on metric (or pseudo-metric) values, percentages of households or dwellings, and estimates by thousands of households or dwellings that these percentages represent. From the point of view of relative error or coefficient of variation these last two types are equivalent.

Appendix 4 presents the coefficients of variation (CV) for the various averages published in this report; these CVs are calculated for all respondents contributing to the average; it can be stated that, at this level, Statistics Canada's guidelines have been followed ( $CV < 16.5\%$ ). For estimates related to subsets of the populations, it has been verified that the guideline has been respected. Some rare exceptions to these rules have been accepted in order to complete the tables.

As for the percentages, the guideline based on the CV has been respected where percentages exceeded 10%. For estimates below this figure, the rule has been bent because it does not easily lend itself to this type of percentage, as it sometimes suggests that one piece of data should not be published although its complementing data is publishable. At the extreme, some percentages were allowed to be published for which the sampling error at the 95% confidence level could be equal to the value of the estimate itself. Chapter 2 contains a series of diagrams on the characteristics of the thermal envelope with very low percentages; each diagram is accompanied by a note indicating the percentage below which this critical point may be reached. Elsewhere, the general practice was to combine some categories to allow for publication, or else the estimates were simply eliminated from the tables.

Sheet 1  
**Calculation Rules to Determine Averages  
 from Data Gathered at Intervals  
 for Variables such as Age of Equipment, Area, Income, Etc.**

**Possible Situations:****1. The code corresponds exactly to the metric value:**

The code thus becomes the metric value.

Example: Age of refrigerator: the code "2" means "2 years".

**2. The code "1" corresponds to a number of values below a given quantity:**

The metric value used thus depends on the variable.

Examples: Age of Appliance:	1 year or less	take	"1 year"
Area of House	less than 600 sq. ft.	take	"450 sq. ft."
Area of Apartment	less than 600 sq. ft.	take	"350 sq. ft."
Household Income	less than \$10,000	take	"\$6,000"

**3. The code corresponds to a well-defined interval with a minimum and a maximum.**

Therefore, take the middle figure of the interval  $(\text{maximum} + \text{minimum})/2$ .

Example: Age of Appliance: 11-15 years take "13 years"

**4. The code corresponds to a number of values above or equal to a given quantity:**

The metric value used thus depends on the variable.

Variable	Highest Category	Value Used	Variable	Highest Category	Value Used
Area (house)	2,501 sq. ft. +	2800	Age, washing machine	21 years & +	24
Area (apartment)	2,501 sq. ft. +	2600	Age, dryer	21 years & +	25
Age, household head	70 years & +	83	Age, heating system	21 years & +	27
Age, 1st refrigerator	21 years & +	26	Age, central air	21 years & +	24
Age, 2nd refrigerator	21 years & +	29	Age, window unit	21 years & +	24
Age, stove	21 years & +	25	Age, water heater	16 years & +	19
Age, dishwasher	21 years & +	23	Dwelling temperature	24 °C et +	25
Age, 1st freezer	26 years & +	31	Household income	\$80,000 +	\$100,000
Age, 2nd freezer	26 years & +	32			

It must be noted that these rules were applied loosely; the decision to apply a rule was based on whether or not a table would be published, and not on whether or not a certain piece of data in a table would be available. As well, the estimates of the CVs were perhaps somewhat conservative in that they exaggerated the actual error; as a result, the basis of calculation was Statistics Canada's hypothesis of a design effect equal to 6. This figure is sometimes excessive when dealing with subsets of the population (e.g. dwellings heated by oil).

### **3.5 TRADITIONAL DATA**

This report contains both unpublished data (such as those regarding the thermal envelope) and data traditionally collected through the Survey of Household Facilities Equipment also conducted by Statistics Canada. As the goal of the survey was not to be a substitute for other traditional sources, it should be understood by the user that where there is a discrepancy between the estimates presented in this context and data from traditional sources, the most traditional data shall prevail. In general, it can be stated that the discrepancies are rather inconsequential when these concepts are taken into consideration.