THE UNIVERSITY OF MANITOBA

EFFECTS OF ENERGY CONSERVATION EDUCATION ON BELIEF, AWARENESS AND NON-STRUCTURAL CONSERVATION PRACTICES

by

Olivia Sophia Davids

A thesis submitted to the
Faculty of Graduate Studies
in partial fulfillment
of the requirements for the degree of
Master of Science

Department of Family Studies
Winnipeg, Canada

April, 1980

EFFECTS OF ENERGY CONSERVATION EDUCATION ON BELIEF, AWARENESS AND NON-STRUCTURAL CONSERVATION PRACTICES

BY

OLIVIA SOPHIA DAVIDS

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF SCIENCE

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my committee members: Dr. Nancy Hook, Chairperson, and Dr. Lois Brockman, Department of Family Studies, Dr. Ken Mount, Department of Statistics, Mr. Leon Feduniw, Department of Interior Design, and Mr. John Hockman, Manitoba Housing and Renewal Corporation. Their guidance, encouragement, understanding and friendship through this unforgettable undertaking will always be greatly appreciated.

I would also like to thank Mrs. Dorothy Ford, a former University of Manitoba Home Economics graduate who is currently a Coordinator and Administrator of family housing for the Winnipeg Regional Housing Authority for her advice and assistance in conducting this research. Her interest in this study, her willingness to assist and kindness will always be remembered. I am deeply indebted to Mrs. Isabel Wettlauffer, Home Economics Curriculum Consultant with the Manitoba Department of Education for her suggestion of the need for the development of energy conservation educational materials and my subsequent decision to centre my research efforts on this topic. It has been a very rewarding experience in more ways than one.

Mr. John Broere, Systems Analyst has been a great help in the computer processing of the data. I extend to him my sincere appreciation for his patience and kindness. Very special thanks to Connie Halwas and Wendy Epp, two recent University of Manitoba Home Economics graduates, without whose unquestioning assistance and support during the data collection and educational process, the scope of the research would have been drastically curtailed. It was a pleasure working with them and their efforts and

suggestions are much appreciated. I would also like to sincerely thank all those families who participated in the study. Their cooperation, friendliness and patience have made this endeavour a successful one. Many thanks to Mrs. Muir and Mr. McLeod, the presidents of the Tenants' Associations in the two sample areas and their executives for their assistance, suggestions and encouragement.

Finally, sincere thanks to my husband, Girmay Yohannes, my parents, Dr. and Mrs. John Davids for their assistance in caring for our young daughter Kimberley, Irene Haigh for her encouragement, interest, and support and my brother Chris Davids. Also, special thanks to Mrs. Vi Patrick who helped me greatly by typing this research paper.

ABSTRACT

EFFECTS OF ENERGY CONSERVATION EDUCATION ON BELIEF, AWARENESS AND NON-STRUCTURAL ENERGY CONSERVATION PRACTICES

By

Olivia Davids

The concern about energy shortages expressed at the national and international levels needs to be translated into practical means of alleviating the situation and transmitted to consumers in an effort to encourage conservation. Before educational programs can be designed, it is important to determine existing beliefs about the energy situation and energy conservation practices. A sample of 138 addresses were drawn resulting in interviews with 70 adults, 10 males and 60 females from tenants in physically similar public housing units administered by the Winnipeg Regional Housing Authority in two geographically separated areas of the city of Winnipeg. Both groups responded to a personal interview in July, 1979, designed to provide information about the respondents' status of beliefs, awareness and non-structural energy conservation practices. Two utility meter readings, three months apart, were taken to provide an average daily consumption rate.

The results, based on frequencies of responses to the personal interviews, showed that most people believed that there were no energy shortages in Canada. Those who believed in energy shortages believed that they were mild and caused by human inefficiency as opposed to actual resource depletion. The newspaper and television were the main sources of energy information while government publications, professional people, politicians, friends and schools were perceived as the least reliable

sources of information. Respondents were quite knowledgeable in the more common non-structural conservation measures, but demonstrated a lack of knowledge in those measures which required specific information about energy utilization. An absence of efforts to conserve was noted in thermostat setting, laundry, clothing, transportation and summer space cooling practices, the use of supplementary heating devices and electric lighting.

In summary, this study indicates an absence of belief in energy shortages in Canada and a lack of basic knowledge about the effects of a selected set of non-structural energy conservation measures among a sample of public housing tenants which could possibly explain their energy consumptive orientation. Some insignts into the factors affecting the delivery of an effective educational program in energy conservation are discussed.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Natural resources, their abundance or paucity and their consumption, whether efficient or inefficient, have always served as significant indicators of the political, economic and social stages of development of nations. In the past, the transitions from one stage to the next, in part originated in major technological advancements which made alternative natural resources accessible and available for the production of energy. Denis Hayes (1976) describes some changes on the social dimension of nations that are concomitant with changes in the type of resource emphasized at any particular time in the historical development of nations:

> Every major energy transition brings with it profound social change. The substitution of coal for wood and wind ushered in the industrial revolution. The petroleum era revolutionized mankind's approach to movement--restructuring our cities and shrinking our world. Now at the twilight of the petroleum age, we face another energy transition in the certain knowledge that it will radically alter tomorrow's society. Each of the energy options available to us today carries with it far-reaching social implications. (p. 6)

As Canadians, movement away from our simple, frugal existence to a highly complex society, has turned our attention away from the environment and its declining supplies of natural resources. We ecstatically embraced the daily comforts occasioned by technological advancement, but neglected to remember that nothing lasts forever. "Today, the ways in which we produce, mechanize, use and energize our homes, bear little resemblance to their antecedents" (Journal of Home Economics, December 1973, p. 20-21). Our relatively rapid progression from the pioneering, frugal ideology to the comforts and luxury of the present time has changed Canada from a nation low in energy use to a nation greatly dependent on energy. Until

recently, the prevailing attitude toward the use of energy resources has been one based on the belief in an interminable resource supply (Morrison, 1975).

In order to appreciate the changing trends with reference to resource use in Canada, this chapter will briefly touch on the following:

1. the status of the international, national and provincial energy resource situation and its relation to the family; and
2. the definition of this research problem and its basic objectives.

The International, National, and Provincial Situation

The disquieting effects of the 1973 Middle East unrest have once again come to mind in the wake of the present unstable conditions in Iran and the negative Arab reaction to the signing of the Middle East Peace Treaty. As a consequence of these factors, the production and availability of oil was decreased and the world price of oil raised substantially ("An Energy Strategy for Canada," 1976). Canada depends on the Middle East for 48.2 percent of her oil needs ("Energy Update," 1977) so that this country's oil supply is directly affected by events in the Middle East.

Canada is divided into a western and an eastern region by the Borden Line, an agreement which facilitates the supply of oil to these regions. The western provinces are supplied by Alberta, Saskatchewan and British Columbia, while the eastern region depends upon the Middle East for 48.2 percent of its supply, Latin America for 47.3 percent and Africa and Europe for 4.5 percent of its supply ("Energy Update," 1977). The reason behind Canada's dependence on international oil stems from the formidable problems associated with the transportation of oil from west to east (Breton, 1975). An International Energy Agency meeting,

chaired by Canada's then energy minister, Alastair Gillespie, concluded that "as early as the 1980's the world will not have sufficient oil and other forms of energy available" ("Energy Update," 1977, p. 1). At this meeting oil importing nations including Canada, made a commitment to decrease their demands for imported oil ("Energy Update," 1977).

The Energy Update report (1977) further emphasizes two crucial facts. Firstly, that large new sources of supply are required to fill worldwide demands for oil to complement and later to replace declining oil regions. It is estimated that discoveries of the past fifteen years--in North Africa, West Africa, the North Sea and the North Slope--will fill the world's requirements for only six years. Secondly, the world will be increasingly competing for the oil of Saudi Arabia, the major remaining Middle East source. But the fact of the matter is that Saudi Arabia will not be able to meet world wide demand.

Despite these signs of imminent danger, there appears to be a trend toward higher consumption of primary energy (petroleum, hydroelectric, natural gas, coal and nuclear energy) in Canada through the seventies ("Energy Update," 1977). Natural gas demands in Canada for 1971 were almost equally divided between the industrial (49 percent) and the residential/commercial sectors (51 percent). Petroleum demands were highest for transportation (48.4 percent), followed by the residential/commercial sector (36 percent) and the industrial sector (15.6 percent) ("Energy in Manitoba," 1974). According to these figures, the residential/commercial sector is a major consumer of natural gas and petroleum.

The use of coal to generate power seems to have regained popularity. In addition, scientists are exploring other alternative sources of energy such as nuclear, solar, wind and biomass power. But, until questions

relating to gas emissions, radioactive wastes, plutonium assimilation and the implementation of technology for alternative resource use can be answered, we will be dependent for the most part on the non-renewable resources ("Renewable Society," no date given). A short poem by Dorothy Winter (1976) encapsulates the attitudinal and practical changes we will have to make in order to conserve our declining energy supply:

> You can go by bike, or hike;
> Muscle-powered,
> Take a freighter, train or plane;
> Fossil-powered.
> "But you can't catch me".
> Says the lowly flea,
> And off he goes at 140 g.
> Protein powered. (p. vi)

In response to the energy crisis of 1973, the Federal Government of Canada has adopted a national energy strategy, the objective of which is self-reliance. Self-reliance means the ability to rely on our own domestic supplies as far as possible to avoid arbitrary changes in world prices or prolonged curtailment of supply ("An Energy Strategy for Canada," 1976). In order to reach the major objective of self-reliance, the Canadian Government has delineated nine major factors which could result in greater efficiency of natural resource consumption: (1) appropriate energy pricing; (2) energy conservation; (3) increased exploration and development; (4) increased resource information; (5) interfuel substitution; (6) new delivery systems; (7) emergency preparedness; (8) increased research and development and (9) greater Canadian content and participation ("An Energy Strategy for Canada," 1976, p. 3). Of particular import to this proposed study, is the second factor on the list, energy conservation, an area in which most residents of Manitoba have some control.

The provinces of Canada control energy resources within their boundaries

as laid down in the Canadian Constitution. By the same token, the implementation of Federal energy policies is under provincial jurisdiction ("An Energy Strategy for Canada," 1976). The province of particular interest to this study, is Manitoba. The following are figures for energy supply/demand by major source between 1972 and 1976.

Table 1

Energy Supply/Demand in Manitoba by Major Source

(B.T.U. 10^9)[a]

Year	Oil	Natural Gas	Electricity	Total
1972	114,990	74,140	34,811	233,941
1973	120,210	76,821	37,692	234,723
1974	124,980	77,300	40,213	242,493
1975	118,566	74,339	40,878	233,783
1976	119,250	74,620	41,988	235,858

Source: Energy Data for Manitoba, 1976, p. 1 (modified for inclusion here).

[a]To convert from natural units, the following factors were used: 1 barrel of oil = 6 million BTU, 1 mcf of natural gas = 1 million BTU and 1000 kwh of electricity = 3.412 million BTU.

Demand for natural gas increased up until 1974, the peak year for consumption. After 1974 there was a gradual decline in demand for natural gas to a slightly higher level than the 1972 level of demand and to a substantially higher level of demand for oil than the 1972 level of demand

for oil. Electricity consumption continued to increase steadily between 1972 and 1976, showing no sign of decline. The overall demand figures show an increase which peaked in 1974, declined significantly in 1975, but showed somewhat of an increase in 1976, reflecting the increase in oil and electricity consumption.

The following table shows the consumption of petroleum products used in transportation for 1975 and 1976:

Table 2

Consumption of Petroleum Products Used in Transportation (000 barrels)

	1975	1976	1977[a]
Motor gasoline	9,345	9,874	10,062
Diesel fuel[b]	2,051	2,131	
Aviation gasoline	109	132	136
Aviation Turbo fuel	1,431	1,491	1,364
Total	12,936	13,628	11,562[c]

Source: Energy Data for Manitoba, 1976, p. 3 (modified for inclusion here).

[a]The 1977 figures are from "Detailed Energy Supply and Demand in Canada," Statistics Canada, 1977.

[b]Manitoba Energy Council Secretariat estimate of diesel fuel used in the transportation sector.

[c]This total excludes the 1977 figure for diesel fuel consumption.

The largest end-use of petroleum products is for motor gasoline. Consumption of this type of gasoline showed an increase of 529,000 barrels between 1975 and 1976 and 188,000 barrels between 1976 and 1977. The amount of motor gasoline consumed is far greater than the amount of diesel fuel, aviation gasoline and aviation turbo fuel consumed.

The following table shows the natural gas sales for 1975 and 1976:

Table 3

Natural Gas Sales by Sector for 1975 and 1976

(bcf)

	1975	1976	1977[a]
Manitoba			
Residential	22.5	22.4	22.0[b]
Commercial	19.5	18.8	18.8
Industrial	18.3	19.8	19.7
Total[c]	60.3	60.9	60.6

Source: Energy Data for Manitoba, 1976, p. 3 (modified for inclusion here).

[a]These figures are from the Statistics Canada Publication, "Detailed Energy Supply and Demand in Canada, 1977.

[b]Statistics Canada uses the designation "Domestic and Farm" as a close approximation to "Residential" in terms of energy consumption.

[c]Annual totals here differ from those in Table 1 as the latter include gas used in the system and losses/adjustments.

Natural gas sales to the residential sector remained quite stable between 1975 and 1976, while sales to the industrial sector increased slightly. The reason for the stability in sales to the residential sector could be a result of the declining use of natural gas in Manitoba as consumers switched to electricity for space heating. Nevertheless, the residential sector is still the most important market for natural gas for space heating in Manitoba. The following table shows electricity sales in Manitoba:

Table 4

Electricity Sales by End-Use Sector in Manitoba (000 kwh)

	1975	1976
General		
Loads under 5mkw	3,498,724	3,716,011
Loads 5mkw and over	2,695,575	2,546,937
Domestic	2,597,968	2,865,873
Farm	819,036	908,743
Street lighting	102,228	106,021
Total	9,713,531	10,143,585

Source: Energy Data for Manitoba, 1976, p. 4 (modified for inclusion here).

In 1976 there was a significant increase in the domestic, farm and small general service demand for electricity. In 1976 electricity sales to the domestic sector was second in magnitude to the large general service sector. These tables (2, 3, and 4) indicate the most important users of the main energy resources:

Oil - motor gasoline sector

Natural gas - residential sector

Electricity - large general sector, followed by the domestic sector.

The following table shows oil prices in Winnipeg between 1972 and 1976:

Table 5

Retail Oil Prices in Winnipeg as of December 31st in ¢/gallon

	Regular Gasoline	#2 Fuel Oil
1972	51.0	19.9
1973	55.3	24.1
1974	59.9	32.2
1975	80.1	38.9
1976	82.2	44.4
February, 1980[a]	108.0	69.1

Source: Energy Data for Manitoba, 1976, p. 5.

[a]Average based on prices quoted by four major oil companies in Winnipeg.

Table 6 shows the prices of natural gas between 1973 and 1977:

Table 6

Natural Gas Prices

	Winnipeg City Gate Price ¢/mcf
June 1973	34
Sept. 1973	36
Nov. 1973	41
Sept. 1974	42
Nov. 1974	66
Nov. 1975	101
July 1976	111
Jan. 1977	119
Feb. 1980[a]	130

Source: Energy Data for Manitoba, 1976, p. 5 (modified for inclusion here).

These tables indicate rather significant price increases for gasoline, fuel oil and natural gas since 1973. Electricity prices have shown similar increases in the various sectors since 1973 ("Energy Data for Manitoba," 1976).

A proposed major factor contributing to the increased demand for energy resources in Manitoba, is the increase in the standard of living.

[a]Telephone conversation with personnel at the Greater Winnipeg Gas Company, February, 1980.

> Increasing disposable incomes have, for example, usually been associated with increases in both the stock and use of private automobiles, purchase of household appliances such as frost-free refrigerators, colour television sets, dishwashers, and small electrical appliances and increased use of plastics and other petro-chemical products. These goods and activities--and the production processes implied by them--have required increasing energy supplies in Manitoba ("Energy in Manitoba," 1974, p. 6).

Manitoba relies almost solely on imports in order to meet its requirements for natural gas and petroleum. Even though Manitoba is fairly self-sufficient in electricity production through hydroelectric generation, the costs of immediate widespread conversion to this energy source in residential/commercial space heating, for example, would be formidable. Also, electricity cannot replace certain other natural resources such as are used in industry and transportation ("Energy in Manitoba," 1974). The increases in utility rates faced by Manitobans since the early seventies are indicative of increased world prices, which have had and are having a chain effect upon the cost to the consumer.

The relatively fast per capita rate of growth in energy demands, the decreasing availability and thus increased cost of energy resources, and the significance of the residential/commercial sector as the major consumer of energy in Manitoba, suggests that a study of household energy conservation practices is in order. Such a study would provide the information needed to formulate meaningful energy conservation programs aimed at changing the energy consumptive attitudes and behaviour of consumers in order to preserve supplies and stabilize prices.

Definition of the Research Problem

This study is concerned with residential energy conservation practices, more specifically, the non-structural energy conservation practices of tenants in public housing in the city of Winnipeg, Manitoba. Public

housing constitutes approximately 2.6 percent[1] of the total housing accommodations in Winnipeg. Therefore, tenants in public housing do have a sizeable effect on the total energy consumption rates for Winnipeg. It is necessary to confine this study to non-structural energy consumption/conservation patterns, because these are areas in which the tenants do have some control. Rent is subsidized by the government and includes apartment rent and in some cases utility and parking expenses, calculated according to the family's income. In other words, the tenants may not be responsible for paying their own utility and parking bills. Other research (Kilkeary and Thompson, 1975) has shown that where tenants are not directly responsible for paying their own utility bills, they tend to consume more energy and use fewer conservation measures than would otherwise be the case. If this is the case in Winnipeg, an energy conservation education program is in order, because the government cannot afford to subsidize waste.

The main sources of space heating fuel for public housing in Winnipeg are electricity (60 percent) and natural gas (40 percent) (Personal communication with John Hockman, 1979). Coupled with the increasing prices of these commodities, space heating is the largest user of energy resources in Manitoba ("Energy in Manitoba," 1974). McCallum (1976) states that homes today are often overheated. A saving of about 10 percent on heating fuel requirements can be accomplished by maintaining the inside temperature at 20°C (68°F) rather than 22°C (72°F) ("Living in Times of

---

[1]Calculation based on the City of Winnipeg projection of total housing stock for 1981 which is 214,612 including public housing units. (Telephone conversation with Larry Loreth, Environment and Planning, February, 1980). The total number of public housing units in Winnipeg is estimated to be 5,500 (Conversation with Mr. John Hockman, Manitoba Housing and Renewal Corporation, 1979).

Scarcity," 1976). These factors provide us with some indication of where and how energy consumption can be decreased.

Purpose of this Research

The purpose of this research was to determine whether exposure to an energy conservation education program would establish or increase awareness of the energy problem; whether it would increase belief in the reality of the problem; and, whether it would increase energy conservation practices via non-structural means.

Specific Objectives

1. To assess current non-structural energy consumption/conservation practices of tenants in public housing in Winnipeg by way of a pre-assessment personal interview.
2. To present an energy conservation educational program to these tenants in public housing.
3. To evaluate the program in terms of changes in energy consumption/conservation behaviour in public housing tenants.
4. To evaluate the program in terms of changes in awareness of the energy shortage and belief in the reality of the shortage.
5. To obtain utility data for the respondents as a reliability check on the evaluation responses.

CHAPTER 2

REVIEW OF LITERATURE

This chapter will review research literature related to factors in residential energy use. The purpose of this chapter is to clarify the relationship and context of the proposed research with prior studies.

The fact that the energy crisis of 1973 with the resultant and continuing foreign oil price increases and decreased availability, had a greater effect on the United States than it did on Canada (Laxer, 1975), is in part indicated by the greater volume and variety of energy-related literature and research available from the United States. Canadian literature and research to date deals mainly with the development of domestic supplies, energy demand studies with reference to government policy making, energy policy at the provincial, national and international levels, the economics of energy, energy industries and energy and environmental factors. In Canada there has not as yet been much investigation into the everyday behavioural aspects of household energy consumption and conservation. Nevertheless, this aspect of research is gaining ground in this country as a result of the rapid escalation of international oil prices, decreased availability and a general decline in world supplies of fossil fuels.

Generally speaking, before any voluntary or coerced changes in behaviour can occur, it is necessary to establish both an awareness and a belief that a problem exists and that such changes in behaviour will modify or lessen the impact of that problem (Kiesler, Collins and Miller, 1969). Since it is the purpose of this study to monitor behaviour change in terms of energy conservation, it becomes necessary to determine the

status of the awareness and belief in the energy shortage in the research sample. The premise that behaviour change is somewhat related to an awareness and belief in the problem, is given credence by the fact that much of the research reviewed either contained awareness and belief components in their instruments, or concentrated solely on beliefs and attitudes toward the energy situation (Bartell, 1974; Bultena, 1976; Cunningham and Lopreato, 1976; Doering, 1974; Gottlieb and Matre, 1974, 1976; Heberlein, 1974, 1975; Hogan, 1976; Honnold and Nelson, 1976; Morrison and Gladhart, 1976; Morrison, 1975; Murray, Minor, Bradburn, Cotterman, Frankel and Pisarski, 1974; Novic and Sandman, 1974; Thompson and Mactavish, 1976; Warren, 1974; and Winett and Nietzel, 1975).

In order for a catalysis in behaviour to occur, that is, a change from energy consumptive to energy conservative behaviour, via an energy conservation educational program, an initial assessment of the present behaviour is required to serve as a baseline for designing the catalyst as well as for determining whether any change has in fact occurred. Researchers have also made initial assessments of energy consumptive/conservative behaviour as a component of their research or others have concentrated their efforts on these assessments as a basis for educational programs, policy-making or further study (Cunningham and Lopreato, 1977; Fox, Fraker, Grot, Harrie, Schorske and Socolov, 1973; Gladhart, 1976; Hogan, 1976; Kilkeary, 1975; Morrison and Gladhart, 1976; Morrison, 1975; Murray, Minor, Bradburn, Cotterman, Frankel and Pisarski, 1974; Newman and Day, 1975; Walker and Draper, 1975; and Warren, 1974).

One commonly used method for attempting to change behaviour, is exposure to energy conservation information and/or energy conservation educational programs. A number of researchers have applied energy

conservation information in various ways, for example, with and without incentives, using material designed to increase or decrease energy use, and, by monitoring effects of existing established information sources on the public such as the news media (Hass, Bagley and Rogers, 1975; Heberlein, 1975; Honnold and Nelson, 1976; Novic and Sandman, 1974; Seligman and Darley, 1976; Warren, 1976; and Winett and Nietzel, 1975).

In an effort to increase the reliability of their data, several researchers have, in addition to their interview and survey instruments, employed actual meter readings with which to calculate consumption levels. Many researchers have also included family transportation in their research on residential energy consumption. These two features will be elaborated in the subsequent summarization of the literature cited above.

In the Morrison study (1975), the main concern was to test a model based on systems theory in order that the family's utilization of energy resources could be understood in the context of that family's day to day operations. This enables one to appreciate how the whole family system utilizes energy as well as how the individuals in that family utilize energy, based on that particular family's distinct pattern of daily operation. She set out to determine the total amount of direct energy consumed in single-family detached dwellings, measured in BTU's, as well as the relationship between a selected set of socio-physical factors on the total amount of direct energy consumed. She also measured the relationship between the family's belief in the energy shortage and the energy consumed by that family. A self-administered interview schedule was presented to the husband, wife and one child over twelve years old in each family. In addition, utility data were obtained from utility companies with permission from the respondents.

Her results indicated more agreed belief (husband and wife) in the reality of the energy problem as education and income levels increased. Also, families who own their own dwelling unit agreed more in the reality of the energy problem than did families who rented. Household size and number of major appliances owned showed strong positive correlations with the amount of direct energy consumed. The structural features of the household, except insulation in the ceiling, were not important predictors of direct energy consumption in this study. Belief in the reality of the energy problem turned out to have a weak negative correlation with direct energy consumption. This means that although there was information in the environment about energy shortages and increased costs, this information does not have a serious impact on the amount of total direct energy consumed. Family characteristics were found to be more important predictors of belief in the energy problem, than were the physical dwelling factors. Physical characteristics of the housing were more related to energy consumption than were the family characteristics.

Morrison and Gladhart (1976) used demographic characteristics such as income, family size, age, sex and occupation as factors which may affect energy consumption. They also considered how some structural characteristics of dwellings such as size, single versus mulifamily arrangement and amount of exterior glass, affected energy consumption. Belief in the energy crisis was also measured in relation to energy consumptive behaviour.

Family income was found to be the single best predictor of residential energy consumption, with the higher income families consuming more than the low income families. They also found that families in the child rearing stage of the life cycle consume more energy than those without

children or those in the later stages of the life cycle. Employed homemakers used less energy than non-employed homemakers. They confirmed the findings of Morrison's (1975) study that physical housing factors are directly related to energy consumption. Belief in the reality of the energy problem does not in itself cause people to consume less energy. They also found that in families in which both husband and wife believed in the finiteness of energy resources and the wastefulness of consumption patterns, energy conservation practices were more likely to be adopted.

Gladhart (1976) considered housing type, that is, single and multi-family housing, family life cycle and family size in his study. With regard to family size he focused on the relationship between the number of children present and the amount of energy used. He also used the age of the wife as an indication of energy utilization. An interesting feature of his study was the analysis of the average energy cost per person in a family, in relation to the size of the family.

The findings of this research indicate that single family homes require much more energy than either multifamily or mobile homes. Families with no children or families where the wife is at least sixty years old, use about 13 percent less energy. Finally, in larger families, that is, families with five persons or more, the average energy cost per person is less than fifty percent of the per person cost in a two-person family. But, nevertheless, larger families still consume more energy than do smaller ones.

Hogan (1976) used interviews and self-administered questionnaires in her research. She established value scales with reference to self-esteem, familism, social responsiveness and ecoconsciousness and tested these as predictors of conservation behaviour. Her technique was thus designed to tap the inner feelings, beliefs and attitudes of respondents and to

determine whether these were related to energy consumption practices. The results of this research showed awareness of the finiteness of energy resources and wastefulness of certain consumption patterns to be positively related to adoption of conservation measures. Social responsiveness was related to demographic characteristics but not to conservation behaviour.

Dr. Hogan is at present involved in a study of energy use patterns in Minnesota families. Here she is concerned with the amount of energy required for space heating, air conditioning, the operation of electrical appliances and driving the car. Her data collection period lasted nine months so that she could determine energy costs at different times of the year. Respondents were requested to state which energy conservation practices they have used and whether they would recommend these practices for other similar families. Finally, beliefs, attitudes and opinions about the energy situation were documented. A series of four interviews were conducted, some of which were video and audio taped. Car odometer and utility meter readings were taken periodically. The aim of this research, as it was with the Morrison (1975) study, was to determine the family's energy use and belief patterns as a whole, rather than to limit the data determination to one respondent in the family. This provides more accurate information on the dynamics within the family, because using information from only one respondent in the family negates the preferences and practices of the other family members, which undoubtedly do affect the energy consumption patterns of the household.

Bultena (1976) compared attitudes and behaviour related to energy among different socio-economic groups. The research was aimed at determining, firstly, whether people believed that resource scarcity was the basic cause of the energy crisis; secondly, whether they thought that

large oil companies were responsible for these shortages and, finally, how serious the respondents judged the energy shortages to be at the national, community and family levels. Information was also gathered on the respondents' perceptions about the adequacy and potential impacts of government energy policies. This study involved attitude and adaptive behaviour determinations using the personal interview research method. Direct measurement of energy consumption was not employed, but respondents were asked to report on conservation measures which they had adopted.

Results of this study show that most respondents view the energy shortages to be due to the actions of large oil companies, to government favouritism to these companies and to wasteful energy consumption. Few respondents related the shortages to dwindling energy reserves. Upper class respondents viewed energy shortages as being a result of dwindling energy supplies, wasteful energy use and population growth. Middle and lower class respondents blamed the large oil companies and government favouritism to these oil companies for the shortages. Increased gasoline and home heating costs were the effects from the energy shortage most often experienced by respondents. Most respondents had lowered thermostats and had reduced electricity consumption in response to public appeals and increased prices. Few respondents adopted conservation measures such as greater use of public transportation and use of carpools. More upper class than middle and lower class persons reported adopting energy conservation measures.

Warren and Clifford (1975) used a slightly different approach by studying conservation behaviour by type of neighbourhood. Neighbourhoods were classified into six types from the most (integral) to the least (anomic)

cohesive and active. Sources of energy information by neighbourhood were also documented. The addition of the concepts of neighbourhood type and source of energy information, certainly broadens one's understanding of the attitudinal and behavioural aspects of energy consumption.

These researchers found major differences in conservation behaviour by type of neighbourhood. The integral neighbourhood was found to be highest in energy conservation while the anomic neighbourhood was lowest. They often found the effects of the neighbourhood to be greater than the income effects. Sources of energy information varied by neighbourhood type as well. The integral setting was conducive to the use of all information from the mass media to interpersonal discussion. In anomic settings, little use was made of any information source.

Gottlieb and Matre (1976) concentrated their research efforts solely on information sources with regard to preferences and the perceived honesty and accuracy of various sources. The results showed that oil, gas and electricity companies, followed by the government ranked lowest as accurate and honest information sources. The television was considered the most reliable source of information, followed by local newspapers, magazines, national newspapers and radios.

Similarly, Novic and Sandman (1974) studied the effects of mass media on peoples' attitudes toward the solution of environmental problems. They divided respondents into high and low media users and documented differences in knowledgeability and types of solutions preferred. They found that high media users consider themselves less informed, view issues as less serious, and prefer less personal solutions to problems than do those who rely more on books, educational courses and interpersonal communication.

Cunnuningham and Lopreato (1977) used mailed questionnaires in their

study to determine the effect of demographic characteristics, especially income, on energy consumption. They investigated sources of energy information with regard to respondents' preferences and perceived reliability of these sources. Furthermore, subjects were asked to indicate their efforts to conserve energy on twenty-six different statements which were categorized into energy conservation measures which were easy to carry out and those which required more work and resulted in less comfort. Each aspect or component of the Cunningham and Lopreato study is extremely well documented and supported by other research in the field.

Newspapers were the first most important source of energy information. Television was second and newsmagazines third. For their second choices, most respondents chose television, then newspapers, followed by newsmagazines. They found other sources such as high school or college courses and government literature to be unimportant for most subjects as sources of energy information. The majority of respondents reported that they had made substantial efforts to conserve energy. This was true for actions that were easy to do such as turning the light out when not needed and opening the draperies during the day and closing them at night. But where conservation efforts involve more work such as hanging clothes out to dry, defrosting the freezer more often, and washing the dishes by hand, reported conservation efforts dropped. The highest number of activities where respondents had made no effort to conserve were recorded for such measures as watching television less, turning down the hot water setting, hanging clothes to dry and defrosting the freezer more often. The researchers stress the fact that large numbers of consumers believe themselves to be conserving energy in a number of ways.

Thomas Heberlein (1974) used an experimental time series design to

determine the effect of informational material designed to either increase or decrease the amount of electricity used by apartment dwellers on their actual consumptive behaviour. The experimentally manipulated variables were decreased energy consumption information only; decreased energy consumption information plus the following information: (a) the economic cost of behaviour; (b) its consequences on other people; and (c) the individual's responsibility; increased energy consumption information plus the information in (a), (b) and (c) above; and no information for the control group. The dependent variable was actual electric energy consumption by way of daily meter readings. Heberlein wanted to determine whether different kinds of information, some of which was designed to appeal to the respondents' sense of moral responsibility to themselves and to others, would change consumptive behaviour. Heberlein controlled for housing type by studying only apartments in six complexes with similar physical features.

The findings indicate that neither the informational material designed to either increase or decrease the amount of energy consumed, nor the energy crisis, influenced the electricity consumption in the apartment units. But, a heavy snowstorm did influence behaviour substantially. The researcher concludes that cognitive appeals alone may not have a clear measurable impact and that structural alternatives such as setting limits for usage and fining people who exceed the limits, might be more effective.

In a later study, Heberlein (1975) conducted a statewide telephone survey to test the theory of Norm Activation. He used littering behaviour, the purchase of lead-free gasoline and household transportation conservation behaviours to test this theory. Thus, the result was a behavioural

report by respondents rather than actual observed behaviour. He found the personal norm to conserve energy to be substantial (98 percent). Awareness of the consequences of one's own conservation behaviour and ascription of personal responsibility for energy shortage were important determinants of the personal norm to conserve energy. The implication of these findings is that attitudes do not readily predict behaviour. He concludes that a single variable does not predict behaviour which is assumed to be determined by multiple effects.

Winett and Nietzel (1975) used an experimental method to note the differences in natural gas and electricity consumption between two groups. One group was given information on how to reduce energy consumption as well as a monetary incentive dependent upon reduced consumption, while the other group was given the information only. Utility meters were monitored. These researchers were more concerned with the effect of monetary incentives on conservation behaviour rather than with an analysis of the effects of physical housing characteristics. The group which received the information and the monetary incentive used significantly less electrical energy. Natural gas use turned out to be related to climate more than to experimental treatment. A two-month follow-up detected a tendency for the energy conservation behaviour caused by the experimental condition, to decline.

Honnold and Nelson (1976) asked introductory sociology and anthropology students to complete a questionnaire. A subsample from this group was given a 'treatment condition' by way of a film, disseminating scarcity information and another questionnaire. Six scales were developed: perceived necessity of conservation, perceived sufficiency of conservation, commitment to conservation behaviour, avoidance of scarcity information,

pretest-posttest perceived necessity and pretest-posttest perceived sufficiency. The purpose of this study was to find out how scarcity information, that is, information using the idea that resources are scarce with a view to persuading people to reduce their consumption of energy, affects peoples' reported energy attitudes and commitment to energy conservation behaviour. This was a pure attitudinal study; actual consumptive behaviours were not measured.

The scarcity information used in this study was relatively ineffective in promoting short-run voluntary conservation. The greater the perceived necessity and sufficiency of conservation efforts, the greater the commitment to conservation behaviour. Among those who believe in the necessity of conservation, the more remote in time the perceived social consequences of resource depletion, the lower the commitment to conservation behaviour. Information emphasizing the immediacy of the resource depletion problem would have the reverse effect. Avoidance of dissonant behaviour, in this case energy conservation behaviour, is higher for consumerists than it is for conservationists and cynics because such information questions their belief that resource depletion is not a problem. If exposure to conservation information is voluntary, those whose initial beliefs are favourable will confront the information more readily than those whose initial beliefs are inconsistent with it.

Doering (1974) surveyed a thousand residents of Indiana to determine their views on the energy crisis. Most of the questions were designed to supply simple "yes-no" answers, while those dealing with who was to blame for the energy crisis, were open-ended. Questions dealing with the belief in the energy crisis, adaptive conservation behaviours with regard to transportation, lowered thermostat settings and changes in home heating

fuels, and subjects' ideas for the use of scarce resources were included. Fifty percent of the respondents said that they did not really believe that there was an energy crisis. The overwhelming majority of respondents blamed the oil companies for the shortage. Responses to the question of actions taken in response to the energy crisis, indicated that a large number of subjects were trying to use their cars less and had turned their thermostats down. Interestingly, 41 percent of the respondents reported that they felt cold when the thermostats were turned down below their normal settings.

James Murray, et al. (1974) did a national cross sectional probability survey in which they investigated household energy conservation, alternative forms of transportation available, expectation about the length of the energy problem and the form of reduced energy consumption by respondents, among other variables. They measured the effect of the energy crisis, family income, occupation and type of residence on these variables. Respondents felt that gasoline fuel was the source of greatest scarcity, but it was not a serious problem; it was more a matter of inconvenience. Household practices adopted by respondents were turning the heat down, using appliances less and turning the lights off.

Newman and Day (1975) conducted a national sample survey to determine energy utilization characteristics of families and of their dwellings. In addition, utility company data were obtained to provide information on the actual amount of energy used and the cost of the electricity and natural gas to consumers. They also studied the relationship of the cost of energy to the household's means, how much households of all kinds depend on cars and gasoline for transportation and how air pollution affects different families. Income was the basic variable used in the analysis. This study

includes suggestions for closing the gaps between the socio-economic groups with reference to the cost of energy.

High income families use more energy regardless of climatic conditions, distance from work, size of house, age and number of people in the household or whether or not the house is insulated. Almost all respondents used their cars to go to work because use of public transportation was too inconvenient.

Fox, et al. (1973) set out to determine which factors determine energy utilization. They controlled for housing type by studying town-houses of similar design and structure. They focused on the questions of how much variation in energy consumption occurs among physically similar units and what proportion of this variance is due to variation in income and family and what proportion is attributable to specific physical factors. The research investigated the effect of the location of the unit, whether end or interior, orientation of major glass areas, family size and family income, among others, on monthly energy utilization. Natural gas and electricity information was obtained from the utility companies. The results show that natural gas savings were due to double glass windows. They also found natural gas consumption to be greater if the unit was an end one. There was no relation between natural gas and electricity consumption. Natural gas consumption was believed to be due to seasonal differences. Electricity consumption was believed to be due to greater user control. Natural gas consumption was neither related to family income nor to family size. The researchers suggest that more research needs to be conducted into the variability created in construction and in user behaviour.

Kilkeary (1975) used interviews with heads of households or spouses to

discover the relationship between exposure to extended blackouts, the consumer's payment of utility bills, car ownership, belief in a concerted family effort to save energy by all United States citizens, family income, education, family composition, age, sex, the purchase of a major appliance in the year preceding the study, and energy conservation. She wanted to find out if the energy crisis motivated conservation, whether consumers were aware of their role in the energy crisis, whether knowledge about the crisis affected consumption and what the public knows about energy-saving and wasting practices. Car ownership, education and family size were positively related to energy knowledge. Exposure to extended blackouts, direct payment of utility bills, car ownership, belief in family effort to produce change affecting the energy crisis and family size were all positively related to the changed practices score. Income was found to be the strongest influence on knowledge and conservation. Families composed of couples with children demonstrated high levels of energy knowledge and energy conservation practices.

Walker and Draper (1975) conducted a study on the energy consumptive behaviour of high, middle and low income groups. Upper income families increased consumption from 1972 to 1974. Middle income families decreased consumption. High income families would not change their energy consumption practices; lower income families could not do so since their use was already minimal and Walker and Draper conclude that middle income families would bear the brunt of conservation programs.

Seligman and Darley (1976) studied the effects of feedback on conservation behaviour in an urban housing development of identical dwelling units. Subjects in this study were given daily feedback on their electricity consumption to see if this would encourage reduction in electricity

consumption. Members of the group given daily feedback on their electricity consumption, and a score relating this consumption to predicted consumption, used 10 percent less energy during the study period than did the control group.

Hass, et al. (1975) conducted an experiment to test the effects of two kinds of energy information messages on the conservation behaviour of respondents. They used potential threat messages in which the magnitude of the potential threat was varied. The other kinds of messages were ones in which the probability of occurrence was reported. The magnitude of potential personal threat conveyed by a message, was more conducive to changed attitudes than was the reported probability of occurrence. Therefore, no matter how likely something might be, if it is not expected to have personal consequences, little attitudinal or behavioural change will occur. Conversely, even a very unlikely event may precipitate change if the perceived consequences are severe.

The purpose of Bartell's (1974) research was to assess the attitudinal and behavioural effects of the energy crisis on Los Angeles residents. The attitude measures included beliefs about the seriousness and duration of the energy shortage, feelings about who is to blame, general perceptions of governmental institutions and actors, preferences among alternate energy policies, and future economic conditions and employment. Behavioural measures included energy conservation practices adopted, changes in mode of transportation and anticipated effects on employment, and personal difficulties experienced as a result of the energy shortages.

Slightly less than half of the respondents (48 percent) believed the energy shortage to be mild, but most (59 percent) of them reported the energy crisis as affecting them in some way. Significant numbers of

respondents had adopted non-structural conservation measures such as turning the lights off when not needed and turning down the thermostat. Measures involving a reduction in the use of the car for recreation, shopping and driving to work, appliance use and watching television less, were much less popular among the respondents. Almost all respondents mentioned transportation problems having to do with the shortage of gasoline, long lines at the gas pumps and fuel costs as affecting them most. One third of the respondents blamed the oil companies for shortages. The only significant predictor of personal energy conservation uncovered by this research, appeared to be an anticipated effect on one's own employment.

Thompson and Mactavish (1976) have used a research design similar to the one presented in this study. This report contains data from the baseline survey they conducted to determine current public perceptions, beliefs and behaviours. Based on this information, they will produce educational materials, and conduct, a re-survey to find out if there were any change in attitudes, beliefs and behaviours.

The majority of the respondents believed that there was an energy problem (63 percent). Waste was reported as the cause of the energy shortages by 25 percent of the respondents, while only 6 percent believe that the problem originates from actual shortages. Of the respondents who believe that there is a problem, 79 percent trust magazines for their energy information, 74 percent trust friends and 73 percent, politicians. These are followed by newspapers, television and family as trustworthy sources. Belief in the energy shortage is strongly related to the informational source used; those who get their information from national magazines and from reports of independent research are more apt to believe in the existence of the energy problem. Belief in the energy

problem is also associated with higher levels of education and income and the adoption of energy conservation practices.

The literature reviewed above is directly related to this research which involved an assessment of awareness, beliefs and the non-structural conservation practices adopted by respondents. Based on this information, an educational program tailored to the needs of this group was developed and presented to the treatment group. The next chapter outlines the methodological procedures for the study.

CHAPTER 3

METHODOLOGY

This chapter will include a statement of the hypotheses proposed for testing, a description of the research design, a list of assumptions on which this study was based and the operational definitions of variables associated with this study. In addition, the sample, the research instruments, the collection of data, the procurement of utility data and the analysis of data will be described.

The hypotheses designed to obtain information on the respondents' belief in energy shortages in Canada, their awareness and knowledge about the energy situation and their non-structural energy conservation practices, are as follows:

Belief Hypotheses

(a) H_0: There are no differences in belief in the reality of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation educational program.

H_A: There are differences in belief in the reality of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation educational program.

(b) H_0: There are differences in belief in the reality of the energy problem of tenants living in physically similar

units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

H_A: There are no differences in belief in the reality of the energy problem of tenants living in physically similar units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

(c) H_0: There are no differences in belief in the reality of the energy problem of tenants living in physically similar units in the experimental group after exposure to an energy conservation educational program.

H_A: There are differences in belief in the reality of the energy problem of tenants living in physically similar units in the experimental group after exposure to an energy conservation educational program.

(d) H_0: There are differences in belief in the reality of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

H_A: There are no differences in belief in the reality of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

Awareness Hypotheses

(a) H_0: There are no differences in awareness of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation eduational program.

H_A: There are differences in awareness between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation educational program.

(b) H_0: There are differences in awareness of the energy problem of tenants living in physically similar units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

H_A: There are no differences in awareness of the energy problem of tenants living in physically similar units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

(c) H_0: There are no differences in awareness of the energy problem of tenants living in physically similar units in the experimental group after exposure to an energy conservation educational program.

H_A: There are differences in awareness of the energy problem of tenants living in physically similar units

in the experimental group after exposure to an energy conservation educational program.

(d) H_0: There are differences in awareness of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

H_A: There are no differences in awareness of the energy problem between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

Practices Hypotheses

(a) H_0: There are no differences in the non-structural energy consumption practices between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation educational program.

H_A: There are differences in the non-structural energy consumption practices between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group after exposure to an energy conservation educational program.

(b) H_0: There are differences in the non-structural energy consumption practices of tenants living in physically

similar units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

H_A: There are no differences in the non-structural energy consumption practices of tenants living in physically similar units in the control group from the time of the pre-assessment measurement to the time of the post-assessment measurement.

(c) H_0: There are no differences in the non-structural energy consumption practices of tenants living in physically similar units in the experimental group after exposure to an energy conservation educational program.

H_A: There are differences in the non-structural energy consumption practices of tenants living in physically similar units in the experimental group after exposure to an energy conservation educational program.

(d) H_0: There are differences in the non-structural energy conservation practices between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

H_A: There are no differences in the non-structural energy conservation practices between tenants living in physically similar units in the experimental group and tenants living in physically similar units in the control group before exposure to an energy conservation educational program.

The Research Design

It was originally proposed that tenants living in physically similar units in one public housing development be approached and asked to participate in a Cost of Living survey. Tenants in physically similar units in another public housing development were to have served as the control group. One of the assumptions of this research was that families who live in public housing possess some similarities because approval of tenancy by the Housing Authority is contingent upon a certain set of requirements. Therefore, since all prospective tenants have to meet this common set of requirements of family composition, family size, and income, among others, some of the non-equivalence between the two groups would be controlled. The research design originally proposed was the non-equivalent control groups design, a quasi-experimental design in which the researcher is able to use intact or naturally assembled groups such as two sections of a housing development (Huck et al. 1974). In this research, however, two different housing developments, but controlled by the same housing authority were used. The observations made prior to the educational program were to provide information as to the status of the respondents' belief in and knowledgeability of conservation and wasteful practices as well as demographic information. These observations were to serve as the criterion for comparison with the post treatment observations following educational programs for both groups.

The energy conservation educational program was designed to attract and maintain the interest of the participants and included a variety of audio-visual and respondent-participation activities. Since the sessions were open to all members of the family, materials were designed specifically for children as well as adults. In order to minimize error due

to the Hawthorne effect, it was agreed to treat this as a Cost of Living survey rather than as an Energy Conservation survey. Questions related to nutrition, food costs, and the effects of rising food prices were interspersed among the energy-related questions. To minimize error due to the Rosenthal effect, it was decided to develop a nutrition educational program which was presented to the control group. The underlying intention was to treat both groups similarly throughout the study. The observations made after the educational program were to indicate whether any changes had occurred in belief in and awareness of the energy problem and in consumption practices.

From this discussion then, two pre-assessment and two post-assessment measurements are indicated. But, it was anticipated that not all respondents would attend all sessions of the educational program, in fact, some of them might only attend one session. Nevertheless, since these "absentee" respondents would have been exposed to at least some energy conservation information either at the program meetings, through hand-delivered informational materials, or vicariously from other tenants, they were also to be measured at the conclusion of the educational sessions. Diagrammatically, the proposed research design may be represented as follows:

	Pre-assessment	Treatment	Post-assessment
Experimental group	0	X[a]	0
Control group	0	Z[b]	0
Absentee Experimental group	0		0

[a] X refers to the energy conservation educational program.

[b] Z refers to the nutrition educational program.

A major change was necessitated in the research design because of the low attendance at the educational meetings. Only 2.7 percent of the pre-assessment respondents in the experimental group and 7.3 percent of the respondents in the control group attended the educational sessions. Consequently, the potential effect of the energy conservation educational programs was curtailed. Therefore, no post-assessment was conducted nor the hypotheses tested.

Assumptions

The following is a list of assumptions on which this research was based:

1. Families living in public housing units controlled by the same housing authority are similar because approval of tenancy is based on a certain set of requirements, usually family income and family composition.
2. The personal interview research method is suited to obtaining both subjective and objective information from families and utility data.
3. Responses to the true--false and agree--disagree statements on the interview schedules will provide an indication as to respondents" attitudes, beliefs and knowledgeability with respect to energy conservation.

Operational Definitions

The operational definitions of terms as used in this study are as follows:

Energy is a measure of the capacity to do work. This study will focus on mechanical energy, this is, the energy produced by the use of

natural fossil resources. In this study, the energy resources to be included are natural gas, electricity and indirectly, petroleum.

Energy Conservation is the act of preserving energy from loss or waste. Energy conservation practices in the household will be used as indicators of energy conservation. See non-structural energy conservation practices below.

Non-structural Energy Conservation Practices are those energy conservation practices involving actions over which the tenants have some control. The following is the list of energy consumption/conservation practices which will be measured in terms of frequency of occurrence and which will give us an indication of energy consumption/conservation attitudes, beliefs and knowledgeability:

1. Use of cold water to wash clothes.
2. Use of the surface burner or unit or the oven to heat up the kitchen when it is chilly.
3. Defrosting the freezer more often.
4. Opening the draperies during the day and closing them at night during winter.
5. Closing the draperies and windows during the day and opening them at night during the summer.
6. Having short hot showers instead of baths.
7. Not opening the windows with the thermostat turned up.
8. Not using the washer and dryer during peak periods.
9. Doing only full washerloads of laundry.
10. Servicing the car regularly.
11. Dressing more warmly instead of turning the thermostat up in winter.

12. Turning the television and radio off when not in use.

13. Not opening and leaving the refrigerator door open unnecessarily.

14. Using a bus or a carpool to go to work.

Energy Conservation Education refers to a program on the efficient use of energy which was conducted for two one-hour sessions. The major objective of the program was to provide information about the danger signals of increased demand and the leveling off of supply of natural resources with a view to modifying the energy consumptive behaviour of the respondents. Every effort was made to encourage attendance by all adults and children over twelve years of age in the family. Respondent participation was emphasized and the program was structured in a non-threatening, informal manner, providing meaningful learning experiences to sustain interest.

Belief in the Reality of the Energy Problem is a measure of whether or not people believe that there are or will be energy shortages in Canada and whether or not they attribute these shortages to human factors or to actual resource depletion.

Public Housing refers to housing which is subsidized by the provincial government, thus making accommodation available at a lower cost to people in certain specified income brackets and which is managed by the Winnipeg Regional Housing Authority.

Tenants refer to those people who meet certain requirements such as a specific level of income and who by meeting these requirements, qualify for residence in the public housing developments and who at the time of the study are residents in these public housing developments.

Families are those units consisting of either one or two parents in the child rearing stage of the life cycle as well as children.

Direct Residential Energy is the energy measured at the place of residence, that is, the meter readings of electricity in kilowatthours and natural gas in cubic feet.

The Population and Sample

The sample consisted of tenants in family public housing under the direction of the Winnipeg Regional Housing Authority in two areas of the city. There are approximately 5,500 public housing units in Winnipeg; approximately 3,000 of these are family units (Conversation with Annette Doer and Dorothy Ford, 1979). The majority of these units are town-houses which are individually metered for utilities; utilities are included in the rent in apartment blocks. Families wishing to rent units in public housing developments must fulfill the following income requirement: monthly rent is calculated on the basis of twenty-five percent of the gross monthly income. Approval of tenancy is not usually granted where assets total more than $3000.00 (Conversation with Mr. Brown, Winnipeg Regional Housing Authority, July, 1979). When income increases tenants usually go to the private market for housing unless they are prepared to continue spending 25 percent of their income on rent.

The sample was confined to family housing tenants, that is, families where either one or two adults and children were present, rather than childless couples or senior citizens. The family housing in both areas were structually similar row-houses. It was hoped to use apartment blocks in this research in order to test the theory that tenants who do not pay their own utility bills directly, conserve less energy (Kilkeary, 1975). Unfortunately, it was not possible to find two sets of apartment blocks sufficiently separated geographically and with similar floor plans. The row-houses in the northern and southern areas of Winnipeg were chosen

because of their similarity, yet geographic separation. Also, the row houses in both areas were completed at approximately the same time in 1971, consist of two-storey units, with full basements, similar floor plans and bedrooms on the second floor. The exterior construction of the units in both areas is stucco and siding with R 10 insulation in the walls and roof. Each unit is provided with a refrigerator, range and gas dryer. According to information taken from records of the Manitoba Housing and Renewal Corporation,[3] there are 14 buildings with 72 units in Sample Area A and 24 buildings with 125 units in Sample Area B. In Sample Area A, there are 59 three-bedroom units with 928 square feet of liveable space and 13 four-bedroom units with 1097 square feet of liveable space. Similar information on unit size for Sample Area B is listed below:

	No. of units	Square footage of liveable space
two-bedroom units	33	884
three-bedroom units	56	1006
four-bedroom units	25	1280
five-bedroom units	11	1504

Thus the square footage of the individual units in sample area B is slightly greater than that of units in sample area A. This translates into larger living rooms, bedrooms and kitchens in sample area B. The large windows of the majority (28.6 percent) of the units in both sample areas faced the east while the majority of the units (22.9 percent) themselves faced the west. (Table 7, p.44). A total of 28 trees were counted in both sample areas, the majority of which were located on the east side of the units

---

[3]The writer takes full responsibility for any inaccuracies that might have appeared as a result of the transcription of this information.

(28.6 percent (8)). The majority of the units (57.1 percent) were middle units, that is they had common walls, while 42.9 percent were end units with more wall space exposed to the elements of the weather.

Table 7

Orientation of Large Windows, Units and Location of Trees[a]

	Large Windows N=70 percent	Units N=70 percent	Trees n=28 percent
North	7.1	12.9	10.7
South	8.6	17.1	10.7
East	28.6	12.9	28.6
West	14.3	22.9	14.3
North East	2.9	11.4	10.7
North West	10.0	11.4	14.3
South East	11.4	5.7	--
South West	17.1	4.3	--
No Observation	--	1.4	10.7

[a]Directions were determined by the use of pocket compasses.

Sample Selection

Sample area A has a total of 170 units which are physically grouped into 100 town-houses and 70 row-houses. Tenants in the 70 row-houses were approached and asked to participate in the survey. Sample area B has a total of 125 row-houses out of which 68 addresses were randomly drawn from a hat without replacement, and tenants at those 68 addresses were approached and asked to participate.

It was assumed that the families in both areas were sufficiently similar, due to the fact that all people wishing to reside in public housing are required to meet the same criteria. On this basis, it was felt that the above mentioned method of selection was warranted. The following is a list of requirements to be met by prospective respondents.

1. They were to be adult male or female members of a family where at least one child was present. "Adult" for this purpose meant anyone 18 years of age or older.

2. The respondent would be available to attend the educational sessions and respond to the second interview schedule.

3. The respondent had lived at his/her present address for at least three months of winter in order to be able to answer the questions dealing with space heating.

4. The respondent had a sufficient understanding of the English language in order to be able to answer the questions without too much assistance.

The introductory letter from the Winnipeg Regional Housing Authority was mailed to all tenants in both areas followed by personal contact with the 70 families in sample area A and the 68 families in sample area B. Out of the 70 units canvassed for participation in the pre-assessment in sample

area A, tenants in 36 units consented to participate while the remaining 34 units were either vacant, or their occupants were on vacation, did not speak English, were never home or refused to participate (Table 8, p.47). The participation rate for sample area A was 65.4 percent, based on calculations excluding the occupants of the 15 units with whom we were not able to make contact. Out of the 68 units canvassed to participate in the pre-assessment, in sample area B, tenants in 34 agreed to participate while the occupants of the remaining 34 units were never home, refused to participate or the units were vacant. (Table 8, p.47). The participation rate for sample area B was 60.8 percent, based on calculations excluding the occupants of those units with whom we were not able to make contact. If, after returning to the units a total of four times, there was no one at home, these units were considered as housing people with whom we were not able to make contact. The rate of refusal in both areas was similar, 27.1 percent for sample area A and 32.3 percent for sample area B.

Out of the tenants of the 36 units who agreed to participate in the pre-assessment in sample area A, occupants of 21 units agreed to respond to the follow-up questions three months later (Table 8, p.47). It was possible to present the follow-up questions to 58.3 percent of the respondents to the pre-assessment, while 27.8 percent (10) had moved and 13.9 percent (5) were never home (Table 8, p.47). Out of the tenants in the 34 units who agreed to participate in the pre-assessment in sample area B, occupants of 25 units agreed to respond to the follow-up questions three months later (Table 8, p.47). Thus, 73.6 percent (25) of the respondents to the pre-assessment, responded to the follow-up questions, while 26.4 percent (9) had moved. There were no refusals by tenants in

both sample areas when asked to respond to the follow-up questions.

Table 8

Rate of Participation in Survey

	Sample Area A (N=70) Number	Sample Area B (N=68) Number
Pre-assessment		
Number of units canvassed	70	68
Agreed to participate	36	34
Units vacant	2	1
Occupants on vacation	3	-
Do not speak English	2	-
Never home	8	11
Refused	19	22
Follow-up Questions		
Number of respondents contacted	36	34
Interviewed	21	25
Moved	10	9
Never home	5	-

Sample Characteristics

Characteristics of age and sex of the samples are presented in Table 9 on page 48. Ages of the respondents ranged from 18 to 65 years. The majority of respondents, 82.9 percent were female most of whom (38.6 percent) were between the ages of 30 and 39 years. Almost a quarter of the women fell

Table 9

Age and Sex of Respondents

(N=70)

Age	Female Percent	Male Percent	Total Percent
18 and 19	1.4	1.4	2.8
20 - 29	22.9	2.9	25.8
30 - 39	38.6	7.1	45.7
40 - 49	12.9	2.9	15.8
50 - 59	7.1	-	7.1
60 - 69	-	1.4	1.4
No information 1.4			
			100.0

into the 20 - 29 year age range. All of the respondents were either a wife or husband in the family, except for three sons, one daughter and one grandparent. The majority of households consisted of three members (32.9 percent) while 28.6 percent were five member households (Table 10, p.50). Of the total number of households, 44.3 percent reported the presence of two adults while 40.0 percent stated that only one adult was present (Table 10, p.50). Two children were present in 42.9 percent of the households while 24.3 percent reported the presence of three children (Table 10, p.50). There were 180 children in the sample households, 55.6 percent of whom were male. The largest number of the children, (20.5 percent) regardless of sex, were between 12 and 14 years of age (Table 11, p.51). The age range from three to fourteen years contained the largest number of children (71.1 percent). The highest grade of school education attained by the respondents ranged from grade 5 to grade 12, with the largest number (32.9 percent) having completed grade 12 (Table 12, p.51). The same held true for the spouses of the respondents and other adults in the family with 31.2 percent of the spouses and 68.4 percent of other adults in the family having completed grade 12. Information about other training beyond the completed high school education showed that 51.5 percent of the respondents and 62.5 percent of their spouses had no other training. Of those respondents who had other training, 64.8 percent were trained for a specific vocation while 29.4 percent (10) had university education. Of the spouses with other training, 41.7 percent (5) had university education, while 33.3 percent (4) were trained vocationally (Table 13, p.52).

The occupation of respondents listed most frequently, 51.5 percent was that of housewife (Table 14, p.52). Other occupations reported were clerical, skilled which included hairdressers, sewing machines operators,

Table 10

Number of Family Members in the Household and Family Composition

(N=70)

Number	Family Members Percent	Adults Percent	Children Percent
0	-	-	2.9
1	-	40.0	10.0
2	2.9	44.3	42.9
3	32.9	11.4	24.3
4	18.6	2.9	14.3
5	28.6	1.4	4.3
6	8.6	-	1.4
7	5.7	-	-
8	1.4	-	-
9	1.4	-	-
	$\overline{X}$ = 4.3	$\overline{X}$ = 1.8	$\overline{X}$ = 2.6
	S.d. = 1.43	S.d. = .86	S.d. = 1.16

Table 11

Ages of Children

(N=180)

Age/Years	Percent
0 - 2	13.9
3 - 5	16.1
6 - 8	16.7
9 - 11	17.8
12 - 14	20.5
15 - 17	12.8
No information	2.2

Table 12

Grade School Education of Respondents, Spouses and Other Adults in the Household

Grades	Respondents (N=70) Percent	Spouses (N=32) Percent	Other Adults (N=19) Percent
3	-	3.1	-
5	2.9	-	-
6	4.3	3.1	-
7	4.3	18.8	-
8	10.0	18.8	5.3
9	11.4	-	-
10	17.1	15.6	15.7
11	15.7	3.1	5.3
12	32.9	31.2	68.4
No information	1.4	6.3	5.3

Table 13

Other Training of Respondents and Spouses

Training	Respondents (N=70) Percent	Spouses (N=32) Percent
No other training	51.5 (36)	62.5 (20)
	(N=34)	(N=12)
Vocational	64.8	33.3
University	29.4	41.7
Military	2.9	8.3
No information	2.9	16.7

Table 14

Occupations of Respondents and Spouses

Occupation	Respondents[a] (N=70) Percent	Spouses (N=32) Percent
Housewife	51.5	12.5
Clerical	14.3	3.1
Skilled	11.4	34.4
Personal services	8.6	6.3
Labourer	4.3	28.1
Students	4.3	6.3
Supervisory	1.4	3.1
Unemployed	1.4	3.1
Retired	1.4	-
No information	1.4	3.1

[a]Of the 70 respondents, 11 were males.

dental technicians and roofers; personal services which includes waitresses, nurses aids, cooks and laundry attendants; supervisory, including managers and supervisors and, finally, labourers. One person was unemployed and one person was retired.

Monthly rent paid to the Winnipeg Regional Housing Authority ranged from below $100.00 to $349.00 with most households paying $150.00 per month (Table 15, p.54).

This concludes the summary of the characteristics of the sample. A brief description of the physical characteristics of the two sample areas follows.

Sample Area A. The 70 units in this area are bounded on the north-west by a busy main thoroughfare which serves the community and on the south-east by an open field at the end of which is a large shopping centre. On the north-east, a street separates the public housing units from privately owned homes and on the south-west the area is bounded by another very busy thoroughfare which leads to an industrial area of Winnipeg. A community hall is located on the west boundary and is within comfortable walking distance of the 70 units surrounding it. The hall is used for meetings of the Tenants' Association, social gatherings and recreational programming for adults and children when such programming is available.[4]

---

[4]Members of the Tenants' Association asked the researcher to assist them in locating an organization which would be willing to conduct a childrens' recreational program within the community hall during the summer. Parks Canada had a program in one of the schools, some distance away from the community, but the Tenants' Association executive felt that they needed something within the public housing community.

The shopping centre is not within walking distance of the public housing units and there are no corner stores or supermarkets to serve this large residential area. This means that a car is almost a necessity. There are no other recreational facilities or public places such as doctors'

Table 15

Monthly Rent

(N=70)

Rent (Canadian dollars)	Percent
Below 100	7.1
100 - 149	25.7
150 - 199	50.0
200 - 249	5.7
250 - 299	5.7
300 - 349	2.9
No information	2.9

Mode = $150.00

or dentists' office where residents might relax or obtain medical or dental assistance without having to use some means of transportation. This area also lacks day-care facilities suited to the needs of the residents. There is a private day-care, but not within walking distance of the public housing community and the cost of sending a child there is usually higher than it would be at other public day-care centres of the cooperative type.

The way in which these 70 units are located on the piece of land, as well as the fact that they are row-houses, gives the appearance of physical overcrowding. It appears as though little consideration was given to unit orientation in relation to other units; privacy is very difficult to achieve when tenants are able to have a full view of their neighbours' living rooms from their backyards.[5] It also appears that little provision was made for playing areas for children who take to the streets and become involved in vandalism which maybe an expression of their frustration and boredom.

Sample Area B. There are two public housing developments in sample area B. There are 22 town-houses designed by the tenants themselves and the 125 row-houses from which this research sample was drawn. On the north side of these units there is a busy connecting thoroughfare, and on the east a street used mostly by local traffic. A street serving local traffic and patrons of the shopping centre located directly across from the housing development, forms the western boundary. On the south the research sample area is bounded by an open playing field at the end of which is an apartment block administered by the Kiwanis

---

[5]The living rooms have sliding glass doors which lead out into the backyard.

Club which houses the Tenants' Association meeting hall. The more recently constructed 22 public housing units are immediately adjacent to the apartment building. A busy artery leading west to the city park and the wealthiest neighbourhood of the city and east to the down town area, forms the southern boundary of the 22 public housing units. The Tenants' Association in sample area B is a very active group which is just as concerned about the children in their community as is the Tenants' Association in sample area A. They have successfully organized Halloween, Christmas, Easter and Family Day activities, all of which focus on the family. The president is a rather resourceful person who tries her utmost to improve the quality of life in the community by lobbying and discussing problems with city and government officials. She had been extremely active in trying to arrange for adults to supervise student crossings where several fatal accidents involving students and automobiles have occurred. The children living in public housing are at a distinct disadvantage socially and emotionally, because the gap between their parents' income and that of the more well-to-do families with whose children they attend school, is quite large. This is evidenced by the low grades of the children in public housing as well as the emotional problems arising out of being singled out and of not having the clothes, books, and the generally more easy and smooth running home life of their classmates.[6]

The tenants in this area do have some advantages over tenants living in sample area A. Their shopping centre is across the street from the development and contains a variety of stores and public service offices such as a supermarket, doctors' and dentists' office, pharmacy and some

---

[6]Conversation with the President of the Tenants' Association, 1979.

clothing stores. Adjacent to the shopping centre is a hotel where adults may relax and enjoy entertainment if they are financially able. Playing areas with climbing equipment, slides and sandbox, as well as an open field have been incorporated into this development for the children. But, unfortunately, the older children who lack sufficient mental stimulation and who suffer other emotional problems, are given to terrorizing the younger ones in their play areas such that maintenance of the equipment is a major problem.[7] Despite the fact that this is family housing, no provision has been made for a day-care centre or a lunch or after school program for children of working parents.

The layout of units in sample area B does not have the same appearance of overcrowding. The concentration of units is dense, as usually found in housing developments, but relief is provided by a number of open spaces interspersed among row-sections. Also, the arrangement of the units and the use of greenery allows the tenants to achieve a greater degree of privacy than is the case in sample area A.

This concludes the discussion of the characteristics of the sample, sample selection and the description of the physical environments in both areas. A description of the research instrument follows.

Research Instrument

At the end of June and the beginning of July, 1979, one personal interview schedule was presented either to the wife or female head of the household, or to the husband in each housing unit randomly selected from address listings of the development. During October, 1979 a set of

---

[7]Conversation with the President of the Tenants' Association, 1979. She stated that older children misuse the equipment and the sand in the sandbox is seldom changed or cleaned so that it is not uncommon to find broken glass in the sand.

follow-up questions was presented to the same person who had previously responded to the interview schedule.

The interview schedule was pretested in a public housing development other than those from which the research samples were drawn. Tenants living in the "pretest development" had received a letter from the Winnipeg Regional Housing Authority explaining that some university students needed some help in working on some questions which were going to be used in a Cost of Living survey to be conducted in Winnipeg later in the summer (Appendix A, p.121). Seventeen out of a total of 23 tenants living in the "pretest development" agreed to respond to and comment on the interview schedule. The interviewers visited that area a total of four times. Several changes were made in the original questionnaire through a process of informal and formal pretesting and subsequent restructuring of questions. The final interview schedule is found in Appendix B, p.123). The following is a description of the final form of the interview schedule which resulted from alterations indicated by the pretesting and which was designed to provide information in six areas:

1. Conservation practices. The first 21 questions dealt with energy conservation practices in relation to thermostat settings, the use of supplementary heating/cooling equipment, clothing worn, use of solar energy, dishwashing and laundry practices, the presence of leaking faucets, the use of lighting, car ownership and use and alternative modes of transportation. Out of the 21 questions, 19 were directly related to energy conservation practices while two questions about grocery shopping practices and freezer ownership were included to divert respondents' attention from the fact that the crux of this research was energy conservation.

2. Awareness of the energy problem. Question 23 was included to

provide information on respondents' perceptions of the energy situation.

3. Belief in the reality of the energy problem. Questions 22 and 24 were included in order to determine whether the respondents believe the energy shortage to be real or whether they believe it to be contrived. Question 25 dealt with the rising cost of food.

4. Sources of energy information. Question 26 required the identification of the first, second and third most important sources of energy information for the respondents. Question 27 was designed to determine the respondents' perceived reliability of various sources of information. Question 28 required information about food specials.

5. Knowledge of energy conservation and wasteful practices. This section consisted of eight true-false and four agree-disagree statements about specific non-structural energy conservation and wasteful practices.

6. Demographic characteristics of the family. This component contained questions about family size, family composition, age of family members, sex of family members, education levels, occupations and rental paid for their units.

In addition to the above information, the interviewers recorded information regarding weather conditions and time of day when the interview was conducted, the location of the unit whether interior or end, the presence of trees on the lot and their location with reference to the unit. Information about building and large window orientation, floor, wall and window coverings, whether the television or radio was on or off during the interview, whether lights were on or off in unused rooms, were also collected by the interviewers unobtrusively. This kind of descriptive information provided the researcher with the context within which the responses to the interview schedule were made.

The seven follow-up questions dealt with thermostat use during the cool summer months of 1979, modes of transportation used to do grocery shopping, whether milk is delivered, the number of bedcovers used during the winter, and whether or not the bedroom door is left open at night (Appendix B, p.123). The purpose of these questions was to assist in explaining responses to the interview schedule and to determine whether there was any relationship between the respondents' space-heating related practices and respondent satisfaction or dissatisfaction with the temperatures inside their units.

Data Collection Procedure

Prior to their first meeting with the interviewers, the tenants in both sample areas received a letter from the Winnipeg Regional Housing Authority explaining the research and assuring them of the confidentiality of their responses (Appendix A, p.122). They were also informed of the purpose of the study and that an interviewer would call on them to obtain their consent to participate in the study.[8] At their first meeting with each prospective respondent, in both sample areas, the interviewers briefly informed them of the study and its purpose, requested permission of the family to participate and explained the interview procedure. At this time, the family was also assured of the confidentiality of the information supplied by them. Thereupon, consenting tenants in each sample area were interviewed according to the interview schedule. At this initial meeting, respondents in both sample areas were invited to attend an informal meeting at the Tenants' Association hall in their respective areas.

---

[8] A former Home Economics student at the University of Manitoba, presently employed by the Winnipeg Regional Housing Authority, was contacted to provide suggestions for making the initial contact with the tenants.

This informal meeting was the first session of the energy conservation and nutrition educational programs in the respective areas. Seventy-five percent of the interviews were conducted between 1:00 p.m. and 9:30 p.m. Except for two interviews when the sky was overcast, the interviews were conducted when the sky was clear with scattered clouds or it was sunny and hot with temperatures of between 25°C and 30°C.

Three months after the termination of the educational programs, participants in both areas were contacted for a second interview which consisted of the questions designed to provide follow-up information for the responses to the pre-assessment and a second meter reading. Students from the Advanced Study in Home Management class, 64.441 were trained in interviewing and meter reading techniques so that they collected the information for this phase of the study in one of their laboratory periods.

Utility Data

Utility data from two sets of meter readings three months apart were used to calculate average daily consumption figures for the samples. These average daily consumption figures do not, by any means, represent a completely accurate statement of consumptive behaviour among respondents because the timespan between the readings was not long enough. Several readings taken at regular intervals at the same time of day over a period of one year to allow for seasonal differences would give more accurate results. But, time and financial constraints did not allow for such an assessment to be undertaken as a part of this study. Secondly, this study was conducted during the summer months at which time space heating is not a major consumer of energy. Nevertheless, the average daily consumption figures did supply a rough standard against which to compare some of the reported conservation practices.

Tenants living in sample area A pay their own gas heating and electricity bills which include lighting and an electric dryer supplied to each unit by the Winnipeg Regional Housing Authority. Costs for water and parking are included in the rent. Tenants living in sample area B pay their own gas bills, which include heating and a gas dryer supplied to each unit by the Housing Authority. Costs for water, lights and parking are included in the rent. Therefore, electricity as well as gas meters were read in sample area A while only gas meters were read in sample area B.

Data Analysis

The data were coded for computer analysis using the Statistical package for the Social Sciences (Klecka, W.A., Nie, N.H., and Hull, C.H., 1975). The coding resulted in a total of 153 variables for which frequencies were determined. The subprogram frequencies provided the absolute, relative, adjusted and cumulative frequencies. A selected set of continuous interval level variables were processed in the condescriptive subprogram to provide measures of central tendency and dispersion. The frequency and condescriptive runs indicated variables of significance which were cross tabulated to produce two by two tables displaying the joint frequency distribution of two variables. Descriptive information appearing in the "comments" section of the interview was used in the narrative discussion of the results. The observations made by the interviewers in conjunction with structural information about the units from the Manitoba Housing and Renewal Corporation were also used in the discussion of the results. Several variables were hand-tabulated either because categories were not coded so as to be mutually exclusive or because the coding system did not allow for an accurate interpretation of the data as in the case of

respondents occupations which were coded by using the last two digits of values assigned them in the Blishen Socioeconomic Index for Occupations in Canada (Blishen, B.R., and McRoberts, H.A., 1971).

This concludes the description of the methodology. The results of the study are presented in the next chapter.

CHAPTER 4

RESULTS

The results of the study will be presented in this chapter. The purpose of this study was to determine the status of respondents' belief in the reality of an energy shortage in Canada, their awareness of the energy situation in Canada and their non-structural energy consumption/ conservation practices. Since some alterations to the original research design were necessary, a brief outline of these will be described prior to the presentation of the results of the study.

Since this research received funding by a Young Canada Works grant, time was of the essence.[9] Acting upon the suggestions of the Tenants' Association Executives, the educational sessions in sample area A were planned for Saturday mornings and those for sample area B, Wednesday evenings. In order to make the best use of the time available, interviewing to attain the initial assessment commenced in sample area B on June 28, 1979 and ended on July 4, 1979. The survey and educational sessions were explained to tenants in both areas in a letter from the Winnipeg Regional Housing Authority (Appendix A, p.122). In addition, the President of the Tenants' Association arranged for an announcement of the survey and a request for participants to be printed in their monthly bulletin just prior to the commencement of the interviewing. When the interviewers

---

[9]The designated duration of the Young Canada Works Project was four months between May 1 and August 31, 1979. Since the research team was not notified of the success of their application for a grant until the end of April, it meant a race against time to complete the project with the time allotted.

made the initial contact with prospective respondents, the survey was once again explained as involving two interviews and two educational sessions. At the conclusion of the interview, the interviewer reminded the respondent of the educational sessions and their dates both verbally and by handing him/her a reminder notice (Appendix C, p.140). Having been asked and reminded a total of four times initially to attend the educational sessions in sample area B, an additional reminder immediately prior to the first session was not distributed.

The first nutrition educational session was conducted on Wednesday, July 11, 1979 at 7:30 p.m. at the Tenants' Association Hall.[10] Meetings were arranged so that all three interviewers could be present at both sessions which were scheduled one week apart. All three interviewers interviewed in both areas, while interviewer one presented the nutrition educational program in sample area B, assisted by interviewer two while interviewer three was responsible for the overall coordination of all sessions. In sample area A, interviewer two presented the energy conservation educational program, assisted by interviewer one. According to the attendance record, the three interviewers, the research supervisor, three senior Home Economics students,[11] the Winnipeg Regional Housing Authority representative for sample area B,[12] three respondents (out of 34 interviewed) and one child were in attendance. The film "Eating on the Run," was shown. It stressed the importance of choosing nutritional snacks and

---

[10]Meetings were scheduled for 7:00 p.m. but the organizers decided to wait 30 minutes in the event that more people would arrive.

[11]The Home Economics students were present to assist with the childrens' program.

[12]At the time of the meeting a Winnipeg Regional Housing Authority representative for both sample areas A and B was present.

well balanced meals especially since the time available for meal preparation has been reduced considerably due to other demands such as those arising from employment outside the home. This was followed by a discussion and pencil and paper activities on the subjects of Food Groups, Diet Recall, Canada's Food Guide and Calories.[13] After the film, the one child in attendance was asked to accompany the Home Economics students to another area of the building to discuss and do some activities in relation to what was being presented to the adults. There was some lively discussion in the adult group with regard to their diet recalls and problem meals in their respective families. They seemed to enjoy this interchange and the programmers were given very positive evaluations for their effort (Appendix C, p.143). On July 12, 1979, the interviewers returned to sample area B to distribute informational handouts to the 31 absentee respondents together with a reminder for the second meeting (Appendix C, p.141).

These efforts to encourage attendance by the respondents met with very little success, for, on Wednesday, July 18, 1979, two respondents (one of whom was in attendance the previous week) and one child were in attendance at the second and last session in sample area B. This session focussed on Food Buymanship, more specifically, shopping tips, and ways in which to control the costs of food during food preparation. One of the respondents seemed to be learning a few things from this discussion as evidenced by her expressions of surprise and of "I didn't know that!"[14] After the meeting, the other respondent made the following comment: "Those who need this sort of information the most just couldn't be bothered to come."

---

[13]The nutrition educational program was arranged in consultation with the Home Economist responsible for the sample B district.

[14]These were genuine expressions of interest in the topic under discussion.

She was saying that there were so many people in the community who could have derived great benefits from attending the sessions, but that they were not interested. Once again, the programmers received very favourable evaluations (Appendix C, p.143). On July 13, 1979, the interviewers returned to sample area B to deliver the second set of informational materials to the 32 absentee respondents. The researchers still remained hopeful that attendance in sample area A would greatly surpass that of sample area B.

Interviewing to obtain the initial assessment in sample area A, commenced on July 5, 1979 and ended on July 13, 1979.[15] Tenants in this area also received the explanatory letter from the Winnipeg Regional Housing Authority in which participation in the survey was fully explained (Appendix A, p.122). The interviewers mentioned the meetings to prospective respondents at the time of initial contact and again at the conclusion of the interview, both verbally and by handing them a reminder note (Appendix C, p.141). Having learned from past experiences in sample area B, it was decided to hand deliver invitations to the first meeting and, if possible, to secure a commitment from the respondents to attend (Appendix C, p.141). This was done on July 13, 1979, a day before the first meeting was held.

On Saturday, July 14, 1979, at 10:45 a.m.,[16] at the Tenants' Association Hall, one respondent, two executive members of the Tenants' Association but who were not part of the sample, were in attendance[17] in addition to

---

[15]No interviews were conducted on July 10 and 11 in order to prepare for the educational sessions in sample area B.

[16]The meeting was called for 10:00 a.m. but commencement was delayed in case more people were on the way.

[17]The Tenants' Association Executive members unlocked the meeting hall door and expressed an interest in participating in the session.

eight children, the three interviewers, the research supervisor, the Home Economics students, the Winnipeg Regional Housing Authority representative for sample area A and the Home Economics Curriculum Consultant for the Manitoba Department of Education.[18] The film "Energy Carol," an animated presentation of how Scrooge is faced with the ghost of energy past, energy present and energy future, was shown. This was followed by a brief overview of the present world-wide energy situation and a discussion of space heating and cooling and how energy and thus dollars could be saved by adopting some non-structural energy conservation practices. After the film, the children were asked to accompany the Home Economics students downstairs where a brief presentation was made, followed by pencil and paper activities relating to energy waste and conservation. Tenants present at this meeting seemed eager to discuss what they described as problems (structural) with their units and the difficulties they had experienced in having them corrected by the Winnipeg Regional Housing Authority. They felt that the Housing Authority's delays in correcting the structural faults in the units contributed to their high fuel bills. The tenants seemed to enjoy this opportunity for airing their feelings about their accommodations. Once again, the programmers were accorded very favourable evaluations for their efforts (Appendix C, p.143). On July 15, 1979, the interviewers returned to sample are A to distribute the energy conservation informational materials to the 35 absentee respondents. A brief verbal presentation dealing with the contents of the

---

[18]The Curriculum Consultant, having been interested in the research from the outset, expressed an interest in the program content and presentation and thus was invited to attend this session.

educational session was informally discussed with each of the absentee tenants (Appendix D, p.145). In addition, the interviewers asked each of the respondents if they preferred a day and a time other than Saturday at 10:00 a.m. and asked them for suggestions which would attract people to a meeting. Most of the respondents seemed reluctant to take the time to discuss the contents of the previous educational session; in most cases the interviewers were not invited in. However, most respondents mentioned that they would prefer a week night for the meeting[19] and that a door prize would attract more people.

Thereupon, the interviewers arranged to conduct the second and last educational session on Tuesday, July 24, 1979 at 7:00 p.m., using a door prize as an added attraction to the meeting. In addition, posters advertising the meeting for adults and children were attached to the rear and front doors of the hall a day before the meeting.[20] The change in time, the possibility of winning a door prize and the advertisement on the doors of the hall, made very little difference in adult attendance. One respondent, (not the same one present at the first meeting) one executive member of the Tenants' Association (her friend who attended the last meeting, was out of town), one other adult (from another part of the development)[21]

---

[19]A possible reason for the discrepancy between the Tenants' Association Executive's suggestion of Saturday mornings and the respondents' preference for a weeknight was that the researcher met with the Executive in May, that is, before school had been dismissed for the summer holidays, while the research was conducted during June and July during vacation time when weekends were used for outdoor activities.

[20]This was done on the advice of a Tenants' Association Executive member who advised that the posters would not last longer than a day because the children would eventually tear them off.

[21]This gentleman, not a respondent, had seen the advertisement on the doors of the hall.

and 26 children were present. The film "Energy Savings in the Home" was shown which dealt with examples of non-structural methods of conserving energy around the home such as lowering thermostat settings, switching off lights in unused rooms and other energy conserving behaviours. Thereafter, the children, accompanied by the Home Economics students proceeded to the basement where there was some discussion about the uses of energy, its finiteness and ways in which young people could assist in conserving energy in the home (Appendix D, p.150). Working with such a large group of children, varying in ages from three years to fourteen years old, in the basement of the hall in which there were no outside windows, proved to be quite a challenge. The fact that the door leading from the basement to the outdoors was barricaded was a cause for concern to the organizers from a safety point of view. When the pencil and paper activities were begun, the children enjoyed identifying energy-consuming equipment in the home, identifying examples of energy wastefulness in pictures and imagining what life would be like without electricity.

At this point, a brief description of what these children are facing in life, is in order. These children are growing up in an environment saturated with very real problems; life in this area seems to be one big struggle for survival centred around money or the lack of it. This is an environment where conflict between husbands and wives and conflict between neighbours can and often does have horrendous consequences.[22] The frustrations of the single parent who would perhaps like to go out to work, but has no suitably priced facility available for child care, the anxieties

---

[22]It was learned that one of the respondents had committed suicide a few days after being interviewed. She left a husband and six daughters behind, ranging in age from 6 months to thirteen years.

of carrying out what are usually considered simple, everyday tasks such as grocery shopping for a family when there is no car in the harsh Manitoba winters, and so on, are just a couple of examples of what, to these people, might be almost insurmountable problems. The children are caught right in the middle of all this; they learn to face the facts and fend for themselves at a very early age. It is quite apparent that often these children must do without many things--sometimes food,[23] adequate clothing, attention, caring, guidance and mental stimulation, all of which are so vital to the development of an emotionally and physically stable individual. Frequently parents lack the knowledge about ways in which to alleviate their situations; they have become apathetic and unmoved by life around them as a result of these chronic problems. That is why we see a grubby faced two year old clothed in a soggy disposable diaper toddling unattended out into the busy street, hanging onto life by the skin of his teeth. That is why a friendly smile and attention from a stranger causes these children to cling to the source of this new-found happiness. These are the children of sample area A.

The adults at this second and final meeting again seemed eager to discuss their problems and difficulties in getting the Winnipeg Regional Housing Authority to do repair work on their units. The general feeling, seemed to be one of placing the responsibility for high fuel bills on their landlords. The tenants felt that they were doing what they could to have lower fuel bills, but they felt it necessary to turn up the thermostat at night

---

[23]The Home Economics students noticed that one little girl was not able to hold her pencil steadily enough in order to join the dots. It is quite possible that she was malnourished. The way in which those children ravenously partook of the refreshments on Tuesday evening, left one wondering what they had eaten for supper.

because it was unbearably cold and draughty. The programmers were once again favourably evaluated (Appendix C, p.143) and, ironically the door prize went to the gentleman who was not a participant in the survey. On July 25, 1979, the interviewers returned to sample area A to deliver the remaining 35 informational packages to those who did not attend the session.

The poor attendance at the meetings led to a reconsideration of the research design since the potential effect of the educational sessions was seriously curtailed by the high rate of absenteeism and what seemed to be apathy. A possible reason for this is that any matter which will not directly assist these people in their daily problems, is accorded a position of secondary importance. The idea that "no one cares about me, so why should I care about anything," seems to sum up the feelings of the tenants. They enjoyed having the interviewers in their homes at which time they often mentioned some of their personal problems. But, the impersonality of a meeting hall seemed to discourage them completely. Since it would not have been possible to measure the effect of the educational sessions by means of a post-assessment, it was decided to dispense with the post-assessment and use the data from the pre-assessment descriptively to determine the status of energy knowledge and awareness, belief in an energy shortage in Canada and energy consumption/conservation practices in the entire sample as well as to determine if and what some of the major differences are among and between the two sample areas. Some questions were designed to provide follow-up information to responses on the pre-assessment and presented to the respondents at the time of the second meter reading, three months after the educational sessions.

It is reasonable to assume that a person's beliefs associated with a particular subject, to a certain extent, influence the status of his or

her awareness or knowledge and thus practices in relation to that subject. Therefore this presentation will commence with information about respondents' beliefs, followed by information about their knowledge and awareness, their practices in connection with energy use, and finally results from the follow-up questions.

Belief in the Reality of an Energy Shortage in Canada

The results show that most of the people surveyed, 65.7 percent, believed that there was no energy shortage in Canada at the time of the interview. Table 16, p. 73 indicates a breakdown of the sample according to their responses to the question of whether there was an energy shortage in Canada. Of the 65.7 percent who believed that there was no energy shortage in Canada, 71.7 percent expected a shortage in the future and 28.2 percent did not expect a shortage.

Table 16

Belief in an Energy Shortage in Canada

(N=70)

Responses	Percent
Believe there is no energy shortage in Canada	65.7
Believe there is an energy shortage in Canada	27.1
No comments	5.7
Doesn't know	1.4

Of the 71.7 percent who expected an energy shortage in Canada in the future, 42.4 percent felt that such a shortage would not be serious (Table 17, p. 74). In fact, they chose the category "no real shortage" to describe their perceptions of an expected energy shortage. Regardless of whether or not they believed that there was an energy shortage in Canada, the majority responded to the question dealing with the identification of their first, second and third choices of possible reasons for an energy shortage in Canada (Table 18, p.). As their first choice, most respondents, 22.9 percent, blamed an energy shortage in Canada on the wastefulness of consumers; for their second choice, 15.7 percent blamed an energy shortage on too much exportation while for their third choice, 20.0 percent blamed the shortages on increasing foreign oil prices.

Table 17

Perceived Seriousness of the Expected Energy Shortage in Canada in the Future by Respondents Who Expect a Shortage

(N=33)

Responses	Percent
No real shortage	42.42
Quite serious	24.24
Very serious	18.18
Don't know	15.15

Table 18

Perceived Reasons for an Energy Shortage in Canada

(N=70[a])

Reason	First Choice Percent	Second Choice Percent	Third Choice Percent
Consumers too wasteful	22.9	14.3	11.4
Poor management, control and distribution of energy resources	14.3	12.9	10.0
Oil companies decrease supply on purpose	11.4	8.6	5.7
Too much exportation of Canadian resources	10.0	15.7	11.4
Foreign oil prices increasing	8.6	12.9	20.0
Reduction in supply of energy resources	4.3	7.1	2.9
No comment	2.9	2.9	2.9
Don't know	4.3	4.3	11.4
No answer	21.4[a]	21.4	21.4
Other	-	-	2.9

[a]Includes those who do not believe that there is an energy shortage in Canada and who have chosen not to respond to this question.

Awareness and Knowledge of Canada's Energy Situation

The most important finding with regard to the distribution of the energy problem was that 41.4 percent of those interviewed believed the energy shortages to be a problem throughout the world as opposed to Western nations or Canada or the United States (Table 19, p. 76). The newspaper

Table 19

Extent of the Energy Shortages

(N=70)

Response	Percentage
World wide	41.4
Western nations only	11.4
United States only	7.1
Canada only	1.4
Do not think it is a problem	1.4
No comment	4.3
No answer	22.9
Don't know	10.0

was listed as first choice for their source of energy information by 30.0 percent of all respondents, 31.4 percent and 20.0 percent identified the television as their second and third choices, respectively (Table 20, p. 78). When questions about their perceptions of the reliability of the same list of informational sources, 17.1 percent identified consumer group publications as their first choice, 24.3 percent and 18.6 percent listed the television as their second and third choices, respectively (Table 21, p. 79).

Responses to the true--false and agree--disagree questions were designated as more knowledgeable and less knowledgeable according to whether or not the response indicated knowledge of energy conservation measures. Each question was individually scored to indicate areas of most knowledge, those areas which are controversial and contain elements of subjectivity (item 6, Table 22, p. 80), and those areas of less knowledge (Appendix E, p.154). On the whole, responses to the majority of the items indicated that the respondents were quite knowledgeable in the more common energy conservation measures such as the use of solar energy during winter, maintenance of automobiles and frost accumulation in the refrigerator-freezer compartment (Table 22, p. 80). Appendix C, p.133 contains the actual true--false and agree--disagree statements presented to the respondents.

Non-structural Energy Conservation Practices

Information about non-structural energy conservation practices was obtained through self-report and utility meter readings. In this section, results from the selfpreports will be presented. In order to facilitate reporting, the non-structural energy conservation practices studies were categorized in the following manner:

Table 20

Sources of Energy Information

(N=70)

Source	First Choice Percent	Second Choice Percent	Third Choice Percent
Newspapers	30.0	17.1	11.4
Television	21.4	31.4	20.0
Radio	11.4	18.6	8.6
Inserts with utility bills	11.4	8.6	7.1
Friends	5.7	4.3	10.0
Magazines	4.3	8.6	4.3
Government publications	4.3	1.4	5.7
Consumer group publications	2.9	2.9	5.7
Professional people	2.9	1.4	1.4
Family	1.4	1.4	2.9
Politicians	1.4	1.4	5.7
Utility company people	1.4	-	5.7
Priests	-	-	1.4
School	-	1.4	1.4
Other	1.4	-	5.7
Don't know	-	1.4	2.9

Table 21

Perceived Reliability of Sources of Information

(N=70)

Source	First Choice Percent	Second Choice Percent	Third Choice Percent
Consumer group publications	17.1	5.7	11.4
Television	14.3	24.3	18.6
Newspapers	12.9	14.3	17.1
Radio	8.6	12.9	10.0
Inserts with utility bills	8.6	4.3	2.9
Magazines	5.7	4.3	2.9
Professional people	5.7	7.1	5.7
Government publications	5.7	7.1	5.7
Friends	4.3	-	2.9
Utility company people	4.3	5.7	1.4
School	2.9	2.9	1.4
Family	1.4	2.9	-
Politicians	1.4	2.9	2.9
Priests	-	-	2.9
Other	7.1	-	1.4
No comment	-	4.3	5.7
Don't know	-	1.4	7.1

Table 22

Awareness and Knowledgeability of Energy Conservation Measures as Indicated by Responses to True--False and Agree--Disagree Items

(N=70)

Items	More Knowledgeable	Less Knowledgeable	Don't Know
True--False	Percentage	Percentage	Percentage
Closing draperies and windows during day in summer, opening them at night, keeps rooms cool	91.4	7.1	1.4
Servicing car regularly results in more efficient use of gas	90.0	4.3	5.7
Opening and closing refrigerator door frequently causes more rapid accumulation of frost	88.6	8.6	2.9
Opening draperies during the day, closing them at night, affects room temperature	87.1	11.4	1.4
Amount of frost in freezer affects efficiency of appliance	77.1	22.9	-
Short, hot shower uses less than hot bath	55.7	41.4	2.9
Cold water detergent plus cold water, as effective as hot water	42.9	54.3	2.9
Lighting, one of big users of electricity in most homes	41.4	55.7	2.9
Agree--Disagree			
Windows should be opened with thermostat turned up in winter to ventilate rooms	88.6	10.0	1.4
Advantage of cutting down household use of electricity and natural gas is to assist in conservation of Canadian resources	84.3	11.4	4.3
People would be more comfortable if dressed warmly instead of turning the thermostat up in winter	77.1	22.9	-
Using less electricity and natural gas would bring discomfort to me and my family	55.7	44.3	-

(i) thermostat dialing behaviour

(ii) supplementary heating

(iii) laundry practices

(iv) transportation

(v) use of selected appliances

(vi) lighting

Thermostat dialing behaviour. Most respondents set their thermostats at 21°C (70°F) both day (30 percent) and night (28.6 percent). Table 23 (p. 82) presents the day and night settings at which respondents generally kept their thermostats during winter. These results indicate that a large number of respondents were not dialing their thermostats down at night (bedtime); thermostats were either dialed up at night (bedtime) or the daytime settings were maintained throughout the night. The majority of respondents, 78.6 percent, reported that other family members were happy with these thermostat settings. However, 17.1 percent of all respondents stated that other family members preferred higher settings. When asked if other family members changed the thermostat setting, 60.0 percent of all respondents replied in the negative, but 32.9 percent reported that their family members dialed the thermostat up (Table 24, p. 83). Of those who reported that family members changed the settings, 51.9 percent said that this was done once a day and 18.5 percent stated that family members changed the thermostat setting twice a day (Table 24, p. 83). The evening was the time preferred by the majority of family members, 48.1 percent for changing the thermostat setting while 29.7 percent reported that their family members changed the setting in the afternoon (Table 24, p. 83). In most instances, thermostat changes occurred when family members were involved in non-physical activities, 92.6 percent (Table 24, p. 83). When

Table 23

Winter Thermostat Settings

(N=70)

Degrees[a] Fahrenheit	Celsius	Day Percent	Night (bedtime) Percent
60	15	4.3	4.3
65	18	4.3	5.7
67	19	1.4	1.4
68	20	11.4	20.0
69	20	2.9	4.3
70	21	30.0	28.6
71	21	2.9	-
72	22	12.9	10.0
73	23	4.3	4.3
75	24	17.0	15.7
76	24	-	1.4
77	25	1.4	-
78	26	1.4	-
80	27	2.9	1.4
Don't know		2.9	2.9
		$\overline{X}$ = 70.1	$\overline{X}$ = 70.1
		S.D. = 3.9	S.D. = 3.73

[a]Responses to this question were given in degrees Fahrenheit by respondents.

Table 24

Thermostat Dialing Practices

1.	Change setting	(N=70)	Percent
	don't change setting		60.0
	change setting up		32.9
	change setting down		2.9
	change setting up and down		2.9
	don't know		1.4
2.	Number of times changed	(N=27)	
	once/day		51.9
	twice/day		18.5
	less than one/day		14.8
	more than twice/day		11.1
	once/month		3.7
3.	Time of day changed	(N=27)	
	evening		48.1
	afternoon		29.7
	bedtime		14.8
	morning		7.4
4.	Type of activity involved in when setting was changed	(N=27)	
	non-physical		92.6
	physical		7.4

leaving the unit for short periods of time such as when shopping or visiting, for a couple of hours, 64.3 percent of all respondents failed to turn their thermostats down (Table 25, p. 84). When leaving the unit for long periods of time such as going away for the weekend, 61.4 percent of all respondents turned their thermostats down, but a significant 30.0 percent failed to do so (Table 25, p. 84). Of those respondents who turned their thermostats down when out for long periods, 23.3 percent turned them down to 18°C (65°F) while 18.6 percent turned them down to 20°C (68°F) and 15°C (60°F), respectively (Table 26, p. 85). Of those who turned their thermostats down when out for short periods, 32.0 percent turned them down to 18°C (65°F) while 24.0 percent turned them down to 15°C (60°F). (Table 26, p. 85).

More than half the people surveyed, 67.1 percent, stated that they aired their units during the winter either by opening the windows (61.7 percent) or doors (38.3 percent). Of those who aired their units during winter, 34.0 percent did so once a week while 60.0 percent failed to turn the thermostat down when airing the unit. Ninety-five percent of those who aired their units, did so to replace stale air (Table 27, p. 86).

Table 25

Thermostat Dialing Practices When Away From Home

(N=70)

	Out for short periods percent	Out for long periods percent
Did not turn the thermostat down	64.3	30.0
Turned the thermostat down	35.7	61.4

Table 26

Temperature Settings to which Thermostats were Dialed Down when out for Short or Long Periods of Time

Degrees Fahrenheit	Degrees Celsius	Out for long periods (n=43) Percent	Out for short periods (n=25) Percent
50	10	4.7	4.0
55	13	2.3	-
58	14	2.3	-
60	15	18.6	24.0
62	16	2.3	-
63	17	-	4.0
64	17	2.3	-
65	18	23.3	32.0
67	19	4.7	-
68	20	18.6	12.0
69	20	2.3	-
70	21	9.3	16.0
Don't know		9.3	8.0
		$\overline{X}$ = 64.0	$\overline{X}$ = 64.2
		S.D. = 5.04	S.D. = 4.73

Table 27

Airing the Unit During Winter

1. Means of Airing Unit (N=47)	Percent
open windows	61.7
open doors	38.3
2. Number of times per week (N=47)	
one	34.0
none	19.1
less than once per week	17.0
two	12.8
seven	10.7
three	4.3
four	2.1
3. Turn thermostat down while airing the unit (N=40[a])	
no	60.0
yes	40.0
4. Reason for airing unit (N=40[a])	
replace stale air	95.0
lower the humidity	2.5
other	2.5

[a]lost 7 people.

Supplementary heating practices. Only 8.6 percent of the total sample used portable heaters as supplementary heating devices. Similarly, 8.6 percent (6) of all respondents used the stove elements or ovens to add some heat to their units. A crosstabulation of these two variables, that is the use of a portable heater and the use of the stove, indicated that five out of the six respondents who used portable heaters refrained from using the stove elements or oven. The majority of respondents, 71.4 percent made the most of solar energy during the winter by opening the draperies during the day and closing them when the sun set. However, 45.7 percent reported that they never wore a sweater indoors during the winter while 42.9 percent said that they sometimes wore a sweater indoors during winter, and only 11.4 percent reported always wearing a sweater.

Laundry practices. The morning hours between 7 a.m. and 12 noon were the most popular times for doing the laundry as reported by 47.1 percent of those surveyed; 28.6 percent had no fixed time for doing the laundry while 5.7 percent washed their clothes between 12 noon and 5 p.m. and 10 percent washed after 8 p.m. and 8.6 percent washed over the supper hour.

Most of the respondents, 22.9 percent did their laundry once a week while 20.0 percent washed seven times a week (Table 28, p. 88). When asked if they were able to adjust the water level on their washing machines, 68.6 percent answered in the affirmative (Table 28, p. 88). Of those who were able to adjust the water level on their washing machines, 91.7 percent reported that they always adjusted the water level to the size of their loads (Table 28, p. 88). Of these who were not able to adjust the water level on their washing machines, 80 percent said that they always waited until a full washload had accumulated before they did the laundry (Table 28, p. 88).

Table 28

Laundry Practices

(N=70)

Practices		Percent
Number of times per week		
one		22.9
two		17.1
three		17.1
four		10.0
six		1.4
seven		20.0
nine		20.0
none[a]		5.7
Don't know		4.3
Use of the washing machine		
Able to set water level on washing machine	(N=70)	
	yes	68.5
	no	28.6
	no answer	2.9
Able to set water level on washing machine: Adjust water level to load	(N=48)	
	yes	91.7
	no	8.3
Not able to set water level on washing machine: wait for full washerload	(N=20)	
	yes	80.0
	no	20.0
Temperature used to to laundry	(N=70)	
Response		
Warm for all loads		32.8
Hot for some loads, cold for some		17.1
Hot for all loads		14.3
Hot for some loads, warm for some		14.3
Warm for some loads, cold for some		10.0
Hot for some, warm for some, cold for some		8.6
Cold for all loads		2.9

[a]These people used a laundromat.

[b]Respondents' were not able to recall how many times other adult family members did their laundry.

Most respondents, 32.8 percent, used warm water for all their loads while 17.1 percent used hot for some and cold for some (Table 28, p. 88). When asked if they hung their clothes out to dry, 80 percent of all respondents answered in the negative and the reason given was that there was no space for a clothesline (45.7 percent). A large number of responses (30.0 percent) to the question of why they did not hang their clothes to dry, fell in the not applicable category.[23] Observation indicates that families are using the basements for living space eliminating clothesline space.

Respondents were asked if they had any dripping hot water taps and 15.7 percent answered in the affirmative. Of these households with dripping hot water taps, 81.9 percent (9) had one dripping tap, while 18.1 percent (2) had two dripping hot water taps.

Transportation. Of the 70 families surveyed, 57.1 percent owned one or more cars. Of these families, 80 percent owned one car, 65 percent used one block heater and 90 percent plugged their cars in during the winter (Table 29, p. 90). Of those who plugged their cars in during winter, 39.5 percent did so for three hours a day while 28.9 percent did so for two hours per day. Three quarters, 75.0 percent, of the car owners used their vehicles to drive to work everyday and in 83.3 percent of these cases, the driver was the sole occupant of the car (Table 30, p. 91). Another important finding from this study as far as energy conservation is concerned, is that only one respondent used a carpool to and from work each day. The most frequently quoted means of transportation was the bus; 62.9 percent of the sample used the bus between one and twenty times per week while the other 37.1 percent reported that they either never used the bus or used it

---

[23] Tenants living in public housing may not erect clotheslines on their lots.

Table 29

Transportation: Automobile Ownership and Maintenance

	Percent
(i) Number of cars owned (N=40)	
one	80.0
two	15.0
three	2.5
four	2.5
(ii) Number of block heaters owned (N=40)	
one	65.0
none	22.5
two	10.0
three	2.5
(iii) Is the car plugged in during winter (N=40)	
yes	90.0
no	5.0
no answer	5.0
(iv) Number of hours per day car is plugged in (N=38)	
three	39.5
two	28.9
four	13.1
one	5.3
eighteen	2.7
no answer	10.5

Table 30

Transportation: Car Use

Car used to drive to work every day (N=40)	Yes	No
	Percent	
	75.0	25.0

Number of people who regularly travel to work in the car (N=30)	
one	83.3
four	10.0
two	6.7

Table 31

Transportation

Number of times per week various means of transportation used (N=70)

Number of times per week	Bus	Carpool	Friends' or relatives' car	Own car
	Percent			
1 - 5	22.9	-	27.2	10.0
6 - 10	18.6	1.4	7.1	5.7
11 - 15	20.0	-	1.4	25.7
16 - 20	1.4	-	-	-
None	37.1	98.6	64.3	58.6

very seldom (Table 31, p.91). Their own care were the next most frequently used means of transportation--41.4 percent (29) reported that they used their own cars between one and fifteen times a week while the other 58.6 percent (41) either did not own a car (30 respondents) or used it less frequently than once a week (11 respondents). Friends' or relatives' cars were used by 35.7 percent of the sample while the remaining 64.3 percent said that they either did not use friends' or relatives' cars or used them very seldom.

Use of selected appliances. Freezers were the most commonly owned item of household equipment with 51 percent of the sample reporting ownership. At most 10 percent of the families owned air conditioners, portable heaters, and dishwashers. (Table 32, p.93). Of the seven families owning an air conditioner, five families had one room air conditioned, used the high setting and turned the appliance off when it was not required.

Indoor temperatures for air conditioners to be turned on ranged from $68^{o}F$ to $85^{o}F$ and about the same number only turned the air conditioner on when it was unbearably hot (57.1 percent) as left it running on a low setting (42.9 percent). The result of a cross-tabulation showed that 57.1 percent of those who only turned on the air conditioner when it was unbearably hot, turned it off when not required. Of those who left it running at a low setting, 28.6 percent found it necessary to leave the air conditioner running, while the remaining 14.3 percent turned it off when not required.

Table 32

Possession of Selected Items of Household Equipment

(N=70)

	Percent
Freezer	51.0
Air conditioner	10.0
Portable heater	8.6
Dishwasher	6.0

Respondents were also questioned about their space cooling practices in the summer in the absence of an air conditioner. About the same number of respondents close the windows, doors, and draperies during the day (20.6 percent) to keep the hot air out, as open everything (17.4 percent) (Table 33, p.93). It is not clear from the results of the study .

Table 33

Space Cooling Practices in the Summer in the Absence of an Air Conditioner

(N=63)

Practices	Percent
Close windows, doors, draperies during the day	20.6
Open windows, doors, draperies during the day	17.4
Use an electric fan only	15.9
Close windows, doors, draperies and use an electric fan	12.7
Close draperies	8.0
Close draperies, open windows, doors	4.8
Open windows, doors, draperies and use an electric fan	1.6
Don't take steps to keep unit cool during summer	19.0

which additional measures, if any those who used electric fans only or closed the draperies only, might have been using to keep their units cool.

Lighting. Most people, 77.1 percent turned off lights not required when they were alone at home at night while 52.9 percent left lights on when they were away from home at night (Table 34, p.95). The majority of respondents, 78.3 percent, left one light on when away from home at night. About one-third of the sample, 34.3 percent, reported that they left a light on overnight, usually the bathroom light (54.1 percent) (Table 34, p.95).

Practices Observed During the Interview

While the respondents were occupied with completing the true--false and agree--disagree statements, the interviewers observed whether or not the respondents were practicing energy conservation. Information from these observations provided the context in which responses to the pre-assessment were made. The majority of respondents had most of their household equipment such as lights (91.5 percent of the sample), television (60.0 percent), radio (80.0 percent) and exhaust fans (90.0 percent, turned off during the course of the interview. A rather large number, 40.0 percent, left the television on while no one was watching. Despite the fact that the weather was hot at the time of the interview, between 25°C and 30°C, 50.0 percent of those interviewed had their living room draperies and sheers opened. Similarly, 65.7 percent of the respondents had their windows opened instead of closed to shut out the hot air. Almost three-quarters, 70.0 percent, of the respondents had carpets on their living room floors. The carpet in 63.3 percent of those living rooms which were carpeted, consisted of area rugs of varying sizes, rather than wall to wall carpet. The walls in 90.0 percent of the unit were painted an off-white colour, while more than half, 58.5 percent of the respondents arranged their chesterfields along an inside wall.

Table 34

Lighting Practices

		Percent
1. Leave most of the lights on when alone at night	(N=70)	
	no	77.1
	yes	22.9
2. Leave lights on when away from home at night	(N=70)	
	yes	52.9
	no	45.7
	no answer	1.4
3. Number of lights left on when away from home at night	(N=37)	
	one	78.3
	two	19.0
	three	2.7
4. Leave lights on overnight	(N=70)	
	no	62.8
	yes	34.3
	no answer	2.9
5. Which lights are left on?	(N=24)	
	bathroom	54.1
	hall	20.9
	night light	12.5
	other	12.5

Utility Data

Two gas meter readings in both sample area A and sample area B and two electric meter readings in sample area A were taken. Three months elapsed between the two sets of readings. This information was used to calculate the average daily consumption rates for the three-month period (Table 35, p.97). These rates do not provide a very accurate indication of the amount of energy used by the respondents for the following reasons.

1. The readings were not all done simultaneously, they were done at different hours and on different days.

2. The readings obtained apply to the use of energy in the summer only, it was not possible to obtain winter readings when the amount of fuel used for space heating reaches its peak.

Nevertheless the average daily consumption figures provide an approximation of the amount of fuel consumed. Natural gas consumption on a per capita basis for both sample areas ranged from 7,417 cubic feet per day to 20,327 cubic feet per day, with the majority of the respondents (69.6 percent) consuming between 10,000 and 14,999 cubic feet per day. Electricity consumption on a per capita basis for sample area A ranged between 881 kilowatthours and 1,772 kilowatthours per day, with the majority of the respondents (69.6 percent) consuming between 1,000 and 1,499 kilowatthours per day.

Results from Responses to Follow-up Questions

In order to determine actual consumption of electricity and natural gas, two sets of meter readings were required. The exclusion of a post-assessment of respondents meant that only one set of meter readings would have been obtained at the time of the pre-assessment. Therefore, since the second set of meter readings were required, it was decided to include a few follow-up

Table 35

Average Daily Consumption of Natural Gas

(N=46)

Number of Cubic Feet per day	Percent	(Number)
0 - 7,999	4.3	(2)
8,000 - 9,999	13.0	(6)
10,000 - 14,999	69.6	(32)
15,000 - 20,000	10.9	(5)
No information	2.2	(1)

Average Daily Consumption of Electricity

(N=13)

Number of Kilowatthours per day	Percent	(Number)
0 - 999	23.1	(3)
1,000 - 1,499	69.2	(9)
1,500 - 1,999	7.7	(1)

questions as the respondents were expecting a second interview and also because it was hoped that these questions would shed some light on responses to questions in the first interview schedule.

Because of the unusually chilly summer months of July and August, 1979, it was decided to determine the extent to which people were turning their thermostats on during the chilly periods of this past summer. Responses to this question showed that 26.1 percent of those surveyed turned their thermostats on during the summer (Table 36, p.99). Those who turned on the thermostat usually turned it to ($65^{o}F$) (41.7 percent), and turned it on at bedtime and left it on overnight (58.4 percent) (Table 36, p.99). The majority of those who turned on their thermostats (25 percent) found it necessary to do so three times during July and August. When it came to supplementary heating practices during the summer, 8.7 percent (4) of all respondents used portable heaters, 37.0 percent (17) of all respondents wore warmer clothes, and 8.7 percent (4) of all respondents turned on the range elements. When asked how many bedcovers they used in winter, 23.9 percent of all respondents said they used one light and one heavy blanket, 17.4 percent used more than two blankets, one light blanket and a comforter and two heavy blankets, respectively. A large number of respondents, 39.1 percent said that they did not wear warmer sleepwear during winter. The bedrooms of all respondents were located upstairs and 76.4 percent of them left the bedroom door open overnight, while 30.4 percent closed their bedroom doors overnight.

This concludes the presentation of the study findings. From these findings, the general belief about energy resources seems to be that resources are plentiful and that Canadians are in no real danger of facing serious energy shortages. There appeared to be a lack of knowledge and

Table 36

Thermostat Dialing Practices During the Summer

		Percent
1. Turned thermostat on in summer	(N=46)	
	yes	26.1
	no	73.9
2. Thermostat settings during summer	(N=12)	
Degrees Fahrenheit / Celsius		
65 / 18		41.7
70 / 21		33.4
68 / 20		8.3
72 / 22		8.3
76 / 24		8.3
3. Number of hours thermostat turned up each time	(N=12)	
overnight (8 or 9 hours)		58.4
one		16.7
two		8.3
four		8.3
Don't know		8.3

awareness about energy conservation practices which require more information about energy utilization. There also seemed to be a lack of conservation in space heating practices, with respondents choosing to keep their thermostats turned up rather than wear warmer clothing.

CHAPTER 5

DISCUSSION

Belief in an energy shortage in Canada, awareness of the energy situation and non-structural energy conservation practices among public housing tenants were investigated in this study. As expected, tenants in public housing believed that there was no energy shortage in Canada, they demonstrated a lack of awareness of the energy situation in general, and a lack of knowledge in and application of non-structural energy conservation practices in the home.

Belief in an Energy Shortage in Canada

The finding that the majority of those interviewed believed there was no shortage of energy in Canada, coincides with the findings of the Decision Making Information Canada Report on Energy (1975). This is the only other Canadian report on energy attitudes to date, in which 50.0 percent of Central Canadian residents (Ontario and Quebec) were not aware of the extent to which Canadian oil supplies were limited, and 33.0 percent believed they would last in excess of twenty years. Similarly, Doering (1974) found that 50.0 percent of his Indiana respondents believed there was no real energy shortage. On the other hand, United States respondents in Thompson and Mactavish's (1976) survey believed that there was an energy shortage, a finding that could be attributed to slightly more than 50.0 percent of the respondents representing the professional, managerial, clerical and sales group. In contrast, the majority of the public housing respondents to this survey were housewives and representative of a lower education and income level category. Cunningham and Lopreato (1977) found that belief in an energy problem increased as education and income increased.

Of those who expected a shortage in Canada in the future, the responses were equally divided between "serious" and "mild" while Bultena's (1976) respondents decidedly described the United States shortages as being "mild." The public-housing tenants did not recognize that energy shortages were due to reduced supplies, nor that the primary energy resources in use are finite or non-renewable. Thompson and Mactavish (1976) also found most of their respondents considered waste the cause of the problem, while only six percent attributed shortages to decreased supply. United States respondents surveyed by Bartell (1974), Doering (1974) and Murray et al. (1974) also believed that the oil shortages were contrived rather than a result of actual reduction in supply and the tendency was to blame the oil companies for the shortages.

It would appear that the fecundity of the media and other sources of energy information played a very minor role in trying to encourage the adoption of energy conservation practices, especially since energy and the declining availability of energy resources was one of the main issues in the June, 1979 Canadian national election campaign. The results discussed above are certainly indicative of the extent of the confusion that exists among the Canadian public which could be a result of pleas for conservation from some quarters (the Department of Energy, Mines and Resources) and positive reassurances of tremendous, indefinite supplies (politicians) from others. Another possible source of confusion could be the use of the term "energy." If a distinction between total energy and energy resources taken individually, such as oil, natural gas and hydroelectricity is not made, or understood, the public may very easily be left with the impression that there is no cause for concern. Canada may be self-sufficient in natural gas and hydroelectricity, but this is not the case with oil. An

added source of confusion was Manitoba Hydro's decision to institute a freeze on utility rates in Manitoba as of April 1, 1979, to remain in effect for the next five years.

In summary, the majority of respondents believed that there was no energy shortage in Canada. Of those who expected an energy shortage, the majority believed that problems with Canada's energy supplies were the result of human manipulation or inefficiency rather than the finite nature of energy sources. This concludes the discussion of the "belief" variable. The following section deals with awareness and knowledge.

Awareness of the Energy Situation and Knowledge of Non-Structural Methods of Conserving Energy

The largest number of respondents perceived the whole world as being confronted with problems of energy shortages, quoted the newspaper as being their first choice of an information source, considered consumer group publications as the most reliable source of information and appeared quite knowledgeable in the more common non-structural energy conservation measures which could be implemented without too much effort. However, they failed to make a distinction between the highly industrialized western nations in which increasingly larger amounts of energy resources have become a necessity and those developing nations whose energy consumption levels and requirements are well below those of the industrialized western nations. Interestingly, the views of the respondents with respect to the source of information on the energy situation, were similar to those found by Cunningham and Lopreato (1977) and Thompson and Mactavish (1976). Cunningham and Lopreato's (1977) respondents also chose the newspaper first, the televison second and newsmagazines, third as information sources while Thompson and Mactavish's (1976) respondents chose the newspaper first,

the television second and the federal government, third. Despite the fact that they were not used, consumer group publications were considered to be the most reliable source of information, with television a close second and the newspaper, third. Sources of information perceived as being least reliable were politicians, friends, schools, utility company people, government publications, professional people and magazines. In contrast, Gottlieb and Matre (1976) found the majority of respondents trusted the television the most, while, utility companies and the government were considered the least reliable.

The majority of respondents seemed to be quite knowledgeable in the use of draperies as a means of controlling the use of solar energy both during the winter and summer months, frost accumulation in the freezer as a function of opening and closing the refrigerator or freezer door, the relationship between servicing a car regularly and the efficient use of gasoline and turning the thermostat down while airing the unit during winter. The majority of respondents also felt that the advantage of cutting down the household use of electricity and natural gas would be to assist in the conservation of Canadian resources. However, slightly less than a quarter of the respondents did not connect frost accumulation in the freezer with the efficiency of the appliance while slightly less than a quarter believed people would not be more comfortable if they wore warmer clothes in the winter instead of turning up the thermostat. Although the majority of respondents believed that cutting down household use of electricity would assist in the conservation of Canada's energy resources, a large number felt that using less electricity would bring discomfort to their families. These tenants may very well be using a limited amount of energy as a result of their financial status. Other research has indicated that people in lower income

brackets use less than do higher income families (Morrison and Gladhart, 1976; Newman and Day, 1975).

The foregoing was a discussion of energy knowledge based on responses to some of the agree--disagree and true--false statements. However, responses to statements about lighting practices, the use of cold water for doing laundry and the difference in the quantity of hot water used in showers versus baths, gave rise to split decisions among respondents, that is, approximately the same number believed the measure to be conservative of energy as believed it either to make no difference or to be wasteful. Restructuring of these statements to remove the ambiguity could provide more specific information about knowledge of these non-structural conservation practices.

In summary, public-housing tenants were more knowledgeable in the more common and simple non-structural conservation practices while they demonstrated a lack of knowledge in those practices requiring specific information about energy utilization.

Non-Structural Energy Conservation Practices

The discussion of the non-structural energy conservation practices of public-housing tenants will include space heating, laundry, transportation and lighting practices.

The high winter day and night thermostat settings, the control of the thermostat by more than one family member, failure to turn the thermostat down when away from the unit for short or long periods and while airing the unit in winter, indicate an absence of energy conservative behaviour. The mean winter day and night thermostat setting used by the tenants was 21^{o}C (70^{o}F). Rather startling was the finding that 42.9 percent of the respondents kept their thermostats between 21^{o}C and 27^{o}C (71^{o}F - 80^{o}F) during the day and

32.9 percent also used these settings at night. On the contrary, other researchers found respondents turning their thermostats down in winter (Cunningham and Lopreato, 1977; Bartell, 1974; Bultena, 1976; and Doering, 1974). Although the majority of public-housing respondents said that other family members were happy with these settings, close to 40.0 percent said that other family members changed the setting either up or down or both. The thermostat was generally turned up once a day in the afternoon or evening when the family was engaged in non-physical activities such as watching television. Thermostats were generally not turned down when tenants were away from home for short periods of time and even though most tenants turned their thermostats down when away from home for long periods of time, just under one third failed to do so. Families who turned their thermostats down when they left their units, whether for short or long periods, turned them down to between 15°C and 20°C (60°F and 68°F). The majority of respondents aired their units by opening their windows, generally once a week, to replace stale air, but they failed to turn down the thermostat while so doing. Decreasing the humidity inside their units was not given as a reason for airing the units.

The results of responses to the seven follow-up questions obtained at the time of the second meter reading, three months after the termination of the educational programs indicate that while the tendency was to wear warmer clothes during the chilly summer months, a fairly large number of people still preferred turning up the thermostat, to between 21°C - 24°C (70°F - 76°F), usually overnight. During the winter the use of more bed clothes (more than two blankets) and higher thermostat settings seemed to compensate for the wearing of lightweight sleepwear and the tendency not to wear sweaters indoors. Even though all the bedrooms were located upstairs,

tenants complained of the childrens' bedrooms being colder than the master bedroom. This could be related to the orientation of the childrens' bedrooms and/or windows or the presence or absence of common walls in relation to these bedrooms.

The tenants are not using lowered thermostat settings as a means of reducing their utility bills. Lowering thermostat settings from 22°C (72°F) to 20°C (68°F) during the day could result in a 10.0 percent savings of heating fuel (McCallum, 1977, p. 112). If the thermostat setting is further lowered to 16°C (60°F) at bedtime, a further 8.0 percent may be saved (McCallum, 1977, p. 112). There are a number of factors related to the structure of the units as well as to the lifestyle of the respondents which could, either singly or taken as a whole, explain these high temperature settings. The lifestyle factors indicated by the study findings such as the preference for turning up the thermostat to wearing warmer clothing in winter, the absence of portable heaters as localized supplementary heat sources, the toleration of high humidity levels produced by many loads of laundry a day and other household activities and the freedom of thermostat control by several people in the household could possibly, in part, explain the high thermostat settings used by these tenants. Structural characteristics such as wall and roof insulation levels of R10, may not be sufficient to prevent heat loss while insufficient caulking or weatherstripping could result in draughty areas around the windows and doors. A malfunctioning thermostat or one located in an area which could cause it to register inaccurate readings, the location and orientation of the units and the location of trees in relation to the units, could further assist in explaining the high settings. A large number of units were end units, that is, they had more wall space exposed to the weather. The largest number of units faced the west, while

most units had trees on the east side where most of the large window areas of the units were located. There were only 28 young deciduous trees in the sample, which could not possibly offer much resistance against the wintry winds. The questions raised by some or all of these factors need to be answered before an effective program of energy conservation may be launched.

The structural factors seem to outweigh the lifestyle factors in terms of their possible effect on the amount of heat loss experienced in these units. In addition, it appears that the thermostat setting practices of tenants may improve only after a number of structural changes which would result in more energy-efficient units are implemented.

The infrequent use of portable heaters and the practice of not wearing sweaters indoors in winter, indicate an absence of energy conservation conscious behaviour. On the other hand, the finding that stove elements and/or the oven were seldom used to add heat to the units was unexpected while the methodological problems involved in the question pertaining to the use of draperies to retain heat in winter, gave rise to problems with interpreting the findings. The finding that almost 75.0 percent of those surveyed opened their the draperies during the day and closed them when the sun set during the winter, coincides with the findings of Cunningham and Lopreato (1977) and Kilkeary (1975). However, to obtain more specific information about practices associated with the use of draperies, the question requires restructuring.

Preference for doing their laundry during the morning peak period, between 7 a.m. and 12 noon, with more than 25.0 percent having no fixed time for laundry, the need to do laundry more than once a week, preference for using warm or hot water and a clothes dryer as opposed to hanging clothes to dry, would indicate an energy consumptive orientation in the laundry

practices of public housing tenants. Sixty-seven percent of respondents did their laundry more than once a week while almost the same number of respondents who did their laundry once a week, washed their clothes seven times a week. The largest number of people, 32.8 percent, used warm water for all their loads followed by those using hot water for some and cold water for some loads, 17.1 percent. Fourteen percent used hot water for all loads. An overwhelming majority of respondents did not hang their clothes outside to dry, nor did they use a clothesline in the basement, a finding similar to that of Cunningham and Lopreato (1977) who found 52.1 percent made no effort to hang their clothes out to dry. Respondents were generally able to set the water level on their washing machines and most of them reported adjusting the water level to the size of the load. Those not able to set the water level, said they always waited until they had a full washer-load before doing the laundry. Similarly, more than half of Cunningham and Lopreato's (1977) respondents reportedly made substantial efforts to wash only full loads in the washing machine. Observation indicated that most public housing respondents were dividing their basements into rooms and using them for living space rather than as a place to hang clothes. The reason for not hanging clothes outside to dry, given by most respondents, was that there was no space. Almost a third of those surveyed stated that the question was not applicable because of a ruling by the Winnipeg Regional Housing Authority against the erection of clothesline on their lots for aesthetic reasons.

The findings with reference to laundry practices strongly suggest a relationship between the times of day when laundry is done, the number of times a week it is done, the type of clothing and fabrics used by the family and specific family characteristics such as family size, family composition, employment status, and other individual personal lifestyles which were not

researched by this study. The fact that the sample was comprised of families in the child-rearing stage of the life-cycle with many children of diaper-wearing age and where the majority of the spouses were employed as labourers, could explain the frequency with which laundry was done, when it was done and the preference for using warm and hot water possibly to sterilize the diapers and dissolve the grease in the work clothes.

The major finding with reference to transportation practices was that out of the car owners who drove to work everyday, only one used a carpool. The majority of families owned cars while the most frequent means of transportation used by respondents was the bus, followed by their own cars. Bultena (1976), Doering (1974) and Thompson and Mactavish (1976) also found a very small number of respondents using carpools.

More than 75 percent of the car owners owned block heaters and almost all of them plugged in their cars, usually for two to three hours a day.

Lights not in use were usually turned off, while the tendency was to leave one or more lights on when away from home at night, and to leave the hall or bathroom light on overnight. Other researchers also found respondents turned off lights not in use (Bartell, 1976, Cunningham and Lopreato, 1977 and Kilkeary, 1975). Only three people out of the twenty-four who left lights on overnight, used nightlights.

Some respondents felt it necessary to leave a light on when away from home at night for security reasons, while the bathroom and/or hall lights were left on in case the children woke up during the night. The more extensive use of nightlights for this purpose could reduce electricity consumption.

Practices Observed During the Interview

The observation that half the respondents had their living room draperies

opened and slightly less than two-thirds had their windows opened in spite of the sweltering heat outside, that area rugs rather than wall to wall carpet were used as floor coverings, and the walls were painted an off-white colour seem to indicate areas for improvement with regard to energy conservation.

The tendency to keep the draperies and windows opened during the day in summer contradicts the earlier finding that the majority of tenants were aware that keeping the draperies and windows shut during the day in the summer assists in keeping the unit cool. This inconsistency further reinforces the need for investigation into the lifestyle characteristics of the tenants and the structural characteristics of the units as discussed under thermostat setting practices.

In summary, the practices of most concern from an energy conservation point of view, are those related to space heating and cooling. The high thermostat settings and the tendency to turn the thermostat up instead of wearing warmer or additional clothing, are areas in which improvement is needed. A parallel area of concern, indicated but not investigated by this study is the present status of the structural characteristics of the units--with reference to energy efficiency. There is a strong indication that the reluctance to use carpools and the nature of their laundry practices, may be related to specific family characteristics. Further study examining family behaviour may explain these relationships.

General Significance of this Study

The most important finding of this study from a methodological point of view was that the non-equivalent control groups research design was not workable in this setting. Conducting the personal interviews for the pre-assessment and follow-up information presented no problems at all, but it was not possible to apply the treatment in a meaningful way by inviting the respondents to

attend educational meetings. Despite the fact that these meetings were arranged in consultation with the Tenants' Associations in both areas in order to take the needs of the tenants into consideration, attendance was poor. The two sessions in each area were designed to be brief, open to all members of the family with special activities for the children and as interesting and flexible as possible. Reminder notices were distributed immediately prior to meetings while just prior to the final meeting in Sample Area A, the interviewers returned to all the respondents to determine whether they were in favour of a weeknight for the meeting in place of a Saturday morning and to solicit ideas from them as to what would attract people to a meeting in the Tenants' Association Hall. Acting upon the respondents' advice, the final meeting day was changed, the meeting advertised by way of hand-delivered notices and posters on the doors of the hall and a door-prize was offered. Nevertheless, these attempts at increasing attendance proved fruitless: the adults sent the children to the meeting instead.

Experience has indicated a number of aspects that would warrant attention by researchers and decision makers in the organization of adult educational programs under conditions similar to those characteristic of this study. Firstly, the poor attendance at the meetings could have been a product of a crucial finding of this study, namely that the majority of public housing tenants believed that there was no energy shortage in Canada. Absence of belief that a problem exists usually results in an absence of action. This points to the necessity for creating awareness and motivation in the public in order to influence their belief systems before any meaningful attempt at education may be instituted. Secondly, taking the specific circumstances of this study into consideration, the priorization of individual needs appear to affect choices relating to participation in various activities of daily living. In communities similar to those which formed the two samples

for this study, where the presence and extent of personal and social problems appeared to be overwhelming, feelings of helplessness, insecurity and apathy may abound. Unless some of these problems can be alleviated, they could take priority over any other activities competing for attention. Thirdly, it would appear that the communities surveyed were transient in nature since the rate of turnover is quite high, approximately 30.0 percent. Under these circumstances, decisions for participating in community activities may be influenced by the idea that this will not be a permanent home which may lead to social isolation from the rest of the community and the non-acceptance of responsibilities for improving the quality of life in the community. Familiarity with the type of information discussed above and tailoring the research method to the needs of the population could prove more beneficial. This study may be considered exploratory in the sense that some of these major considerations surfaced during the course of the research.

If a similar study were to be conducted in the future, casual learning situations on an individual basis and as a part of the interview could be arranged to make the learning experience more individualized and meaningful and thus more effective. In addition the interest of the children could be capitalized upon by including them in such informal learning situations. With reference to a more long-term transmission of energy conservation education, educators may achieve this through the school system. The beliefs, attitudes and values of the young people in grade school have usually not crystallized, thus making them more open to change. A few units on energy conservation, or energy conservation education incorporated into existing course materials could prove an interesting and meaningful learning experience for the students with the added benefit to the country at large, of arousing and establishing an energy conservation consciousness.

Since the television and the newspaper were cited as the major sources of energy information, these media could play an important role both in establishing the awareness that is necessary to produce motivation for action, and in maintaining a level of consciousness necessary for the internalization of the contributions that viewers are able to make in order to alleviate problems with national energy shortages.

Limitations of this Study

The following is a list of the overall limitations of this study.

1. The respondents were required to recall their winter energy practices for the interviews which were conducted during the summer.

2. More accurate information could have been obtained by keeping detailed records of practices. This would have involved the expenditure of a larger amount of resources than were available for conducting this study.

3. Research into energy use in the home should be conducted over a longer period of time, at least one year, in order to allow for seasonal changes in consumption, record keeping by families and periodic discussions with families about energy matters.

4. More detailed structural information about the units would allow one to make more sound generalizations.

5. More frequent readings of the gas and electric meters would provide more accurate information about consumption. The meters would have to be read concurrently so that respondents could be asked to read their own meters on a specified day and at a specified time.

Summary

The purpose of this study was to determine the status of public housing tenatns' belief in the energy shortages, their awareness and knowledge about the energy situation in general and their non-structural energy conservation

practices. Most tenants believed that there was no energy shortage in Canada, while those who believed there was a shortage, or expected a shortage in the future, believed it was or would be mild. The tenants attributed the shortages to human inefficiency rather than to actual reduction in supply.

The newspaper and television were the main sources of energy information with professional people, government publications, schools, friends and family perceived as the least reliable sources of information. Consumer group publications were considered most reliable by the majority of respondents despite the fact that they did not use this source themselves. There was an indication of some knowledge of the more common energy conservation practices, but little knowledge of those practices requiring specific information about energy utilization.

Non-structural energy conservation practices with reference to thermostat setting behaviour, clothing practices during the winter and transportation, indicate a lack of effort to conserve. As previously discussed, it is not possible to make any conclusive statements about the actual consumptive behaviour as provided by the meter readings.

REFERENCES

Bartell, Ted. The Effects of the Energy Crisis on Attitudes and Life Styles of Los Angeles Residents. Presented at the 69th Annual Meeting of the American Sociological Association, Montreal, August 1974.

Breton, Albert. The Federal-Provincial Dimensions of the 1973 Energy Crisis in Canada. Paper prepared for the International Seminar in Public Economics, Berlin, January 8-10, 1976. University of Toronto, Institute for Policy Analysis, November 1975.

Bultena, Gordon. Public Response to the Energy Crisis: A Study of Citizens' Attitudes and Adaptive Behaviours. Iowa State University, Department of Sociology, 1976.

Cunningham, W.H., and Lopreato, Sally Cook. Energy Use and Conservation Incentives: A Study of the South-western United States. New York: Praeger Publishers, 1977.

Decision-Making Information Canada Report on Energy, 1975.

Doering, Otto, Fezi, J., Gauker, D., Michaud, M., and Pell, S. Indiana's Views on the Energy Crisis. Purdue University, Agricultural Economics Department, Cooperative Extension Service, 1974.

_____. An Energy Strategy for Canada: Policies for Self Reliance (Summary). Energy, Mines and Resources Canada, 1976.

_____. Energy and the Food System. Agriculture Canada, 1976, p. vi.

_____. Energy Data for Manitoba. Manitoba Energy Council Secretariat, July 1977.

_____. Energy in Manitoba: Supply and Demand. Winnipeg: The Manitoba Energy Council, 1974.

_____. Energy Update. Energy, Mines and Resources Canada, 1977.

_____. From Log. Cabin to Pushbutton House: A Quick Overview. Journal of Home Economics, December 1973, p. 20-21.

Gottlieb, David. Sociological Dimensions of the Energy Crisis. Project E/S-5 State of Texas, Governor's Advisory Council, 1974.

Gottlieb, David, and Matre, Marc. Sociological Dimensions of the Energy Crisis: a Follow-up Study. University of Houston, Energy Institute, 1976.

Hass, J.W., Bagley, G.S., and Rogers, R.W. Coping with the Energy Crisis: Effects of Fear Appeals Upon Attitudes Toward Energy Consumption, Journal of Applied Psychology, Vol. 60, No. 6, 1975, p. 754-756.

Hayes, D. The Worldwide Debate Over Nuclear Power: The real Issues are Values and Ethics. Science Forum, August 1976, 52, Vol. 9, No. 4, p. 6.

Heberlein, T.A. Conservation Information: Energy Crisis and Electricity Consumption in an Apartment Complex. Energy and Systems Policy, 1975, 1, p. 105-117.

_____. Social Norms and Environmental Quality. A paper presented at the American Association for the Advancement of Science Annual Meeting, January 1975, in Morrison, p. 35.

Hogan, M.J. Lecture on Current Energy Research Project, University of Manitoba, Faculty of Home Economics, March 22, 1979.

Honnold, J.A. and Nelson, L.D. Voluntary Rationing of Scarce Resources: Some Implications of an Experimental Study. Paper presented at the Annual Meeting of the American Sociological Association, New York, August 30, 1976.

Kiesler, C., Collins, B., and Miller, N. Attitude Change. New York: John Wiley and Sons, Inc., 1969, p. 25-27.

Kilkeary, Rovena. The Energy Crisis and Decision-Making in the Family. Springfield, Virginia: U.S. Dept. of Commerce, National Technical Information Service, 1975. PB238783, in Morrison, p. 36.

Klecka, W.R., Nie, N.H., and Hull, C.H. Statistical Package for the Social Sciences. McGraw-Hill, 1975.

Laxer, James. Canada's Energy Crisis. Toronto: James Larimer and Company, 1975.

McCallum, Bruce. Environmentally Appropriate Technology. Renewable and Other Developing Technologies for a Consumer Society in Canada. Fisheries and Environment Canada, 1977, p. 112.

Morrison, Bonnie Maas. Socio-Physical Factors Affecting Energy Consumption in Single Family Dwellings: An Empirical Test of a Human Ecosystems Model. Ph.D. Dissertation, Michigan State University, 1975.

Morrison, Bonnie Maas, and Gladhart, Peter. Energy and Families: the Crisis and the Response. Journal of Home Economics, January 1976, p. 15-18.

Murray, J.R., Minor, M.J., Bradburn, N.M., Cotterman, R.F., Frankel, M., and Pisarski, A.E. Evolution of the Public Response to the Energy Crisis. Science, 184, No. 4234, April 1974, p. 257-262.

Newman, D.K., and Day, D. The American Energy Consumer. Cambridge, Massachusettes: Ballinger Publishing Company, 1975.

Novic, K., and Sandman, P.M. How Use of Mass Media Affects Views on Solutions to Environmental Problems, Journalism Quarterly, 51, 3, 1974, p. 448-452.

_____. Renewable Society. Access, Alberta, Edmonton Journal and the National Film Board of Canada, no date given.

Statistics Canada. Detailed Report.

Thompson, P.T., and Mctavish, J. Energy Problems: Public Beliefs, Attitudes and Behaviours. Grand Valley State College, Urban Environmental Studies Institute, 1976.

Winett, R.A., and Nietzel, M.T. Behavioural Ecology: Contingency Management of Consumer Energy Use. American Journal of Community Psychology, 3, 1975, p. 123-133.

SECONDARY SOURCES

Fox, J., Fraker, H., Grot, R., Harrie, D., Schorske, E., and Socolov, R. Energy Conservation in Housing: First Year Progress Report, July 1st, 1972, in Morrison, p. 29.

Gladhart, P.M. Energy Conservation and Lifestyles: An Integrative Approach to Family Decision Making. Occasional Paper No. 6, Family Energy Project, Michigan State University, College of Human Ecology, 1976, in Cunningham and Lopreato, p. 133.

Hogan, M.J. Energy Conservation: Family Values, Household Practices, and Contextual Variables. Ph.D. Dissertation, Michigan State University, 1976, in Cunningham and Lopreato, p. 139.

Seligman, C., and Darley, J.M. Feedback as a Means of Decreasing Energy Consumption. Paper presented at the 71st annual meeting of the American Sociological Association, New York, August 1976, in Cunningham and Lopreato, p. 24.

Walker, N., and Draper, E. The Effects of Electricity Price Increases on Residential Usage by Three Economic Groups: A Case Study. In Texas Nuclear Power Policies 5, University of Texas, Centre for Energy Studies, 1975, in Cunningham and Lopreato, p. 155.

Warren, D.I. Individual and Community Effects on the Responses to the Energy Crisis of Winter, 1974: An Analysis of Survey Findings from Eight Detroit Area Communities, 1974, in Cunningham and Lopreato, p. 157.

APPENDICES

APPENDIX A

Contents of Letter from the Winnipeg Regional Housing Authority to Tenants Explaining the Pretest

Letter from Winnipeg Regional Housing Authority Explaining the Survey

Contents of the Letter Mailed to Tenants by the Winnipeg Regional Housing Authority requesting assistance for Pre-testing the Interview Schedule

Dear Tenant:

The rising cost of living is affecting many people in different ways. Some senior students at the University of Manitoba are interested in how the people of Winnipeg are coping with rising costs and what their feelings and opinions are on the increasing prices of food, transportation and utilities. You can be of great assistance to the students by helping them to develop questions that may be asked of people in Winnipeg. They would like to meet with you for about twenty minutes to discuss the questions and invite your comments and suggestions for improving them.

The Winnipeg Regional Housing Authority

410-352 Donald Street
Winnipeg, Manitoba, R3B 2H8
Telephone (204) 943-0861

Dear Tenant:

The rising cost of living is affecting many people in different ways. Some senior students at the University of Manitoba are interested in how the people of Winnipeg are coping with rising costs and what their feelings and opinions are on the increasing prices of food, transportation and utilities.

They would like to discuss these rising costs with you and invite your suggestions for stretching the dollar. Because these rising costs affect people at all ages, in all walks of life, they are interested in your suggestions as well as those of the rest of the family. The information you or your family supply is confidential and you will never be identified in any way.

To hear about your feelings and opinions, the students will arrange two twenty minute interviews with you. Thereafter, two public meetings, not more than one hour and thirteen minutes in length will be arranged such that you and all members of the family can attend. Special activities will be arranged for the children so that you won't have to be concerned with finding a babysitter.

Although you are under no obligation, you can be of great assistance to the people of Winnipeg by consenting to participate in this survey. If you would like to assist, kindly call Olivia David at 474-9168, between 9:00 a.m. and 5:00 p.m.

Thank you.

Sincerely,

D. Ford

(Mrs.) D. Ford
PROJECT MANAGER
Family Branch

APPENDIX B

Research Instruments

Cost of Living Survey

The rising cost of food, transportation and utilities has prompted us to find out how the people of Winnipeg are coping with these price increases. Your answers to the following questions will be held in confidence.

1. At which setting do you and your family keep the thermostat during the winter ? List the day and night (bedtime) settings for winter.

   Day _____ Night (bedtime) _____

   Comments: _____

   _____

2. Are the other family members happy with these settings ?

   Yes ____

   No ____ do they prefer to have the temperature higher_____ or lower _____ than what you set it at ?

3. During the winter, do other family members change the temperature setting ?

   No ____

   Yes ____ do they turn the thermostat up ____ or down ____ from the setting it was on ?

   About how many times a day do they change the setting ?

   _____once
   _____twice
   _____more than twice

   At what time of day do they usually change the setting?

   _____

   What kind of activity are they usually involved in when they change the setting ?

   _____non-physical, for example, watching television or reading; or
   _____physical, for example, housecleaning, cooking or doing odd jobs around the house ?

Comments: _____

_____

4. Do you turn the thermostat down when you and the rest of the family are away from home in the winter .....

for short periods of time, for example, when visiting or shopping ?

No ____

Yes ____ to which setting ? _____

for long periods of time, for example, when going away for the weekend ?

No ____

Yes ____ to which setting ? _____

Comments: _____

_____

5. Do you use a portable heater ?

No ____

Yes ____

Comments: _____

_____

6. Do you find it necessary to turn the stove element or oven on to warm up the kitchen when it is chilly ?

No _____

Yes _____

Comments: _____

_____

7. Do you and your family find it necessary to wear a sweater around the house during the winter ?

No ____

Yes ____ always _____ sometimes _____

Comments: _____

_____

8. In winter, do you open the draperies during the day and close them when the sun sets ?

No ____

Yes ____

9. Do you find it necessary to air the house by opening the windows _____ or doors _____ during the winter ?

No _____

Yes _____ do you turn the thermostat down when you open the windows or doors ?

No _____

Yes _____

Why do you air the house ? _____

How many times a week do you air the house ?

Comments:_____

10. Do you have an air conditioner ?

No _____ how do you try to keep the place cool ? _____

Yes _____ what does the indoor temperature have to be for you to turn on the air conditioner ? _____

How many rooms of the house are air conditioned ?

To which setting do you usually turn the air conditioner ?

_____high
_____medium
_____low
_____other, specify_____

Do you turn it off when it is not required ?

No _____

Yes _____

Do you.....

only turn it on when it is unbearably hot_____ or do you leave it running continuously at a low setting ? _____

Comments:_____

11. Do you have a dishwasher ?

No _____

Yes _____ how frequently do you wash the dishes ?

_____more than once/day

_____once/day

_____once every other day

_____less frequently

Comments:_____

_____

12. At what time of day do you usually do your laundry ?

_____between 7 a.m. - 9 a.m.
_____ " 9 a.m. - 12 noon
_____ " 12 noon - 5 p.m.
_____ " 5 p.m. - 8 p.m.
_____ " 8 p.m. - 10 p.m.
_____ " 10 p.m. - 7 a.m.
_____ no fixed time

How many times a week do you do the laundry ? _____

Comments: _____

_____

13. Are you able to set the water level on the washing machine ?

No _____do you wait until you have a full washerload of things that can be washed together ?

No _____

Yes _____

Yes _____do you adjust the water level to the size of your load ?

No _____

Yes _____

Comments :_____

_____

14. What temperature water do generally use to do your laundry ? Check the appropriate responses.

_____hot water for all loads
_____hot water for some loads
_____warm water for all loads
_____warm water for some loads
_____cold water for all loads
_____cold water for some loads

Comments: _____

_____

15. Do you hang your clothes outdoors to dry when the weather is warmer ?

Yes ____

____ No ____there is no space for a clothesline
____there is space but a clothesline has not been installed
____other, specify _____
_____

Comments: _____

_____

16. Do you have any dripping hot water taps ?

No _____

Yes _____ how many ? _____

Comments: _____

_____

17. In addition to the freezer compartment of your refrigerator, do you have a deep freezer ?

No _____

Yes _____

Comments: _____

_____

18. Some people and especially children generally like to have most of the lights on at night when they are alone at home, do you ?

No ____

Yes ____

Do you leave the lights on when you and the family are away from home at night ?

No _____

Yes _____ how many ? _____

Do you find it necessary to leave any lights on overnight ?

No _____

Yes _____ which ones ? _____

Comment: _____

_____

19. Does your family have a car ?

No _____
Yes _____ how many ? _____

How many have block heaters ? _____

Do you plug your car(s) in, in the winter ?

No _____
Yes _____

About how many hours a day are (is) they (it) plugged in ?

_____ 20 - 24 hrs./day
_____ 15 - 20 " "
_____ 10 - 15 " "
_____ 5 - 10 " "
_____ less than 5 hrs./day

Is the car used to drive to work everyday ?

No _____
Yes _____ how many people regularly travel to work in the car ? _____

Comments: _____

_____

20. How many times a week, Monday through Sunday do you use the following methods of transportation ?

bus _____
carpool _____
friends' or relatives' car _____
your own car _____

Comments: _____

_____

21. How frequently do you shop for groceries ? _____

About how much money do you spend each time you shop for groceries ? _____

Have the increasing prices caused you to change your shopping habits ?

No _____
Yes _____how ? _____

_____

Comments: _____

_____

22. How widespread is the energy problem ? Check one.

_____the whole world
_____the Western nations only
_____the U.S. only
_____Canada only

Comments: _____

_____

23. Is there a shortage of energy in Canada ?

No ____do you expect a shortage in the future ?

No _____
Yes _____ how serious do you believe it will be ?
_____very serious
_____quite serious
_____a mild shortage
_____don't know

Yes _____

Comments: _____

_____

24. What do you think is (will be) the main reason for the shortage of energy in Canada ? Second choice ? Third choice ?

_____Consumers are too wasteful
_____There is a reduction in supply
_____There is too much exportation of Canadian resources
_____The oil companies purposely decrease supply to keep the prices up
_____There is poor management, control and distribution of energy resources
_____Foreign oil prices have increased
_____Other, specify_____

Comments: _____

25. Below are listed some commonly held reasons for rising food prices. Which of these do you believe is the main reason for the increases ? Second choice ? Third choice ?

_____Consumers are demanding too much
_____There is a reduction in supply of various food items
_____There is too much exportation of meat and dairy products
_____The middle men purposely decrease supply to keep the prices up
_____There is poor management, control and distribution of food
_____The prices of imported foods are continually increasing
_____Other, specify_____

Comments: _____

26. Of the following sources of information, where do you get most of your information on the energy situation ? Second choice ? Third choice ?

_____consumer group publications
_____family
_____friends
_____government publications
_____inserts with utility bills
_____magazines, name_____
_____newspapers
_____politicians
_____priests
_____professional people
_____radio
_____school
_____television
_____utility company people
_____Other, specify_____

Comments: _____

27. Which one of the following sources of information do you consider most reliable ? Second choice ? Third choice ?

_____consumer group publications
_____family
_____friends
_____government publications
_____inserts with utility bills
_____magazines, name_____
_____
_____newspapers
_____politicians
_____priests
_____professional people
_____radio
_____school
_____television
_____utility company people
_____Other, specify _____
_____

Comment: _____
_____

28. Do you watch for food specials ?

No ____

Yes ____of the following sources of information, where do you get your information on food specials ?

_____family
_____flyers
_____friends
____newspapers
____radio
____Other, specify_____
_____

Comments:_____
_____

Now, there are a few true-false and agree-disagree statements I would like you to check. There are no right or wrong answers.

True - False Checklist

1. T___F___ Lighting is one of the big users of electricity in most homes.

2. T___F___ If cold water detergent is used, washing clothes in cold water will remove as much soil as when washing them in hot water.

3. T___F___ The amount of frost that collects in the freezer or in the refrigerator does not affect how efficiently the appliance works.

4. T___F___ Opening the draperies during the day and closing them when the sun goes down, has no effect on the temperature of the rooms.

5. T___F___ Closing the draperies and the windows during the day and opening them at night, in the summer, helps to keep the rooms cool.

6. T___F___ Having a short, hot shower instead of a hot bath, does not really reduce the amount of hot water used.

7.[a] T___F___ Hydro bills are higher when major electrical appliances such as clothes dryers and hair dryers are used between 5 p.m. and 8 p.m.

8. T___F___ Servicing the car regularly at the recommended mileage intervals, assists in the efficient use of gasoline.

9. T___F___ Frequent opening and closing of the refrigerator door causes the frost to build up much faster than when the door is opened less frequently.

Agree - Disagree Statements

1. A___D___ Windows should be opened with the thermostat turned up to ventilate the rooms in winter.

2. A___D___ People would be more comfortable if they dressed more warmly instead of complaining about the cold or turning the thermostat up in winter.

3. A___D___ One advantage in cutting down my household's use of electricity or natural gas is to assist in the conservation of Canada's decreasing energy supplies.

4. A___D___ Using less electricity and natural gas would bring discomfort to me and my family.

[a] Respondents were asked to skip question 7 because in Manitoba higher rates for peak period consumption of electricity applies to commercial consumers only.

There are just a couple of questions left about you and your family.

1. Who lives in this household ?

Household members		Sex	Age	Occupation	Highest grade in school	Other Training
1.	Respondent					
2.						
3.						
4.						
5.						

2. What is your monthly rent ? _____

Thankyou for your cooperation.

I would like to read your meters now:

Electric _____

Gas _____

To be completed by the interviewer

Time of day: _____

Temperature: _____

Weather conditions: _____scattered cloud _____sunset

_____overcast _____sunny

A. Check the appropriate alternatives below for each respondent interviewed. This may completed while the respondent is checking the true -false and agree - disagree statements.

			No observation
1.	Lights in unused rooms	____on ____off	_____
2.	Livingroom draperies	____closed ___sheers ____opened ___	_____
3.	Windows	____closed ____opened	_____
4.	Air conditioner	____on ____off	_____
5.	Television	____on ____off	_____
6.	Radio	____on ____off	_____
7.	Carpet in livingroom ?	____no ____yes, wall to wall ? No ____ Yes ____	_____
8.	Exhaust fan	____on ____off	_____
9.	Colour of walls	____off white ____other	_____
10.	Wall coverings	____no ____yes	_____
11.	Chesterfield on	____inside wall ____outside wall ____beside a window	_____

B Location of the unit:

____end
____middle

C Which direction do the large windows of the unit face ?

_____north
_____south
_____east
_____west

____north-east
____north-west
____south-east
____south-west

Which direction does the unit itself face ?

_____

D Are there any trees on the lot ?

No_____

Yes ____ are they

_____evergreem
_____deciduous
_____tall
_____short
_____broad
_____narrow
_____broad-leafed
_____narrow- leafed
_____offer shade
_____offer no shade

How many trees are there ? _____

Where are they located ?

_____north of the building
_____south " " "
_____east " " "
_____west " " "

_____north-east of building
_____south-east " "
_____north-west " "
_____south-west " "

COST OF LIVING SURVEY

Date_____

In the summer we asked the people of Winnipeg how they were coping with the rising cost of food, transportation and utilities. Today we are doing the second interview which completes this survey. Your answers to the following questions will be held in confidence.

1. During the cool summer days and evenings, in July and August, did you or other family members find it necessary to turn up the thermostat ?

___ No. Did you use a portable heater ?
___no
___yes

Did you wear warmer clothes ?
___no
___yes

Did you turn on the elements and/or oven to warm up the place ?
___no
___yes

___Yes. To which setting ? _____

Approximately how many times did you and your family find it necessary to turn up the thermostat in the summer ?
_____

About how many hours did you leave it turned up each time ?
_____

Comments:_____
_____

2. Which form of transportation are you using now to do your grocery shopping ?

____bus
____your own car
____your relatives' car
____walk
____bicycle
____have groceries delivered
Other, specify_____

_____

Comments: _____

_____

3. How do you buy milk during the week ?

____go to the store
____have it delivered; how many times a week ? _____
Other, specify_____

Comments: _____

4. How many bedcovers do you use in the winter ?

____ _____2 heavy blankets
____ _____1 heavy and 1 light blanket
____ _____1 heavy blanket, 1 comforter
____ _____1 light blanket, 1 comforter
____ _____2 heavy blankets, 1 comforter
____ _____more than 2 heavy blankets
____ _____more than 2 light blankets
____ _____more than two heavy blankets plus a comforter
____ _____more than 2 light blankets plus a comforter
____ _____Other, specify _____

_____

Comments: _____

5. Where is your bedroom located ?

_____upstairs
_____downstairs

Comments: _____

_____

6. When you go to bed at night, do you leave the bedroom door.....

_____open or
_____closed

Comments: _____

_____

7. Do you and your family wear warmer sleepwear in the winter than in the summer ?

____no
____yes, always _____ sometimes_____

Comments: _____

_____

8. METER READING: Gas:_____

Electric:_____

Thankyou for your cooperation.

APPENDIX C

Reminder Notices 1, 2 and 3

Tally of Participant Evaluations of Educational Meetings

Reminder Notice #1

R E M E M B E R M E !

Cost of Living Meetings

Thank you for taking the time to help us out with the interviews. We really appreciate your cooperation. We would like to remind you about the meetings to be held at the Community Hall on July _____ and _____ at _____. You may wish to pin this note on your bulletin board or stick it on the refrigerator as a reminder of these dates.

Thank you again for your assistance.

Reminder Notice #2

Cost of Living Survey

Dear Tenants,

Sorry we missed you at the meeting on Wednesday, July 14th at 7:00 p.m. Those present enjoyed a film and a lively discussion in the comfort of an air conditioned hall. Three University students were on hand to work with the children. The meeting lasted no more than an hour and fifteen minutes after which refreshments were served.

We are looking forward to seeing you at the last meeting on Wednesday July 18th, 1979 at 7:00 p.m. Bring the children, come, cool off and enjoy yourselves. The whole family is welcome! See you on Wednesday.

Reminder Notice #3

Cost of Living Survey

Dear Tenants:

Sorry we missed you at the first Cost of Living meeting last Saturday, July 14, at 10:00 a.m. in the Community Hall at 1417 Fife Street.

Those present enjoyed a film and a lively discussion about the increasing costs of utilities and what we can do to save money and still be comfortable in our homes. Some Home Economics students were on hand to work with the children. The meeting only lasted an hour after which refreshments were served.

We are looking forward to seeing you at the last meeting which will be held on Wednesday, July 25th, at 7:00 p.m. in the Community Hall at 1417 Fife Street. We have changed from a Saturday morning to a Wednesday evening. Since many of you might have plans for other activities for weekends, come and enjoy yourselves! See you on Wednesday!

Tally of Meeting Evaluations

The evaluations completed by all adult participants in attendance at the two energy conservation and two nutrition educational sessions were tallied to provide an overall tally of the participants' perceptions of various aspects of the meetings.

1. Which one of the following words or phrases best describes this meeting?

	(N=12)
Interesting	9
Helpful	1
I learned a few things	2
Boring	-
Useless	-

2. Was the meeting . . . . .

Just the right length?	12
Too long?	-
Too short?	-

3. How would you rate the presentation of the material by the students?

Excellent	12
Fair	-
Poor	-

4. Were there any other topics you would have liked to discuss?

No	10
Yes[a]	1
No response	1

[a]The efficient use of appliances to conserve energy.

	Film	Displays
Interesting	4	4
Helpful	2	2
Informative	4	4
Boring	-	-
Useless	-	-
No response[a]	2	2

[a]One person missed the question, while another came late and missed the film.

5. What did you think of the film and the displays?

APPENDIX D

Energy Conservation Lesson No. 1 (Adults)

Energy Conservation Lesson No. 2 (Adults)

Energy Conservation Lesson No. 1 (Young People)

Energy Conservation Lesson No. 2 (Young People)

Contents of Lesson 1 Prepared for Door to Door Presentation

Energy Conservation Education Lessons

Energy Conservation Educational Program Outlines

These program outlines, two each for adults and young people, were developed for presentation to respondents in Sample Area A. The suggested learning experiences and teaching materials were adapted for use according to the size and interests of the group of participants. Age grouping was an important factor in organizing and adapting materials for the young people.

Session 1: Adults

Time:
Date:
Presenter:
Assistant:
Equipment:

Introduction: Film: "Energy Carol" - need for conservation (N.F.B.)

CONCEPTS	LEARNING EXPERIENCES	TEACHING AIDS
A. Space Heating/ Cooling -gas heating principles -effects of humidity levels -possible savings with lowered thermostat settings -ventilation in winter -function of draperies-winter -function of carpeting -furniture arrangement -obstruction of heat registers -use of exhaust fan -closing off attics, garages, basements. -supplementary heating. Summer - use of windows and draperies -use of air conditioner.	Elaboration of these sub-concepts by drawing out responses from the participants, questioning method. If there's time left, small group discussion, participants to report back to group- assistant to record main ideas mentioned.	Energy Conservation kit (Home Economics Directorate) Diagrams, calculations on posters.

Summary: Construct an energy conservation crossword puzzle based on concepts covered for participants to complete, read out answers.

Content of next session: Simple energy conservation measures around the house; transportation; reading meters and utility bills.

Meeting Evaluation Forms

Handouts

Closure

Energy Conservation Educational Program

Session 2: Adults

Time:
Date:
Presenter:
Assistant:
Equipment:

Introduction: Film: "Energy Savings in the Home" from the Home Economics Directorate.

CONCEPTS	LEARNING EXPERIENCES	TEACHING AIDS
B. Lighting -how much it uses, leaving lights on unnecessarily. -fluorescent vs. incandescent -direct vs. overhead lighting -recommended wattages	Discussion	Posters
Washing Machines -how much they use -how much hot water heaters use -washing full loads -using cold water	Discussion	Posters
Dryers -how much they use -hanging clothes to dry		

CONCEPTS	LEARNING EXPERIENCES	TEACHING AIDS
Refrigerators		
-how much they use -frost levels, de-frosting more often -opening door too often and for too long	Discussion	Posters
Showers		
-short hot showers vs. hot baths		
Television and Radio		
-how much they use -not leaving them on all day long		
C. Utility Bills		
-how to read them -reading meters -calculation of utility rates	Discussion	Posters
D. Transportation		
-use and maintenance of automobile -alternate modes of transportation	Discussion	Posters

Summary: Develop a case history for participants to think about and complete. Have them hand these in and/or crossword.

Meeting Evaluation Forms

Handouts

Clsoure

Energy Conservation Educational Program

Session 1: Young People

Time:
Date:
Presenter:
Assistant:
Equipment:

Young people may stay and view the films or other visual materials with their parents at the beginning of the session. Thereafter, they can be asked to accompany me to another room where we can talk, in a very relaxed manner, about the very basics of energy.

CONCEPTS	LEARNING EXPERIENCES	TEACHING AIDS
A. Energy		
-source of energy -how energy is produced -Canada's energy supplies decreasing, therefore, need to save what we have.	Use questioning method of teaching	a piece of wood, coal, some water; colourful pictures showing how these resources are harnessed.
B. Ways in which energy is used		
-making a hamburger -packaging a chocolate bar -packaging soft drinks, etc. -garbage, pollution, waste -biodegradable vs. non-biodegradable articles	Ask them to give examples, make a list on chalkboard or poster.	a hamburger, can of soft drink, candy bar, examples of biodegradable and non-biodegradable articles.
C. Heat loss - winter		
-opening doors and windows frequently -wearing warmer clothes indoors		posters, pictures for identifying energy wasteful practices.

End with play acting various situations based on material covered.

Energy Conservation Educational Program

Session 2: Young People

Time:
Date:
Presenter:
Assistant:
Equipment:

View the film or other visual materials with parents, retire to the other room and proceed with discussion.

CONCEPTS	LEARNING EXPERIENCES	TEACHING AIDS
D. Household energy conservation -leaving lights on -relationship of hot water use to energy consumption -short showers vs. hot baths -use cold water whenever you can -opening and closing the refrigerator too often and for too long -turning television and radio off when not in use	List uses of water and decide where cold water would do just as well as hot.	pictures, posters, colouring-in exercises, joining dots.
E. Transportation -gasoline cost -large vs. small cars -aerodynamics -use of bus or carpool		

Provide old magazines for them to cut and make energy posters.

Educational Handouts Used with the Energy Conservation Education Program

Source	Name of Resource
Adults	
Manitoba Hydro	"Test Your Energy Quotient" "Average Consumption of Electrical Appliances" "I Saved Energy--You Can Too" "The Efficient Use of Electricity: When You Have a Refrigerator; When You Are Cooking Food; When You Use Hot Water" "How to Read Your Meter" "Save" - energy crossword "The Energy Escape Case" - fill in the blanks "The Energy Word Hunt Game"
Children	"Connect the Dots" "No Gas, No Oil, No Electricity. Cross out the things Johnny Can't do" "What do we Use" "Colouring blanks of a child turning off the lights "Which give off heat or light? Colour them orange"
Adults	
Energy Conservation by Consumers Project	"Energy Word Search" "Energy Word Puzzle"

Contents of Lesson 1 Prepared for Door to Door Presentation in Sample Area A

At the meeting we discussed the energy situation in Canada and we heard how the decreasing supplies of energy in the world are causing other countries to look to Canada for their future supplies. Exploring and finding new oil wells is more costly and takes much more time than it did before so that while we are waiting for these new discoveries we are using up what we stored. Therefore we can help to make Canada's energy resources last a few years longer and save on our utility bills by cutting down our use of energy. A few ways in which we are able to conserve energy in our homes are:

1. Home heating costs are the highest of all household utility costs since so much energy, in your case, gas is needed. We can cut down on these heating costs by lowering our thermostats a few degrees in winter and wearing warmer clothes like sweaters during the day and heavier nightclothes and more blankets at night. If you can turn your thermostat down to about $68^{o}F$ during the day and to between $65^{o}F$ at night, you could save quite a bit of money, about $45.00 a year on a $300.00 heating bill.

2. Another way to save heating dollars is to turn the thermostat all the way down in the winter and wear warmer clothes when you open the windows or doors to air the place and then when everything is closed up again turn it to the normal day setting of $68^{o}F$. Turning it all the way up to $80^{o}F$ doesn't make the place get warmer faster, it just makes the furnace work harder and it uses more gas.

3. From the survey we found that many people open their windows doors and draperies during the day in the summer to keep cool. Doing this in the early hours of the morning when it is cool is fine, but later when it gets hot, all the hot air is trapped in the house. Some ways to keep cool and comfortable in the summer would be to close the windows, doors and draperies during the day and open them at night to let the cool air in, using a fan, wearing fewer and lighter clothes and cooking, showering and doing the laundry in the cooler hours of the evening.

4. Humidity, or the amount of moisture in the air is another factor which could make us feel uncomfortable. In the summer we have problems with high humidity whereas in the winter it is too low. Activities which produce moisture are cooking, showering and doing the laundry, among others. If these can be done in the cooler hours of a summer evening when the windows can be opened you and your family will feel more comfortable. On the other hand in the winter we need more humidity in the air to stop our skin, nasal passages and everything else from drying out. But, too much humidity in the winter makes us feel cold so that we need to find a balance between humidity and dryness in the air. When there is water or frost on the inside of the windows or doors, during the winter, it could mean that there is too much moisture in the air inside. One can usually tell that there is too much moisture inside when the toilet tank is dripping, when water drips down the walls or when there is water on the windows.

Those were just a few of the points that were discussed at the meeting. As soon as we find out from the other tenants in this area which is the best time to have a meeting, I will be in touch with you again. Thank you very much.

APPENDIX E

Scoring Procedure for True--False and Agree--Disagree Statements

SCORING PROCEDURE FOR THE TRUE--FALSE AND AGREE--DISAGREE CHECKLISTS

Responses to the true--false and agree--disagree statements were tabulated to provide information on respondents' knowledgeability and awareness about a selected set of non-structural energy conservation practices. A key or scoring procedure (p.) was determined, using information from two publications from the Department of Energy Mines and Resources, Canada, namely "100 Ways to Save Energy and Money in the Home" and "The Car Mileage Book." The checkmarks in the key identify responses which were considered indicative of knowledge and awareness of a set of non-structural energy conservation practices. Those statements "identified with the letter "C" indicate items which resulted in split decisions by respondents, where the number of responses were almost equally divided between the true--false and the agree--disagree alternatives, respectively. The decision to indicate areas of controversy was made after a study of the responses indicated the possibility of indecision by respondents as a result of unclear wording of the statements, problems with defining time periods such as "short" in statement number six and the effects of the varying points of departure for responding to the statements. Responses to these statements provide a rough indication of the respondents' knowledge and awareness about certain non-structural conservation practices, as well as areas of indecision.

T = True

F = False

A = Agree

D = Disagree

C = Controversial

True--False Checklist

C 1. T____ F____ Lighting is one of the big users of electricity in most homes.

C 2. T____ F____ If cold water detergent is used, washing clothes in cold water will remove as much soil as when washing them in hot water.

3. T____ F ✓ The amount of frost that collects in the freezer or in the refrigerator does not affect how efficinetly the appliance works.

4. T____ F ✓ Opening the draperies during the day and closing them when the sun goes down, has no effect on the temperature of the rooms.

5. T ✓ F____ Closing the draperies and the windows during the day and opening them at night, in the summer, helps to keep the rooms cool.

C 6. T____ F____ Having a short, hot shower instead of a hot bath, does not really reduce the amount of hot water used.

[a]7. T____ F____ Hydro bills are higher when major electrical appliances such as clothes dryers and hair dryers are used between 5 p.m. and 8 p.m..

8. T ✓ F____ Servicing the car regularly at the recommended mileage intervals, assists in the efficient use of gasoline.

9. T ✓ F____ Frequent opening and closing of the refrigerator door causes the frost to build up much faster than when the door is opened less frequently.

Agree--Disagree Statements

1. A____ D ✓ Windows should be opened with the thermostat turned up to ventilate the rooms in winter.

C 2. A____ D____ People would be more comfortable if they dressed more warmly instead of complaining about the cold or turning the thermostat up in winter.

3. A ✓ D____ One advantage in cutting down my household's use of electricity or natural gas is to assist in the conservation of Canada's decreasing energy supplies.

C 4. A____ D____ Using less electricity and natural gas would bring discomfort to me and my family

---

[a]Respondents were asked to skip question 7 because in Manitoba, higher rates for peak period consumption of electricity apply to commercial consumers only.