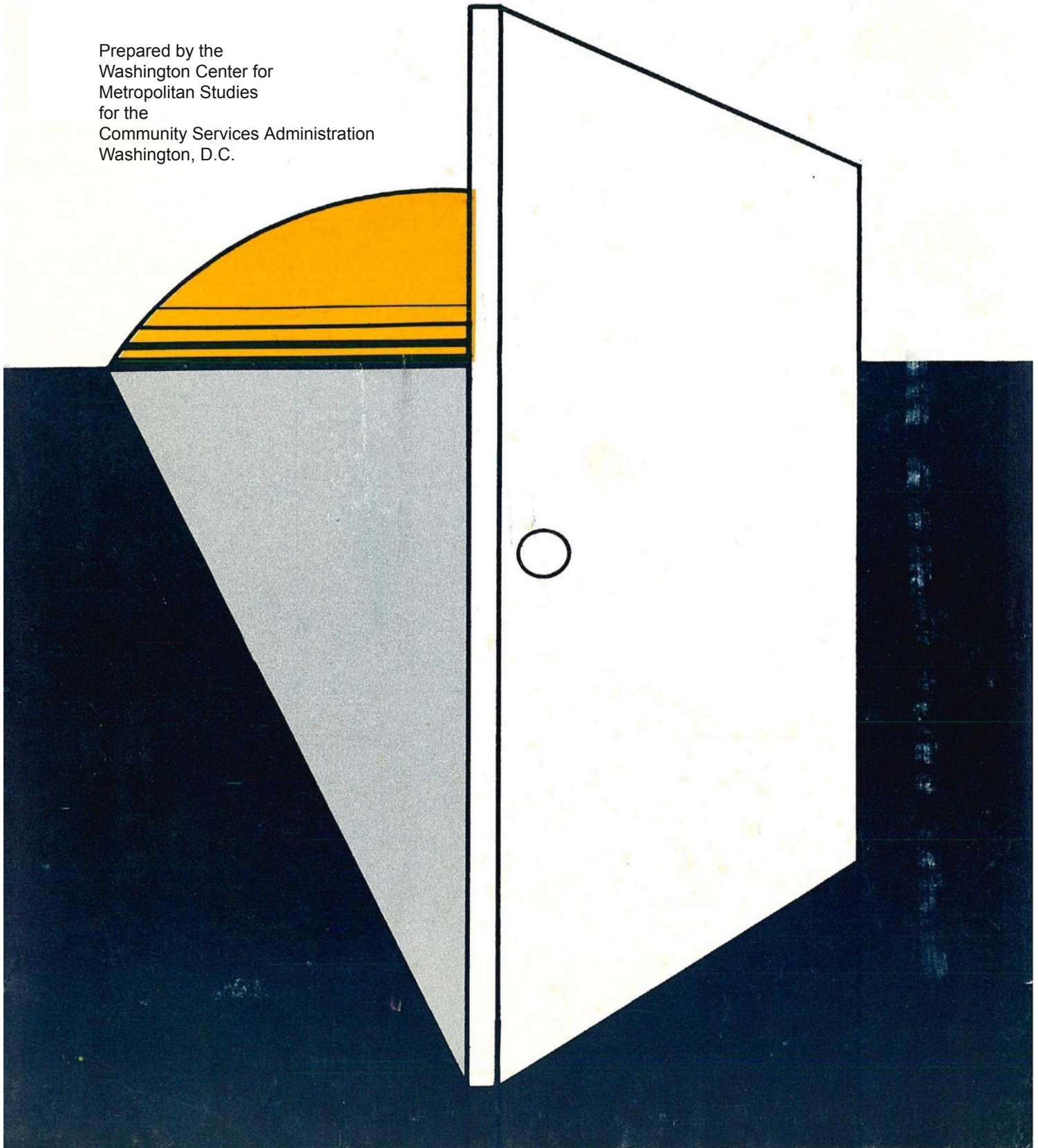


COLDER...DARKER

Prepared by the
Washington Center for
Metropolitan Studies
for the
Community Services Administration
Washington, D.C.



COLDER...DARKER:

THE ENERGY CRISIS AND LOW-INCOME AMERICANS

An Analysis of Impact and Options

**By
Eunice S. Grier**



The study reported herein was performed
pursuant to Contract No. B6B-5522
with the Community Services Administration,
Washington, D.C.

June 1977

PREFACE

The Washington Center for Metropolitan Studies conducted two national surveys of energy use and household activities. The first, developed and run in 1973 under the aegis of the Ford Foundation's Energy Policy Project, served as the basis for a report by Dorothy Newman titled, "Let Them Freeze in the Dark." The second survey, modeled on the first but with a significantly improved and expanded questionnaire, was run in 1975 under a contract with the Federal Energy Administration. This report provides an analysis of the information from both surveys, and includes an assessment of the impact of the energy situation on the lives of poor and near-poor Americans, an analysis of how the impact has changed both in its basic nature and intensity since 1973, and recommendations from the study's findings concerning policy alternatives for the nation's lower income citizens and their use of energy. The findings of the study have dictated the title.

Table of Contents

LIST OF TABLES	iv
EXECUTIVE SUMMARY	viii
The Impact of Energy Costs on Low-Income Households	viii
Energy-Related Characteristics of Low-Income Dwellings	viii
Weather Protection in Low-Income Homes	ix
Appliances in low-Income Homes	ix
Changes in Home Energy-Conservation Behavior	ix
Use of Energy in Personal Travel	x
Implications for Policy and Programs	x
I. WHAT THIS REPORT IS ABOUT	1
Who Are the Poor and Near-Poor?	2
Comparisons with Higher-Income Households	5
The WCMS Energy Surveys	5
Organization of this Report	6
II. THE COST OF PERSONAL ENERGY USE AND ITS IMPACT ON LOW-INCOME HOUSEHOLDS	7
The Rising Cost of Household Energy	7
Implications For National Policy	8
The Costs of Energy for Low-Income Households	9
The Aggregate Energy Consumption of Low-Income Households	12
III. ENERGY-RELATED CHARACTERISTICS OF LOW-INCOME DWELLINGS	15
Space Heating Requirements and “Built-In” Housing Characteristics	15
Housing Structure Types Occupied by Low-Income Americans	16
Structure Types by Income Level	18
Structure Types by Community Type	18
Structure Types by Region	18
Structure Types by Characteristics of the Low-Income Household	20
Sizes of Housing Occupied by Low-Income Americans	20
Size by Income Level	20
Size by Type of Community	21
Size by Region	22
Types of Heating Systems in Homes of Low-Income Americans	22
Type of Heating System by Income Level	23
Type of Heating System by Region	23
Type of Heating System by Community Type	24
Availability of Temperature Controls in Low-Income Dwellings	25
Availability of Controls by Income Level	25
Availability of Controls by Community Type	25
Availability of Controls by Region	26
Types of Energy Used for Space Heating in Low-Income Households	27
Natural Gas	27
Fuel Oil	27
Electricity	28
Bottled Gas	28
Minor Fuels	28

IV. ENERGY-RELATED BEHAVIOR IN LOW-INCOME HOMES	30
Insulation, Storm Windows and Similar Energy-Conserving Features in Low Income Dwellings	30
Presence of insulation	31
Storm Doors and Weatherstripping	33
Window Protection	35
Energy-Related Improvements in Low-Income Homes	36
Temperature Maintenance Practices in Low-Income Households	40
Usual Temperatures	41
Day vs. Night Temperatures	42
Other Uses of Energy in Low-Income Dwellings	45
Water Heating	45
Appliances	46
Changes in Energy-Conserving Behavior	48
V. <i>HOW LOW-INCOME PEOPLE USE ENERGY IN PERSONAL TRAVEL</i>	50
Car Ownership in Low-Income Households	50
Types of Autos Owned by Low-Income Households	52
Fuel Consumption in Cars Owned by Poor Households	54
Mileage Driven	55
Gas Mileage	57
Gas Consumption	58
Public Transit Use by Low-Income Households	59
Recent Changes in Transportation Behavior Among Low-Income Households	60
Auto Ownership	61
Miles Driven Annually	61
Gas Mileage	62
Gas Consumption	63
Problems Due to Lack of Transportation	63
VI. <i>IMPLICATIONS FOR POLICY AND PROGRAMS</i>	66
The Overall Energy Situation of Low-Income Households	66
Home Heating as a Central Focus for Energy Programs	67
Transportation as a Focus for Energy Programs	68
Low-Income Households with Cars	68
Low-Income Households Without Cars	69
Some Important Sub-Groups Among Low-Income Households	70
Low-Income Households Outside Metropolitan Areas	70
Low-Income Renters	71
The Low-Income Elderly	73

LIST OF TABLES

Table No.		Page No.
1	Upper Income Limits, By Size, For Households Defined as Low-Income in 1973 and 1975	
	WCMS Surveys of Household Energy Use Compared to Federal Poverty Standards	
2	Selected Characteristics of Low-Income Households Compared to Households of All Income Levels, 1975 WCMS Survey of Household Energy Use	

- 3 Where Low-Income Households Live in U.S., by Region, 1975
- 4 Location of Low-Income Households by Urban, Suburban and Non-Metropolitan Areas, 1975
- 5 Price Per Million BTUs of Electricity and Natural Gas Consumed By Low-Income Households Vs. All U.S. Households, 1973 and 1975
- 6 Differential in Consumption and Expenditures for Electricity and Natural Gas Between Low-Income Households and All U.S. Households, 1975
- 7 Consumption and Cost of Electricity Used By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
- 8 Consumption and Cost of Natural Gas Used By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
- 9 Estimated Aggregate Consumption of Natural Gas and Electricity By Low, Upper-Middle and High-Income Households, U.S., 1975
- 10 Average BTUs and Average Cost of Natural Gas Consumed Annually By Households in Dwellings of Selected Characteristics, U.S., 1975
- 11 Average Price Per Unit of Natural Gas and Electricity in Different Regions of the U.S., 1975
- 12 Type of Housing Occupied by Low-Income Households in U.S. Compared to Upper-Middle and High-Income Households, 1975
- 13 Type of Housing Occupied By Low-Income Households Living in Communities of Different Types, 1975
- 14 Type of Housing Occupied By Low-Income Households, By Region, 1975
- 15 Type of Housing Occupied By Low-Income Households of Different Characteristics, 1975
- 16 Size of Dwellings Occupied By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
- 17 Size of Housing Occupied By Low-Income Households By Type of Community, 1975
- 18 Size of Dwellings Occupied By Low-Income Households By Region, 1975
- 19 Types of Heating Systems in Homes Occupied By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
- 20 Types of Heating Systems in Homes Occupied By Low-Income Households in U.S. By Region, 1975
- 21 Types of Heating Systems in Homes Occupied By Low-Income Households, in U.S. By Type of Community, 1975
- 22 Absence of Temperature Controls in Low-Income Households in the U.S., By Region, Community Type and Tenure, and Compared to Upper-Middle and High-Income Households, 1975
- 23 Types of Fuel Used For Space Heating By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
- 24 Types of Fuel Used for Space Heating By Low-Income Households By Type of Community, 1975
- 25 Presence of Insulation in Homes Occupied By Low-Income Households Compared to Upper-Middle and High-Income Households, 1975
- 26 Presence of Insulation in Homes Occupied By Low-Income Households By Region, 1975
- 27 Presence of Insulation in Homes Occupied By Low-Income Households By Type of Community, 1975
- 28 Presence of Storm Doors and Weatherstripping in Homes Occupied by Low-Income Households Compared to Upper-Middle and High-Income Households, 1975
- 29 Presence of Storm Doors and Weatherstripping in Homes Occupied By Low-Income Households By Region, 1975
- 30 Presence of Storm Doors and Weatherstripping in Homes Occupied By Low-Income Households By Type of Community, 1975
- 31 Presence of Storm Windows, Insulating Glass, and Weatherstripping in Homes

	Occupied By Low-Income Households in U.S. Compared to Upper-Middle and High-Income Households, 1975
32	Presence of Storm Windows, Insulating Glass, and Weatherstripping in Homes Occupied By Low-Income Households By Region, 1975
33	Presence of Storm Windows, Insulating Glass, and Weatherstripping in Homes Occupied By Low-Income Households By Type of Community, 1975
34	Energy-Related Improvements Reported in Homes Occupied By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1973-75
35	Presence of Insulation in Homes Occupied By Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975 and 1973
36	Presence of Storm Doors in Homes Occupied By Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975 and 1973
37	Presence of Storm Windows or Insulating Glass in Homes Occupied By Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975 and 1973
38	Usual Home Temperature in Winter For Low-Income Households Compared to Upper-Middle and High-Income Households, 1975
39	Usual Home Temperature in Winter For Low-Income Households By Region, 1975
40	Usual Home Temperature in Winter For Low-Income Households By Type of Community, 1975
41	Usual Home Temperature in Winter in Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975 and 1973
42	Major Appliances Possessed By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
43	Recent Changes Reported in Energy Use in the Home By Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975
44	Number of Autos in Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
45	Number of Autos in Low-Income Households By Type of Community, 1975
46	Number of Autos in Low-Income Households By Region, 1975
47	Types of Autos Owned By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
48	Types of Autos Owned By Low-Income Households in the U.S. By Type of Community, 1975
49	Annual Miles Driven as Estimated By Low-Income Households With Cars in the U.S. Compared to Upper-Middle and High-Income Households, 1975
50	Principal Uses of Autos Owned by Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
51	Means of Commuting to Work Reported By Employed Persons in Low-Income Households By Type of Community, 1975
52	Gas Mileage as Estimated For Cars Owned By Low-Income Households in the U.S. Compared to Cars Owned By Upper-Middle and High-Income Households, 1975
53	Estimated Annual Gas Consumption For Low-Income Households With Cars in the U.S. Compared to Upper-Middle and High-Income Households, 1975
54	Uses of Public Transit By Low-Income Households in the U.S. Compared to Upper-Middle and High-Income Households, 1975
55	Recent Changes Reported in Energy Use for Personal Transportation By Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1975
56	Change in Number of Autos in Low-Income Households in the U.S. Compared to Higher-Income and Total Households, 1973-1975
57	Change in Annual Miles Driven as Estimated By Low-Income Households With Cars in the U.S. Compared to Higher-Income and Total Households, 1973 and 1975
58	Change in Gas Mileage as Estimated For Cars Owned By Low-Income Households in

- the U.S. Compared to Higher-Income and Total Households, 1973 and 1975
- 59 Change in Annual Gas Consumption For Low-Income Households With Cars in the
U.S. Compared to Higher-Income and Total Households, 1973 and 1975
- 60 Frequency of Problems Caused By Lack of Transportation Reported By Low-Income
Households Compared to Upper-Middle and High-Income Households, U.S., 1975
- 61 Estimated Number of Low-Income Dwellings Lacking Weather Protection By Region,
1975
- 62 Selected Aspects of Homes Occupied By Low-Income Households in Non-Metropolitan
Areas, 1970
- 63 Selected Aspects of Dwelling Occupied By Low-Income Renters in the U.S. Compared
to All Low-Income Households, 1975
- 64 Selected Aspects of Dwellings Occupied By Elderly Low-Income Households in the
U.S. Compared to All Low-Income Households, 1975

EXECUTIVE SUMMARY

This report on the energy crisis and its impact on low-income households is based on two national surveys by the Washington Center for Metropolitan Studies. One was made in May 1973 (pre-embargo) and the second in 1975 (post-embargo). Both surveys merge personal interviews of a representative sample of U.S. households with data on consumption and costs obtained directly from their utility suppliers. Low-income households are defined here as those with incomes at or below 125 percent of the Federal poverty line. They constitute roughly the lowest fifth of American households in terms of income.

The Impact of Energy Costs on Low-Income Households

Low-income households consume much less energy, on the average, than high-income households. The **10 percent** of American households with incomes of \$25,000 or more consume in the aggregate almost as much natural gas, nearly one-fifth more electricity, and about twice as much gasoline as the **20 percent** in the lowest income bracket.

Americans with low incomes use energy mainly for essentials—heating, lighting, refrigeration, and short-distance driving—and much less often for “frills” and conveniences. Despite this frugality, they pay somewhat more per unit of energy they consume, especially for electricity—although the gap narrowed somewhat between 1973 and 1975. In those two years alone, the average low-income household saw its per-unit cost of electricity rise by 30 percent; of natural gas, by 34 percent.

In 1975 many low-income households were paying 20 percent or more of their incomes for energy consumed in their homes and cars. We estimate that the average low-income household which had an income of \$3,400 in 1975, using electricity, natural gas and gasoline, paid about \$670 for the three fuels combined. However, if they used fuel oil for space heating, in addition to the three other fuels, their total annual expenditures for energy were higher still—probably \$900 or more in 1975, or over one-fourth of their meager income.

Energy-Related Characteristics of Low-Income Dwellings

Space heating is the largest in-house energy use. It has been estimated to take over half of all residential energy. Space heating requirements depend heavily upon “built-in” attributes of the dwelling such as location, type, size, and heating system characteristics.

For example, a single-family house consumes an average of nearly twice as much natural gas as an apartment. Dwellings in the North Central region consume 64 percent more gas, and those in the Northeast 33 percent more, than homes in the South Central states.

Energy prices vary widely by region also. Electricity costs 90 percent more in the Northeast than in the South Central region; natural gas 45 percent more. While low-income households are concentrated somewhat disproportionately in the South Central region, with its generally moderate climate and relatively low energy prices, 49 percent live in either the Northeast or North Central states. Those in the Northeast, particularly, bear the brunt of colder-than-average temperatures and much higher-than-average heating costs.

About 54 percent of all low-income households occupy one-family detached homes—a low proportion than among those with higher incomes, but still a majority. While the free-standing house may be the American “dream home,” it is by far the most energy-rapacious—partly since it is exposed to the weather on all sides. On the other hand, the occupant often has more control over temperature than the apartment dweller, plus more latitude to make energyconserving improvements—if he has the money and strength.

About one-third of low-income Americans live in apartments. Apartments are usually more energy-efficient than single homes, but they often do not afford their tenants the same opportunities or incentives for energy conservation. Yet the tenant too pays for the energy he uses, either directly or as part of the rent.

Low-income households predominantly occupy small dwellings. The median size is under five rooms, compared to over seven rooms for those with incomes of \$25,000 or more. Their dwelling size is some help to their heating budgets. But nearly two out of five have no thermo stat or valve with which to control their dwelling temperature—a proportion which rises to almost half among low-income renters.

Weather Protection in Low-Income Homes

Weather protection in low-income homes is far below average. Only about a fourth reported in 1975 that they had insulation in both walls and ceiling; about the same proportion reported that all windows were protected by storm windows or insulating glass; even fewer had window weatherstripping; and less than one-third had all their exterior doors protected by storm doors.

Only small percentages of low-income households reported adding insulation, storm doors or windows between 1973 and 1975. The percentages were much larger among higher-income households, whose homes already had much better weather protection in 1973. On the other hand, many more high-income households reported recent improvements that increased energy consumption, such as additions, which would offset conservation measures at least in part.

Ironically, when those who could not report the temperature of their dwellings were excluded (and nearly one low-income household in five could not), the 1975 survey results indicated that average temperatures in low-income dwellings were somewhat higher, on the average, than in higher-income dwellings. This was the opposite of the relationship in 1973.

While the shift toward more energy-conserving temperatures was greater among higher-income households, the chief reason may have been that they could manage it more readily. Many more low-income households are elderly and need warmer dwellings for comfort and even health. In addition, many more are renters who cannot control their dwelling temperatures. Moreover, the draftiness of many low-income dwellings may require higher thermostat settings for reasonable comfort. Despite the higher average, considerably larger percentages of low-income than high-income households kept their dwellings at below 65 degrees both day and night in 1975; and this group had increased since 1973.

Appliances in low-Income Homes

Many fewer low-income households reported having most kinds of appliances than those of higher incomes. But a few appliances—refrigerators, cook stoves, and TVs—were virtually universal. Except perhaps for TVs, these may reasonably be classed as necessities rather than luxuries in today's American society.

Where low-income households owned appliances which came in two forms, moreover, they more often had the kind which used less energy. For example, most had refrigerators which required defrosting, while most higher-income households had the higher-consumption frostfree type. Many more low-income households also had wringer washers and black-and-white TVs.

Changes in Home Energy-Conservation Behavior

Almost without exception, more higher-income households than low-income households reported making energy-conserving changes in their behavior around the house between 1973 and 1975 (turning off lights, turning down thermostats, etc.). However, this difference probably was related more to opportunity than to motivation. Low-income households already were con-

serving energy more in 1973. Also, many fewer had the opportunity to take such actions as changing furnace filters more frequently.

Use of Energy in Personal Travel

Nearly half of all low-income households did not own a car in 1975—a year in which most upper-middle and high-income households had two cars or more. However, those with autos usually owned similar model types to those of higher-income households—which is explained chiefly by the fact that three-fourths acquired them secondhand. Relatively few households in any income group owned small “economy” compacts and subcompacts in 1975. These cars were even less frequent in low-income households, probably because they are of comparatively recent popularity and fewer have yet been “traded down.”

The typical auto owned by a low-income household was not only older, but got somewhat better gas mileage than the newer car, often “loaded” with extras, of the more affluent. However, gas mileage decreased somewhat for low-income households between 1973 and 1975—again probably a reflection of the “trading-down” pattern, which causes them to lag behind the patterns of higher-income drivers by a few years.

Low-income households with cars report driving much less than high-income households. Nearly half say they drive less than 5,000 miles per year. An almost equal percentage at the \$25,000-plus level say they drive at least 20,000 miles annually. Most cars in low-income households are reported to be used only for short-distance driving.

Low-income households, as well as those of higher-incomes, reported increases in number of miles driven between 1973 and 1975. But higher-income households increased their mileage far more. In general, smaller proportions of low-income households reported making energysaving changes in driving behavior (driving slower, driving less for recreation, etc.). Again, the chief cause is probably differentials in opportunity; low-income households were much less likely to use their cars for long-distance driving and pleasure in 1973.

Public transit is used by only a minority of Americans at any income level today. The main reasons are probably that transit is often unavailable, inadequate, or more expensive than autos. However, somewhat more low-income households do make use of transit. About one-third reported using it in the month prior to the 1975 survey, compared to less than one-fifth of higher-income households. Most used it principally for non-commuting purposes—shopping, visits to the doctor or dentists, etc. Fewer used it to get to work than among the more affluent.

About one-fourth of low-income households reported some problem due to lack of transportation in the year prior to the 1975 survey, compared to only two percent of high-income households. Many of these problems were of a serious nature—such as inability to get to a doctor or dentist, or inability to take a particular job. Many low-income households reported more than one problem. But many others may not even have been conscious of difficulties due to lack of transportation, since they had adjusted their lifestyles so completely to its unavailability. And some of these may be in the most serious plight of all.

Implications for Policy and Programs

Low-income Americans are very diverse. Policies and programs intended to help them deal with the energy shortage must reflect this fact. No single approach will meet the needs of all, or even the majority.

As energy costs continue to climb, many low-income households will increasingly face choices between spending for energy and spending for other life essentials. The energy crisis can literally become a life-and-death matter for such people unless public policies come to their aid.

However, the nation can do much to help its low-income citizens cope with rapidly rising energy costs. Because costs to the public must ultimately reflect increased costs for energy and other essentials, all taxpayers will ultimately benefit from providing such help. --

Home heating can be an important focus for energy programs for low-income households. Programs to help these households improve the weatherization of their dwellings could be of great value. This is especially true for the 42 percent who live outside metropolitan areas. But many of the rural and small-town dwellings which are in the worst shape probably are too rundown to be worth fixing. Expansion of rural housing assistance programs also merits consideration for this reason.

The dwellings of low-income renters also are less adequately protected against the weather than those of owners. While a majority of these renters are apartment dwellers, 44 percent occupy detached homes. Most low-income apartment dwellers, moreover, live in small buildings—many probably converted from single-family houses. Many of these buildings are probably old and in generally poor condition, and it would be unwise to assume that the landlord has the resources to make energy-saving improvements—just as it would be unwise to assume that the tenant has the incentive. We recommend further analysis of this problem, with particular attention to design of policies which would encourage landlords to improve the weather protection of their properties.

The low-income elderly are another group worthy of special consideration in this respect. Weatherization programs would aid many, especially since their stage of life and their restricted budgets allow them comparatively few options for adapting to lower temperatures and higher heating costs. Weatherization might be linked to job programs, so that unemployed youth could obtain incomes and training by helping to improve the situation of those at the other end of the life cycle.

But some elderly might also prefer to move to housing that was designed with the special needs of older people in mind. Those who moved into their former homes might be better equipped to weatherize and maintain them. More emphasis on special Federally-assisted programs of housing for the elderly could contribute to energy conservation as well as to the welfare of many older Americans.

Transportation can be another important area of program focus. Many low-income people are heavily dependent on their cars, and many have no other transportation alternative. Most of their cars are bought used, and often receive very inadequate maintenance. A nationwide network of auto maintenance centers for low-income drivers—providing tuneups, lubrication, inspection, and regular maintenance services at subsidized rates—could reduce gas consumption, cut ownership costs, and provide both safer and more reliable transportation. They could be coupled with job programs.

The nearly half of all low-income households who do not own cars also deserve consideration. For many, public transit is either unavailable or sorely inadequate. Most of these carless low-income households live in central cities. More flexible transit services using minibuses, vans, and other small vehicles—subsidized to keep rates low, and with routes oriented toward the needs of their users—could help those in urban areas. They could also be coupled with job programs. We recommend further analysis of this problem.

Finally, we recommend that the Community Services Administration strengthen its linkages with other agencies of the Federal Government which have responsibility toward the low-income population or sub-groups like the elderly. CSA could both share its special knowledge of their needs and seek opportunities for joint program efforts.

I. WHAT THIS REPORT IS ABOUT

This is a report on how America's low-income households have been affected by the energy crisis. It asks questions such as the following: How are these households affected by rapidly rising costs of gas and electricity? What changes have they made in their dwellings and lifestyles to accommodate them? What options do they appear to have for further changes and conservation? How do their experiences and behavior compare with those of households at other income levels? And what are the implications of these findings for public policies relating to low-income households and energy use in the United States?

The principal sources of information for this report are two national surveys of household energy use conducted in May of 1973 and May of 1975 by the Washington Center for Metropolitan Studies. The first, sponsored by the Ford Foundation, was made shortly before the oil embargo brought energy to the forefront of the nation's consciousness. The second, sponsored by the Federal Energy Administration, was conducted after the term "energy crisis" had become a household word.

Before the pinch of rapidly rising energy costs was felt by most middle and upper-income Americans, low-income households were already frugal in their consumption of gas, oil and electricity. In its first national survey of household energy use in 1973, the Washington Center found that poor and near-poor households used far less energy in their daily lives than did those who were better-off.

The energy they consumed directly was limited largely to the essentials of life-space and water heating, cooking, food refrigeration, and lighting. Comparatively little was used for "frills" or amenities. Even where low-income households possessed "nonessential" appliances common among those of higher incomes, they were often of a type which used less energy. For example, if they had clothes washing machines, these were more often of the old-fashioned wringer type. Automobile driving by the poor and near-poor was severely limited. Almost half did not even own a car. Those who did restricted their travel largely to local driving with few if any long distance trips.¹

In 1973, then, America's low-income population already had few options for cutting back on energy use—at least not without substantial, sometimes health-endangering, changes to their lifestyles. And in many instances a major part of their energy usage was not under their own control. If their heater had no thermostat or valve to set the temperature at a lower level, or if it was under the control of a landlord, there was little they could do to conserve one of the largest components of the household energy bill.

At the same time, the Washington Center's May 1973 survey found that the price per unit of energy consumed was inversely related to income level. While poor and near-poor households consumed less energy on the average than middle- and upper-income Americans, they typically paid a higher price for each unit they consumed. For natural gas—a fuel used in about two-thirds of American homes—poor households paid an average of \$1.24 per million BTU's, lower-middle-income households \$1.19, upper-middle-income households \$1.17, and the highest income group only \$1.15.

¹ For a report of findings of the 1973 survey see Newman, Dorothy K. and Dawn Day. *The American Energy Consumer*. Cambridge, Mass.: Ballinger Publishing Company, 1975.

Between May 1973 and May 1975, when the Washington Center conducted its second national energy survey, the price of both natural gas and electricity in household use rose sharply. The average increase for both fuels was nearly the same, about 40 percent. Increases of roughly comparable magnitude occurred for all income levels and all regions of the country. While the increases for low-income households were somewhat less than for all households combined, they were still large. For low-income households nationally, the average price of natural gas rose from \$1.24 to \$1.66 per million BTU's; of electricity, from \$2.38 to \$3.10.

Since low-income households were already paying a higher rate for less energy in 1973, and were using that energy mainly for essentials, it seems reasonable to assume that they have been able to exercise only limited conservation measures, and that the rapid increases in household energy costs since 1973 have had a serious impact on their household budgets.

Who Are the Poor and Near-Poor?

When we talk of "low-income" or "poor and near-poor" households in this report, we are talking of the roughly one-fifth of American households whose incomes in the year preceding the survey fell at or below 125 percent of the Federal government's poverty standards. These standards take into account both income and household size. They are quite stringent. In 1975, for example, a household of one or two persons would not be considered "poor or nearpoor" if its money income in the year preceding the survey was close to \$4,000. A six-person household would be excluded if its money income was as high as \$8,300. Since the Washington Center's surveys asked respondents to indicate only a range within which their incomes fell, rather than an exact amount (in the interest of getting the highest possible response rate), the federal figures in both survey years were modified slightly by the Center to obtain rounded numbers. In some cases, the Center's figure was somewhat above the federal standard of 125 percent of the poverty line, and sometimes it was lower (Table 1).

TABLE 1
UPPER INCOME LIMITS, BY SIZE, FOR HOUSEHOLDS DEFINED AS
LOW-INCOME IN 1973 AND 1975 WCMS SURVEYS OF HOUSEHOLD
ENERGY USE COMPARED TO FEDERAL POVERTY STANDARDS

Household Size	Maximum Money Income (Dollars)			
	1973		1975	
	Federal*	WCMS	Federal*	WCMS
1 person	\$2,626	\$3,000	\$ 3,322	\$ 4,000
2 persons	3,379	3,000	4,655	4,000
3 persons	4,149	5,000	4,995	6,000
4 persons	5,309	5,000	6,250	6,000
5 persons	6,264	7,000	7,351	8,000
6 persons	7,041	7,000	8,231	9,000
7 persons or more	8,646	9,000	10,178	11,000

*125 percent of poverty maximum. See text.

Despite the similarity in their economic circumstances, the poor and near-poor as defined by the Washington Center in this report are by no means a single entity. They come in all sizes of households, live in all regions of the country, are of all age groups and races, and reside in all types of dwellings. However, they are not a representative cross-section of American households. They in-

clude some types of households in considerably larger or smaller proportions than does the population as a whole (Table 2). For example, in the 1975 survey:

- 45 percent of the poor and near-poor are home owners, compared to 69 percent of all households regardless of income.
- 37 percent are headed by persons 65 years of age or older, compared to 18 percent of all households.
- 26 percent are black, compared to 11 percent of the total.
- 52 percent are headed by women, compared to 21 percent of the total.
- 21 percent contain five persons or more, compared to 18 percent of the total.

Elderly people, minority group members, households with female heads, large households, and renter households—all these groups are found in disproportionate numbers among low-income households. All of them have, therefore, been hit harder by the “energy crisis” and resultant higher costs than households more widely regarded as “typical”—middle-income majority-group families with children in particular. Yet, whether because of advanced age, infirmities, or the presence of small children, many households in all groups of the poor and near-poor will encounter particular difficulty in cutting down dwelling temperatures as a means of economizing on energy. Many renters do not even have this option. In addition, low-income households are less likely to possess cars and non-essential appliances and hence have less flexibility for conservation and cost-saving in these respects as well.

The low-income households who are the focus of this report also tend to be concentrated more often in some parts of the country than in others (See Table 3). About 25 percent of them reside in the South Central states, compared to only 16 percent of all households regardless of income level. While no other region has such a disproportionate percentage of all its households at low-income levels as the South Central Region, existing regional patterns of population distribution are quite uneven regardless of incomes. As a consequence, large proportions of the poor and

TABLE 2
SELECTED CHARACTERISTICS OF LOW-INCOME HOUSEHOLDS
COMPARED TO HOUSEHOLDS OF ALL INCOME LEVELS
1975 WCMS SURVEY OF HOUSEHOLD ENERGY USE

	Low-Income Households		All U.S. Households	
	Number (x 1,000)	Percent	Number (x 1,000)	Percent
All Households	14,002	100%	71,484	100%
Homeowners	6,349	45	49,610	69
Renters	7,653	55	21,874	31
Head 65 or Older	5,177	37	13,131	18
Head Under 65	8,825	63	58,353	82
Head Black	3,604	26	8,077	11
Head Non-Black	10,398	74	63,407	89
Head Male	6,747	48	56,607	79
Head Female	7,255	52	14,877	21
With Children Under 18	5,137	37	31,882	45
With No Children Under 18	8,865	63	39,602	55
With 5 Persons or More	2,991	21	12,821	18
With 4 Persons or Less	11,011	79	58,663	82

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 3
WHERE LOW-INCOME HOUSEHOLDS LIVE IN U.S., BY REGION, 1975

Region	LOW-INCOME HOUSEHOLDS		ALL HOUSEHOLDS	
	Number (x 1,000)	Percent of Households in Region Which are Low-Income	Percent of All Low-Income Households in U.S. Residing in Region	Percent of All U.S. Households Residing in Region
Total United States	14,002	20%	100%	100%
West	1,740	15	12	16
North Central	3,759	18	27	29
South Central	3,509	31	25	16
South Atlantic	1,868	17	13	15
Northeast	3,126	18	22	24

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

near-poor live in regions of the country that are subject to severe climatic conditions. For example, 27 percent live in the North Central states, with their often bitter winters. Another 22 percent live in the Northeast where winter temperatures can be equally low. In both of these regions the rising cost of energy for home heating can mean especially severe economic problems for low-income families—with one alternative being to reduce heat below healthful levels.

Low-income households also tend to be located disproportionately in some types of communities (See Table 4). Forty-two percent reside outside metropolitan areas, compared to 31 percent of all U.S. households regardless of income. And only 19 percent reside in the suburbs, which are home to 37 percent of all U.S. households. At the same time, 39 percent of low-income households are in central cities of metropolitan areas vs. 31 percent of U.S. households of all income levels.

Thus, low-income households are found in disproportionate numbers in central city and rural or small town settings. Comparatively few reside in the suburbs where most of the nation's growth has recently occurred. It is likely that a good number of the suburban poor actually reside in older satellite cities which are suburban only in a statistical sense—cities such as Camden, New Jersey and East St. Louis, Illinois. Others may live in still undeveloped rural fringe portions of suburban counties.

TABLE 4
LOCATION OF LOW-INCOME HOUSEHOLDS BY URBAN, SUBURBAN
AND NON-METROPOLITAN AREAS, 1975

Type of Community	LOW-INCOME HOUSEHOLDS		ALL HOUSEHOLDS	
	Number (x 1,000)	Percent of Households in Type of Community Which are Low-Income	Percent of All Low-Income Households in U.S. Residing in Type of Community	Percent of All U.S. Households in U.S. Residing in Type of Community
Total United States	14,002	20%	100%	100%
Metropolitan Areas	8,106	35	58	69
Central Cities	5,422	24	39	31
Suburbs	2,684	11	19	37
Non-Metropolitan Areas	5,896	26	42	31

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

If low-income households were distributed geographically in the same manner as the rest of the population, both the design and delivery of programs intended to help them cope with rising energy costs would be somewhat easier. Their uneven concentration in certain areas and types of communities increases the problems involved, and affects the magnitude of their needs. We shall come back to this point in later sections of this report.

Comparisons with Higher-Income Households

Throughout this report, we shall frequently compare low-income households with households in higher income categories. In both 1975 and 1973, the low-income category made up roughly the lowest fifth, or lowest quintile, of U.S. households. Where 1975 data are used, we usually compare these households with those in the upper-middle income and high-income groups. For our purposes, the upper-middle income category is defined as households in roughly the fourth quintile, or 60 to 80 percent, of the income range. They are the households with incomes between \$14,000 and \$20,500 in the 1975 survey. High-income households are defined as those with incomes of \$25,000 or more—roughly the highest 10 percent of the income distribution.

Whenever comparisons are made between the 1973 and 1975 results or where we are discussing changes reported by our survey respondents between 1973 and 1975, we use somewhat different income breakdowns for technical reasons. The low-income category is defined for each year in terms of the Federal criteria operative at the time. These households are usually compared only with higher-income households—which in this case are defined roughly as the upper quintile or fifth of the income distribution. For 1975, this includes all households with incomes of \$20,500 and over; for 1973 it encompasses those with incomes of \$16,000 and more.

The WCMS Energy Surveys

Both the 1973 and 1975 WCMS National Surveys of Household Energy Use employed personal interviews, each taking about one hour to complete, with representative samples of U.S. households. These interviews asked many questions about the household's characteristics, housing conditions and lifestyles, as well as about its patterns of energy use. (See Appendix for 1975 questionnaire.)

Both surveys also incorporated a direct measurement feature, intended to eliminate errors due to faulty recall or missing information regarding natural gas and electricity consumption and costs by the households.^{2*} The households sampled were asked to sign a waiver enabling the Washington Center to obtain billing information on the amount and price of these two fuels consumed by them over the past year directly from their utility companies, in all cases where they paid their utility bills directly. The companies were surveyed by mail, and the data reported by them were combined with the interview data. Thus the study was not dependent on individual households' recall of information for the accuracy of these data.

The survey results reported here deal only with **direct** consumption and costs of energy for household purposes. They do not measure the **indirect** consumption of energy which is associated with the production, transportation, distribution, and marketing of virtually all goods and services used in American households today—including both vital necessities and luxuries. Rising energy costs have been one of the major factors in the recent increases in the cost of these items to the consumer. Low-income households, with their already strained budgets, have felt the impact of these indirect energy costs as well as of the more direct ones.

The results reported here are based in all instances upon samples. Like all statistics derived from samples, they are subject to sampling variance, and must therefore be considered estimates.

² *These are the two most common fuels consumed within the home in the United States today. For all practical purposes, electric power is now universal in American homes, and an estimated 69 percent are also served with natural gas.*

The 1973 survey used a sample of about 1,500 households; the 1975 survey about 3,200. The two samples are fully compatible, however, allowing for comparisons and analyses of change. Advanced multistage area probability sample techniques were used in selecting them. The standard error tolerances generally applicable to the results of each survey are comparable to those of other national probability samples of the same size.³ Furthermore, checks of the household characteristics for the two survey years against comparable figures from the much larger (47,000 households) sample used by the U.S. Bureau of Census in its Current Population Surveys showed close correspondence. While the 1973 and 1975 samples are fully compatible, and both include some of the same households, not all of the households sampled are the same; there may be small differences in responses to particular items for this reason.

In general, our check procedures, both between the two surveys and against independent data sources such as the Census Bureau's Current Population Survey, found no substantial systematic bias in either sample. Neither did we find evidence of significant differences in the responses of households which were surveyed twice (in 1973 and 1975) and those which were surveyed only once in the enlarged 1975 sample. We have thus felt free to generalize the sample results to the universe of households throughout this report.

However, the reader should bear in mind that small differences of only a few percentage points in the statistics for different population categories or time periods may be due to sampling variance. We have generally refrained from commenting on such minor differences in the text where we felt that sampling variance might be responsible. Nonetheless, the great majority of our findings—with respect to such matters as differences by region and community type, and changes between the 1973 and 1975 surveys—are of such magnitude and so consistent with other data that we believe they can safely be accepted as fact.

Organization of this Report

The remainder of this report deals with the direct use of energy by low-income American households, either within the dwelling unit itself or in personal transportation. The use of energy by low-income households in 1975 is usually compared with that of higher-income Americans. Energy use among the poor is also examined in terms of the nation's major regions, in terms of households who reside in rural and suburban communities vis-a-vis urban concentrations, and in terms of low-income households of varying characteristics. Finally, changes in practices and attitudes relative to energy use between the 1973 and 1975 surveys are examined to determine if significant changes have occurred, and to evaluate the implications of these changes for governmental policies to encourage further conservation and to assist low-income Americans in coping with rising energy costs.

Chapter II presents data on energy consumption and costs among low-income households and among households with higher incomes. Chapter III deals with features built into the dwellings of low-income households which have an important effect upon energy consumption and costs, and with the relative frequency of such features in dwellings occupied by households of low and higher-income levels.

Chapter IV discusses energy-related behavior on the part of low-income households, including the addition of insulation and storm windows to their dwellings and various kinds of energy-saving behavior as well as behavior which increases energy use within the home. Chapter V deals with use of energy for personal transportation, and Chapter VI sums up some of the policy implications of the findings which we believe may be of particular significance to the programs and policies of the Community Services Administration and other federal agencies with responsibilities toward meeting the needs of low-income Americans.

³ For the precise figures, see Grier, Eunice S. *Survey of Household Energy Use, 1975. Final report to the Federal Energy Administration Washington Center for Metropolitan Studies, March 1976.*

II. THE COST OF PERSONAL ENERGY USE AND ITS IMPACT ON LOW-INCOME HOUSEHOLDS

Energy used directly by private households has been estimated to constitute about one-third of all energy consumed within the United States.⁴ The remaining two-thirds of U.S. energy consumption is accounted for by private industry and governments at all levels. Of this two-thirds, a part eventually finds its way into individual households in the form of goods and services, and hence can be considered as *indirect* personal energy use. The extent of indirect personal energy consumption is difficult to estimate, however, since the data available are very incomplete. This report concerns itself solely with direct consumption of energy by U.S. households. While this is less than half of all U.S. energy consumption, it is a very important part nonetheless—both in terms of the total economy and in terms of individual household budgets.

Of all direct personal energy consumption, somewhat more than half is estimated to go for uses within the dwelling itself—for heating, cooking, lighting, and operating appliances. The remainder goes for personal transportation, mainly by automobile.

Historically, the cost of energy has been relatively low in the United States, and energy sources have generally been thought of as inexhaustible or nearly so. Abundant energy supplies, together with plentiful natural resources of most other kinds, have been granted much of the credit for this nation's material prosperity.

Only in the past few years has the eventual depletion of these material bounties begun to loom as a spectre before the U.S. public. The first concrete demonstration of how seriously shortages of resources—and energy resources, in particular—could affect the accustomed living standards of the American householder occurred with the imposition of the Arab oil embargo, which took place between the 1973 and 1975 WCMS surveys. Since then, both prospective shortages of energy and the increased costs which result from a changing supply-demand relationship have become a matter of increasing concern both to the government and to private citizens.

The Rising Cost of Household Energy

Between the May 1973 and May 1975 Washington Center surveys, according to our direct utility data, the average price of electricity in household use increased by 41 percent per million BTU's.⁵ For natural gas, the price increase was almost the same—about 40 percent. For gasoline, the Center did not obtain direct price data; but Federal estimates place the increase at about 44 percent.⁶ The increase in price of over 20 percent per year for each of these three principal types of energy was well into the double-digit category in the 1973-1975 period. It was about twice the rate of increase in the Consumer Price Index for all items, which rose by 21 percent during the same two-year

⁴ Newman and Day, op. cit.

⁵ For comparability, our consumption figures for both electricity and natural gas are expressed in BTUs—British Thermal Units. A BTU is the amount of energy required to raise the temperature of one pound of water by one degree Fahrenheit. The average U.S. household consumes hundreds of millions of BTUs of energy in one year. For all U.S. households combined, annual consumption mounts high into the thousands of trillions.

⁶ U.S. Dept. of Labor, Bureau of Labor Statistics. CPI Detailed Reports for May 1973 and May 1975.

span. Coal and fuel oil—fuels of somewhat less importance from the standpoint of all households nationally, but used by millions of households nonetheless—rose in price by a combined average of 78 percent between May 1973 and May 1975, according to the same Federal source.

Energy in the U.S. is still comparatively cheap today, relative to most other nations. Total expenditures for personal energy needs still account for only a small percentage of money outlays by all U.S. households combined. But not only has the cost of energy risen rapidly; further increases are in sight. Thus, the economic concerns surrounding energy today do not stem only from the current level of energy costs, but from several other matters as well:

- a) The rapid pace at which energy costs have recently been escalating, both in absolute dollars and in percentage terms;
- b) Foreseeable future costs and impending shortages of energy, and their prospective impact on U.S. households and the economy as a whole. When recent trends are projected into the future, even the fairly short term, rather serious questions emerge.
- c) The prospects for energy conservation in a nation which until very recently has not considered it a matter of priority, and has tended to build its homes, office buildings, highway networks, and other physical structures in ways that are inherently wasteful of energy.
- d) The impact of rising energy costs on those U.S. households which have not shared in the general prosperity, and hence have little if any flexibility in their personal budgets either to absorb them or to adopt conservation measures which require capital outlays by the householder.

The final matter is, of course, the major subject of this report.

Implications For National Policy

From a policy standpoint, the impact of energy costs and shortages upon low-income households is not of concern solely for humanitarian reasons—important as these are in themselves. Problems faced by low-income households can reverberate widely through the structure of public policies and programs at the national, state, and local levels, and eventually will be felt by all citizens.

For one thing, the poor are the objects of a number of Federal programs aimed at reducing their relative disadvantage, or alleviating the human problems which result from their poverty. In addition to the wide range of special programs administered by the Community Services Administration, these include the public assistance and Medicaid programs; the Food Stamp program; and Federally-subsidized low and moderate-income housing programs.

Many of these programs base their eligibility and benefit levels on a needs test, which takes into account income and often assets as well. The eligibility income cutoffs are changed from time to time based on the cost of living, as are the benefits. Thus, rising energy costs eventually and directly affect the cost to all taxpayers of such assistance programs.

On the other hand, the time lag which generally occurs in adjusting eligibility and benefit levels to meet rising costs of living has tended to create more economic difficulty for low-income households at a time when energy costs have been increasing so rapidly. More timely benefit increases would be more equitable from the standpoint of the poor; but they would also tend to raise the overall cost of operating the programs even further. A tradeoff is involved which raises particularly difficult questions for public policy.

Somewhat more indirectly, rising energy prices also increase the cost to the public of such measures as unemployment insurance and minimum wage laws. The benefits provided under these programs are also responsive over time to living costs; and as employers pay more under these measures they will tend to pass the higher costs along to their customers.

Particular groups who tend to be concentrated among the poor and near-poor—such as the elderly, the handicapped, the chronically ill—are the beneficiaries of special programs keyed to their

particular needs. These programs—including Social Security, government retirement programs, Medicare, and various kinds of special treatment and rehabilitation efforts—will also be affected either directly or indirectly by energy costs. In the case of Social Security the impact is quite direct, since benefits are keyed to the Consumer Price Index. In the case of other programs, a less direct but still substantial impact is almost inevitable as the cost of maintaining benefits at constant or near-constant levels rises in accord with general living costs. In all cases, the impact will be felt by all taxpayers.

The Costs of Energy for Low-Income Households

In the aggregate, direct household energy costs for American households mount well into the billions of dollars. Still, for the average household they are still relatively small compared to incomes at this time. For low-income households, however, the financial burden created by rising energy costs is not a minor one. Furthermore, each unit of energy they consumed in their homes cost them more, on the average, than U. S. households of all income levels in both 1973 and 1975. This was largely a result of pricing policies which rewarded larger consumers with lower per-unit prices.

Since the “energy crisis” came to widespread public attention, efforts have been underway to change these pricing policies in the interest both of conservation and of equity. Between 1973 and 1975 the price gap between low-income households and other households narrowed somewhat. However, low-income households continued to pay more per unit for gas and electricity—and especially for electricity.

The increase in prices paid for electricity and natural gas between 1973 and 1975 was somewhat smaller for low-income households than for all households, in both dollar and percentage terms. Still, low-income households had to cope with an increase of roughly one-third in the price they paid for each unit of either electricity or natural gas they consumed, out of budgets that were already strained.

Both in 1973 and in 1975, low-income households consumed less energy in their homes and paid lower total amounts for household energy. As Table 6 shows, their average consumption of natural gas and electricity was considerably lower in 1975 in terms of millions of BTUs than the aver-

TABLE 5
PRICE PER MILLION BTUs OF ELECTRICITY AND NATURAL GAS
CONSUMED BY LOW-INCOME HOUSEHOLDS VS. ALL U.S. HOUSEHOLDS
1973 AND 1975

	Price Per Million BTUs	
	Low-Income Households	All U.S. Households
Electricity - 1973	\$2.38	\$2.09
1975	3.10	2.95
Increase 1973-1975		
Dollars	\$0.72	\$0.86
Percent	30.3%	41.1%
Natural Gas - 1973	\$1.24	\$1.18
1975	1.66	1.65
Increase 1973-1975		
Dollars	\$0.42	\$0.47
Percent	33.8%	39.8%

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975 and 1973.

TABLE 6

DIFFERENTIAL IN CONSUMPTION AND EXPENDITURES FOR
ELECTRICITY AND NATURAL GAS BETWEEN LOW-INCOME HOUSEHOLDS
AND ALL U.S. HOUSEHOLDS, 1975

	Low-Income Households	All U.S. Households	Difference (Percent)
Electricity			
Average annual BTUs per household (millions)	60.6	94.2	55.4%
Average annual cost per household (dollars)	\$188.00	\$278.10	47.9%
Natural Gas			
Average annual BTUs per household (millions)	109.8	136.3	24.1%
Average annual cost per household (dollars)	\$182.30	\$224.60	23.2%

Source: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

age for all U. S. households combined; and their per-household expenditures for these two primary forms of energy were lower also. However, due to higher per-unit prices paid by low-income households, the differential between their energy consumption and that of the average U. S. household was somewhat larger than the difference in the amounts paid for this energy.

The difference in consumption of electricity between low-income households and the average of all U. S. households was about twice as great as the difference between them in consumption of natural gas. We can reasonably assume that this variation is related to the fact that natural gas is most often used for heating—which can be reduced only to a limited degree in the interest of saving without sacrificing comfort and possibly even health. Electricity, on the other hand, is more often used to operate appliances and for other less essential purposes. Electricity is also the more expensive of the two.

The difference in total amounts spent annually for these two energy types between low-income households and all households was less than the difference in consumption. The reason, of course, was the pricing policies referred to earlier. For electricity, the cost-consumption differential was substantially greater than for natural gas.

Still, low-income households using both electricity and natural gas consumed sufficiently less electricity than the average of all households that their average annual expenditures for the two fuels were nearly the same, despite the much higher per-unit price of electricity. For all U. S. households without regard to income, the average annual electric bill was nearly one-fourth higher than the annual gas bill.

As Tables 7 and 8 show, both annual consumption and per-household annual cost of electricity and natural gas were directly related to incomes in 1975. Both increased substantially at the higher income levels. For the average household with an income of \$25,000 or above, the annual consumption of natural gas was 79 percent higher than for the average low-income household; so was its annual gas bill. The differences between low-income and high-income households were considerably greater for electricity; the average household with a \$25,000-plus income used more than twice as much electricity as the average low-income household, and paid more than twice as high an electric bill as well.

Households in our survey sample at the \$25,000-and-over income level actually paid somewhat more per unit of both gas and electricity in 1975 than low-income households. They paid considera-

TABLE 7
CONSUMPTION AND COST OF ELECTRICITY USED BY
LOW-INCOME HOUSEHOLDS IN THE U.S., COMPARED TO
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	Low- Income	INCOME \$14,000- 20,500	\$25,000 and Above
Number of households using electricity (thousands)	13,937	14,175	7,221
Percent of all households ⁷	100%	100%	100%
Average annual BTUs per household (millions)	60.6	111.3	137.5
Average annual cost per household	\$188.00	\$314.80	\$440.00
Average price per million BTUs	\$ 3.10	\$ 2.83	\$ 3.20

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

bly more per unit for electricity than upper-middle-income households, but paid closer to the same average amount for gas.

This had not been true in 1973. We do not understand all the reasons for the difference. However, it may be related to the predominant places of residence of higher-income households vs. households in the lower income categories—since higher-income households reside disproportionately in some regions of the nation, as well as in suburban jurisdictions of metropolitan areas. The average price of energy in these locations may be somewhat higher than for those in which higher income households are less frequent. Due to sample size limitations, geo

TABLE 8
CONSUMPTION AND COST OF NATURAL GAS USED BY
LOW-INCOME HOUSEHOLDS IN THE U.S., COMPARED TO
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	Low- Income	INCOME \$14,000- 20,500	\$25,000 and Above
Number of households using natural gas (thousands)	9,628	9,416	5,261
Percent of all households	69%	66%	73%
Average annual BTUs per household (millions)	110.1	137.4	190.5
Average annual cost per household	\$182.70	\$228.30	\$328.00
Average price per million BTUs	\$ 1.66	\$ 1.66	\$ 1.72

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

⁷ Actually, there are still a few households left in the United States which do not have electricity. Their number is so small, however, that for all practical purposes electricity can be considered universally available and used by all American homes.

-graphic breakdown of high-income households would probably not yield reliable results, however.

Relative to their incomes, the utility bills of lower-income households are proportionately much larger than those of higher-income households. The \$188 electric bill of the average low-income household or the average gas bill of \$182.70, may be compared to the maximum income cutoff for inclusion of a four-person household under this category in our sample. That maximum was \$6,000.

For gasoline used in personal autos, the low-income households **with cars** reported median gas consumption of just under 500 gallons annually. Assuming an average price of 60 cents per gallon—a rough price estimate, since we did not obtain data on the actual prices paid by our survey households for gasoline—low-income households paid an estimated median amount in the neighborhood of \$300 annually.

The median amount of gasoline which households in our sample with incomes of \$25,000 or more reported consuming annually to run their autos was over three times as high as the median for low-income households—slightly under 1,400 gallons. At an estimated 60 cents per gallon, that amount of gasoline cost the high-income household about \$820 per year—much more than the estimated total amount paid by low-income households, but much lower in relationship to income.

Combining the estimated expenditures for these three most common types of energy, the low-income household which used all three for any purpose paid an average of approximately \$670 in the year 1974 - 1975 for the three combined. For the household with before-tax money income of \$3,390—which was the average for low-income households in the 1975 survey—this expenditure represented nearly 20 percent of that income.

However, this expenditure must be regarded as a low estimate of average energy costs for many low-income households. The cost was especially high for those who heated with fuel oil and used natural gas and electricity for other purposes such as cooking, lighting, and running of various appliances. In 1975, the average low-income American household in this group paid an estimated \$242 for gas and electricity alone. Since the average expenditure for low-income households using oil in 1975 was about \$377, their total direct energy cost for the year could have been well over \$900—that is, \$242 for gas and electricity, \$377 for fuel oil, and \$300 for gasoline used in the family car.

Since 1975, the prices of all these fuels have continued to rise at a faster rate than incomes. Thus, the bite taken by residential energy from the average low-income household pocketbook must be considerably greater today. And it can be expected to grow even larger in the next several years.⁸

The Aggregate Energy Consumption of Low-Income Households

While the cost of energy is a major item in the budget of the average low-income household, in the aggregate these households consume relatively little of the nation's residential energy—considerably less, in fact, than their proportionate share of all U. S. households (See Table 9).

The aggregate consumption of natural gas by the 49,438,000 gas-using U. S. households of all income levels in the year prior to May 1975 is estimated at 6,740 trillion BTUs. The aggregate consumption by the 71,281,000 U. S. households using electricity is estimated at 6,715 trillion BTUs. No data of comparable reliability are available for other types of energy used inside the home; but these two, as we have indicated, are the most important.

The 9,628,000 gas-using households classified by the Center as low-income consumed an estimated 1,057 trillion BTUs of natural gas in the year prior to the 1975 survey. This was less than 16

⁸ in a paper prepared for the Joint Economic Committee in May 1981, Lester C. Thurow of M.I.T. projects that increases in direct energy costs in the home will cut the real standard of living for the poorest 10 percent of American households by eight percent while the richest 10 percent will be cut by less than one percent between 1976 and 1980.

TABLE 9
ESTIMATED AGGREGATE CONSUMPTION OF NATURAL GAS AND
ELECTRICITY BY LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED
TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low- Income	\$14,000- \$20,500	\$25,000 and Above
<u>Natural Gas</u>			
Total Number of Households Using Natural Gas (Millions)	9,628	9,416	5,261
Percent of All Gas-Using Households in U.S.	20%	19%	11%
Aggregate Consumption of Natural Gas (Trillions of BTUs)	1,057	1,290	1,002
Percent of Aggregate Gas Consumption by All U.S. Households	16%	19%	15%
<u>Electricity</u>			
Total Number of Households Using Electricity (Millions)	13,937	14,174	7,221
Percent of All Electricity-Using Households in U.S.	20%	20%	10%
Aggregate Consumption of Electricity (Trillions of BTUs)	844	1,580	993
Percent of Aggregate Electricity Consumption by all U.S. Households	13%	24%	15%

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

percent of total residential natural gas consumption, although these low-income households made up nearly 20 percent of all U. S. households served with natural gas.

In terms of electricity, the differential was considerably greater. Low-income households used an estimated 844 trillion BTUs—less than 13 percent of all electricity consumed for residential purposes, although they again constituted nearly 20 percent of all U. S. households using electricity.

By contrast, households in the upper-middle-income bracket of \$14,000 to \$20,500 annually consumed an estimated 1,290 trillion BTUs of natural gas in the same period—just over 19 percent of the total, or almost exactly equal to their proportion of all gas-using households. And households with \$25,000-plus incomes consumed far more than their proportionate share of gas—nearly 15 percent, although they made up less than 11 percent of the gas-using households surveyed.

Again, the disparities in aggregate consumption by income groups were still greater for electricity. The \$14,000-\$20,500 category of households consumed an estimated 1,580 trillion BTUs—24 percent of all residential electricity, although they constituted just under 20 percent of all households using electric power. And households with incomes of \$25,000 or more used an estimated 993 trillion BTUs, almost 15 percent of all residential electricity, although they made up only 10 percent of all households using electric power.

To summarize: The highest-income 11 percent of gas-using U. S. households consumed nearly as much natural gas as did the low-income 20 percent. And the top 10 percent of households in terms of income consumed 18 percent **more** residential electric power, in the aggregate, than did the nearly twice as many households who constitute the low-income 20 percent of the population.

III. ENERGY-RELATED CHARACTERISTICS OF LOW-INCOME DWELLINGS

This chapter and the one which follows examine current uses of energy within the homes of low-income households in the United States. In this chapter, we shall look at the types of homes they live in, the size of their dwellings, and the energy sources they use to heat their homes and run their appliances. Chapter IV will deal with efforts by low-income households to conserve on energy in ways that are within their control and means, as well as with other changes in their energy-consumption behavior. We also examine the extent to which the homes of low-income households are equipped with energy-conserving features, as well as energy-using features.

As appropriate, comparisons are made with energy use and conservation in homes of higher-income Americans, and among various sub-categories of low-income households. Particular attention is given to variations among the poor in the nation's major regions and in central cities vis-a-vis suburbs and non-metropolitan communities.

Space Heating Requirements and “Built-In” Housing Characteristics

Space heating consumes much more energy than any other in-household use. It has been estimated to take 57 percent of all residential energy.⁹ Thus, both budgetary impact and ability to conserve depend heavily upon the degree of control householders can exercise over the energy required to heat their homes.

Space heating requirements depend heavily upon “built-in” attributes of the dwelling, as Table 10 indicates.

Particularly important from the space heating standpoint—and difficult if not impossible to modify—is the type of structure. The most frequent American dwelling type is the single-family detached (also known as free-standing) house; second most common is the apartment. Less frequent housing types are single-family attached houses (also known as rows, twins and townhouses), and mobile homes. All have differing exposures of exterior walls to the elements, and their heat requirements vary as a result. In general, the single detached home uses the most energy; apartments use the least; and attached homes are intermediate.

A second important “built-in” characteristic of the dwelling is its size. A dwelling's size can sometimes be enlarged by addition, or reduced by subdivision into smaller units, but this is seldom easy or cheap to accomplish. Size, of course, is directly related to heating requirements. In addition, the type and size of the dwelling tend to be related. Single detached dwellings usually have more interior space than other types. Thus, the free-standing home exerts a “double whammy” on heating consumption—first through its exposure to the elements on all sides, and second through its relatively large interior space.

A third “built-in” attribute is the type of heating system and the kind of fuel it uses. Both are usually difficult and expensive to alter. A central heating system is generally more comfortable, but inherently less flexible than individual room heaters—which can be turned on or off and sometimes moved around as needed. The kind of fuel used for heating is important from a cost standpoint. Am-

⁹ *Newman and Day*, op. cit.

TABLE 10

AVERAGE BTUs AND AVERAGE COST OF NATURAL GAS
CONSUMED ANNUALLY BY HOUSEHOLDS
IN DWELLINGS OF SELECTED CHARACTERISTICS
UNITED STATES, 1975

	Million of BTUs Per Household	Average Cost Per Household
All Households	136.3	\$224.60
Structure Type		
Single-Family Homes	147.6	237.70
Apartments	76.3	154.90
Size of Unit		
Under 500 Sq. Ft.	96.3	161.60
Under 1,000 Sq. Ft.	110.1	192.70
1,000 - 1,999 Sq. Ft.	141.9	225.20
2,000 Sq. Ft. or More	181.5	292.00
Region of Country		
Northeast	131.2	281.20
North Central	161.4	235.40
South Atlantic	118.2	234.50
South Central	98.4	146.00
West	121.5	171.00

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

ong the most common space heating fuels, natural gas has historically been the cheapest in most areas, electricity the most expensive, and fuel oil intermediate. (These cost relationships may change in the future as supply-demand relationships shift.)

Still another important attribute is the presence or absence of a temperature control within the dwelling—a thermostat or valve which can be turned up, down, on, or off as the occupants' heating needs and motivation to conserve may dictate. By no means do all dwellings have such a control, and where it is missing it may be difficult or expensive to add. In rental units heated by an older central system, it may be well-nigh impossible. Old-fashioned wood and coal-fired heating plants also give their users little control.

A final attribute of the dwelling which is related to heating requirements is its location. Some parts of the nation, and notably the Northeast and North Central regions, tend to have considerably longer winters and lower temperatures than others. In addition, the cost of energy varies considerably by region, as Table 11 indicates. A household which resides in the Northeast suffers the combined disadvantage of low temperatures and high energy costs. The household cannot escape these problems except by moving to another part of the country.

Taking all these factors into account, it is clear that many of the characteristics which affect a household's consumption of energy for heating were fixed quite firmly at the time their home was constructed. Changing them would be both difficult and expensive, if possible at all. How do poor and near-poor households fare with respect to these "built-in" attributes?

Housing Structure Types Occupied by Low-Income Americans

Slightly over half of low-income American households (54 percent) occupy one-family detached houses. By general consensus the single house is the American "dream home." Thus it may be con-

TABLE 11

AVERAGE PRICE PER UNIT OF NATURAL GAS AND ELECTRICITY
IN DIFFERENT REGIONS OF THE UNITED STATES, 1975

	Price Per Million BTUs of Electricity	Price Per Million BTUs of Natural Gas
Northeast	\$4.21	\$2.14
North Central	3.13	1.46
South Atlantic	3.01	1.98
South Central	2.22	1.48
West	2.29	1.41

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

sidered encouraging that so many in the lowest income group have achieved it. In energy consumption, however, the single detached house is by far the most rapacious. Moreover, it often contains a number of energy-consuming amenities—like clothes washers, dryers, individual hot water heaters, etc.—which in apartments are likely to be shared with others.

On the other hand, energy use is more often subject to control by the occupants in single-family homes than in apartments. They can usually lower or raise the temperature. They can add such features as storm doors, windows, and insulation. Some of these measures are expensive, however—prohibitively costly for many poor families. And by no means all low-income households who reside in detached homes own these dwellings. About 33 percent are renters.

Apartment dwellers constitute the next highest proportion of all low-income households—one-third. While apartments are usually more energy-efficient than single-family dwellings, in many cases the tenant does not pay his utility bill separately; it is included in the rent. Moreover, the tenant often lacks the opportunities for energy conservation available to single-home residents.

Thermostats or valves are not always available to apartment dwellers, and especially to low income tenants. Tenants can sometimes add energy-conserving features to their apartments; but the benefits will often accrue mainly to the landlord. Thus, even where poor apartment dwellers have the

TABLE 12

TYPE OF HOUSING OCCUPIED BY LOW-INCOME HOUSEHOLDS IN U.S.
COMPARED TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

Type of Housing	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of Households)		
All Households	100%	100%	100%
Single-family detached	54	78	87
Single-family attached	6	7	4
Mobile homes	6	4	1
Apartments - 8 units or less	22	6	3
Apartments - 9 units or more	11	5	5

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

opportunity to conserve, a clear incentive is often missing. Yet sooner or later heating costs will usually be passed along to these tenants as part of the rent.

The landlord's options are somewhat greater. He can reduce the heat, or he can pass the costs on as higher rents. Even in communities with rent-control laws, increasing costs for energy and other maintenance expenses usually receive compensation, although it may be a bit slow in coming. The landlord also has the option of installing energy-saving features, but most existing public policies give him little incentive to do so. His investment will probably take considerably longer to "pay off" than would reducing the heat or raising the rent—often longer than he plans to own the building.

Among low-income apartment dwellers, twice as many (22 percent of all low-income households) live in structures with eight units or fewer as reside in large multi-unit structures (11 percent). This suggests a prevalence of small apartment complexes and older single-family buildings which have since been converted. Such buildings are unlikely to have good insulation or other energy-saving features. Many of the poor who live in large apartment complexes are probably public housing tenants.

Other types of dwelling structures are relatively infrequent among low-income households. Altogether, about 87 percent reside either in single-family detached homes or in apartments. Another six percent live in single-family attached dwellings (rows or twins), and six percent in mobile homes. Whether the poor household lives in a free-standing house or an apartment, the rising cost of energy is likely to bring economic difficulties for its members: in single-family detached units, because of the inherently high cost of heating these homes; in apartments, because options and incentives for conserving energy are so limited. Attached houses are somewhat more energy-conserving because less wall space is exposed to the weather. Although mobile homes tend to be relatively wasteful of energy, they are usually quite small and consume somewhat less energy for this reason.

Structure Types by Income Level

Compared to higher-income households, those with low incomes are much less likely to live in detached homes and much more often reside in apartments, as Table 12 indicates. Even though a slight majority of low-income households live in single-family detached structures, the proportion rises sharply to 78 percent of upper-middle-income households and to an even higher 87 percent of those with incomes of \$25,000 or more. By the same token, the percentage of apartment dwellers drops abruptly from one-third among households in the low-income bracket to 11 percent among those with upper-middle incomes, and to only eight percent of those with incomes of the \$25,000-plus level. Attached dwellings and mobile homes are not common among households of any income level, but are even less frequent among those with high incomes.

Structure Types by Community Type

One of the main reasons that so many low-income households occupy detached homes is that so many live outside metropolitan areas where other types of dwellings are relatively uncommon. Of the 42 percent of all poor and near-poor households who live outside metropolitan areas, 70 percent occupy single detached dwellings. Among the 39 percent of low-income households living in central cities, on the other hand, 53 percent occupy apartments (Table 13). Even among low-income households living outside metropolitan areas, however, apartments are far more frequent than among higher-income households nationally. Almost one-fifth of non-metropolitan low-income households live in apartments, compared to only eight percent of \$25,000-plus households regardless of community type.

Structure Types by Region

Low-income households also tend to differ substantially in the kinds of structures they occupy depending on the region of the nation in which they live. (See Table 14.) Single family detached

TABLE 13

TYPE OF HOUSING OCCUPIED BY LOW-INCOME HOUSEHOLDS
LIVING IN COMMUNITIES OF DIFFERENT TYPES
1975

Type of Housing	COMMUNITY TYPE		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
(Percent of All Households)			
All Low Income Households	100%	100%	100%
Single-family detached	32	64	70
Single-family attached	13	*	2
Mobile homes	1	10	9
Apartments - 8 units or less	33	18	14
Apartments - 9 units or more	20	8	4

* Less than 1 percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

homes predominate overwhelmingly among the poor and near-poor in the South Atlantic and South Central states where 38 percent of all low-income households reside. They are a distinct minority in the Northeast, and a slight minority in the West. Thus, in the Northeast—one of the two regions with the coldest winters as well as the region with the highest energy costs of all—low-income households are much more often found in apartment units.

Single attached homes (row houses or twins) do not predominate among poor households in any region—although they are most frequent in the Northeast, probably because they are concentrated in older central cities. Only in the West and South Atlantic states are mobile homes occupied in significant proportions by low-income households. In both regions, however, they probably tend to be concentrated in more temperate areas like Florida and southern California, so that their energy consumption is relatively modest even for their size.

TABLE 14

TYPE OF HOUSING OCCUPIED BY LOW-INCOME HOUSEHOLDS
BY REGION, 1975

Type of Housing	REGION				
	West	North Central	South Central	South Atlantic	North East
(Percent of Households)					
All Low-Income Households	100%	100%	100%	100%	100%
Single-family detached	48	54	70	73	28
Single-family attached	4	4	5	6	10
Mobile homes	14	4	3	16	
Apartments - 8 units or less	22	27	17	1	35
Apartments - 9 units or more	11	11	5	2	24

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975

Structure Types by Characteristics of the Low-Income Household

The kind of dwelling structure occupied by low-income households varies with several key characteristics of these households (Table 15). Among those headed by elderly persons, a greater-than-average 57 percent majority reside in single-family detached dwellings, and a below-average 28 percent in apartments. This may reflect the fact that many older people acquired their present homes at a much earlier age. They are still living in them—and trying to cope with the cost of operating them—despite greatly reduced income.

Larger low-income households also tend more often to occupy detached houses; 61 percent of those with five persons or more do so. This is probably a combined result of their space needs and their tendency to be located more often outside metropolitan areas. On the other hand, 32 percent of these larger households live in apartments—mainly in smaller apartment structures. Black households and female-headed households are less likely to occupy single detached homes than the average for low-income households, and more likely to live in apartments.

Sizes of Housing Occupied by Low-Income Americans

Even though a majority of low-income Americans live in single family dwellings, their homes tend to be smaller than average and thus comparatively economical of energy for structures of their type. More than half of all poor and near-poor American households reported in 1975 that their dwellings had less than five rooms (54 percent). The median size was 4.9 rooms.

Size by Income Level

The size of the average dwelling increases considerably with the income of its occupants. In contrast to the relatively small homes of lower-income households, homes occupied by upper-middle-income Americans in the \$14,000-\$20,500 bracket have a median size of 6.3 rooms, and dwellings occupied by those in the highest income category, over 7 rooms. For no individual subgroup of low-income households examined, including large households and homeowners, is the median dwelling size as high as for these higher income groups. While 81 percent of **all** American households with incomes of \$25,000 or more occupied dwellings with six or more rooms in 1975, only 45 percent of households **with five or more members** in the lowest income group had dwellings this large.

TABLE 15

TYPE OF HOUSING OCCUPIED BY LOW-INCOME HOUSEHOLDS
OF DIFFERENT CHARACTERISTICS
1975

Type of Housing	Head Black	Head Female	Head 65 or Over	With 5 Persons or More
(Percent of All Households)				
All Low-Income Households	100%	100%	100%	100%
Single-family detached	49	46	57	61
Single-family attached	12	8	9	4
Mobile homes	1	5	4	4
Apartments - 8 units or less	20	24	16	25
Apartments - 9 units or more	18	15	12	7

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 16

SIZE OF DWELLINGS OCCUPIED BY LOW-INCOME HOUSEHOLDS IN U.S.
COMPARED TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

Number of Rooms	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of All Households)		
All Households	100%	100%	100%
1 - 3 Rooms	23	4	1
4 Rooms	31	11	6
5 Rooms	24	26	12
6 Rooms	14	27	23
7 Rooms or more	9	31	58
Median	4.9	6.3	7.1

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Size by Type of Community

Low-income households located in the suburban rings of metropolitan areas are most likely to have larger dwellings; there, 27 percent occupy homes with six rooms or more. Still, the median size of these poor-occupied suburban homes is only 5.0 rooms, compared to a median of over 7 rooms for all high-income households regardless of location. The smallest dwellings, not surprisingly, are in the central cities. But even in the small towns and rural areas of nonmetropolitan America, close to half of the poor and near-poor households surveyed in 1975 reported that their homes contained no more than four rooms.

TABLE 17

SIZE OF HOUSING OCCUPIED BY LOW-INCOME HOUSEHOLDS
BY TYPE OF COMMUNITY, 1975

Number of Rooms	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
All Low-Income Households	100%	100%	100%
1 - 3 Rooms	32	23	13
4 Rooms	26	28	36
5 Rooms	20	21	28
6 Rooms	16	14	12
7 Rooms or more	6	13	11
Median	4.7	5.0	5.0

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Size by Region

Low-income households are most likely to occupy small dwellings if they are located in the western states. In the West, about two-thirds of all homes occupied by low-income households contain four rooms or fewer. The second highest proportion of small dwellings is found in the North Central region, where an estimated 60 percent contain no more than four rooms. Yet in the Northeast region, where densities are relatively high and one would expect mostly small units, quite the opposite is the case. About a fourth of all dwellings occupied by poor and near-poor households in the Northeast have six rooms or more, despite the greater frequency of apartments in this region. The median size is 5.1 rooms. The proportion of large units and the median size is about the same in the Northeast as in the South Atlantic states, where there are many fewer apartments.

These regional differences may seem somewhat incongruous at first glance—smaller dwellings in the regions of “wide open spaces” and larger units in the more densely-populated Northeast. The apparent paradox disappears, however, when housing sizes are examined in terms of the characteristics of low-income households in each region. In the West, for example:

- 63 percent are renters, compared to 55 percent of low-income households in the nation as a whole.
- 48 percent reside in central cities, compared to 39 percent in the nation as a whole.
- 73 percent are childless, compared to 63 percent in the nation as a whole.

In the Northeast region, the proportions of renters and central city residents are also comparatively high, but the proportion of low income households which are childless is only 52 percent—far below the incidence in the rest of the nation. At the same time, a somewhat higher percent of low-income households in the Northeast than in the West are headed by elderly persons—34 percent compared to 30 percent.

Types of Heating Systems in Homes of Low-Income Americans

Most American homes are now heated by a central unit, and almost no American dwelling is without some form of space heating at all. Nevertheless, one-third of all households in the lowest income category reported in 1975 that their homes were not centrally heated. Almost all of

TABLE 18
SIZE OF DWELLINGS OCCUPIED BY LOW-INCOME HOUSEHOLDS
BY REGION, 1975

Number of Rooms	REGION				
	West	North Central	South Central	South Atlantic	North East
(Percent of All Households)					
All Low-Income Households					
100%	100%	100%	100%	100%	100%
1 - 3 Rooms	35	27	18	13	21
4 Rooms	30	33	31	34	27
5 Rooms	12	18	29	27	28
6 Rooms	17	11	12	19	14
7 Rooms or more	6	11	10	6	10
Median	4.5	4.7	5.0	5.1	5.1

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 19

TYPE OF HEATING SYSTEM IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS IN U.S. COMPARED TO UPPER-MIDDLE
AND HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of All Households)			
All Households	100%	100%	100%
Central System	64	95	96
Heat only in individual rooms	34	4	2
(Room heaters with flue or vent)	(20)	(2)	(1)
(Portable room heaters or stoves)	(14)	(2)	(1)
No regular heating system	1	1	1
Use supplementary room heaters	20	21	23

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

those without central heating, however, said they had units which provide warmth for individual rooms. A majority of these are stationary room heaters with a flue or vent, but a sizable number are portable units which can be moved from place to place as needed.

While central systems are often more comfortable and distribute heat more evenly, individual room heaters can be more economical. Where climate is generally mild, room units can be turned on to take the chill off the air as needed—perhaps only in the evening or during the day only in the cooler months. They can also be used only in a portion of the dwelling while the rest of the space is not being utilized. While it is possible to shut off rooms in centrally heated dwellings, the savings are not generally commensurate. On the other hand, room heaters do not usually provide the same degree of comfort. If not watched carefully, they can be uneconomic and even hazardous. A considerable proportion of fires in low-income dwellings are caused by these heaters, and they represent one of the many hazards of being poor.

Type of Heating System by Income Level

In upper-middle and high-income dwellings, central heating systems are far more common—in fact, close to universal. Only five percent of households with incomes of \$14,000 to \$20,500 lack central heating, and only four percent of households at the \$25,000-plus level. Most of these reside in the South and West—probably in localities where heat is infrequently needed.

Income level and type of heating system have little to do with whether or not the household uses supplementary room heaters, however. In fact, the proportion using supplementary heaters rises slightly with income—from 20 percent among the poor and near-poor to 23 percent among those with incomes of \$25,000 or more—despite the fact that at these upper levels virtually every household has central heating. The reasons are not clear, but it is possible that higher-income households are less tolerant of even minor inequalities in heat distribution, and better able to afford to counteract them.

Type of Heating System by Region

As might be expected, individual room heaters are more common among low-income households residing in the warmer states. In the South Central region, for example, about two-thirds of

low-income homes rely on room units rather than on a central system, compared to one-third nationally. In the South Atlantic states, 50 percent use individual units, and four percent report that they have no regular heating system at all. That room units for space heating may not always be sufficient, however, is suggested by the high proportions in both regions of the South which report that they also use supplementary heaters on occasion. In fact, the proportions are the highest in any of the nation's five regions. (Table 20.)

Type of Heating System by Community Type

The frequent absence of central heating in the South Central and South Atlantic states may be due to the types of communities often found there as well as to the climate. These regions have fewer large urban concentrations and more rural areas and small cities and towns. In the nation as a whole, only about half of all low-income households who live outside metropolitan areas have central heating, compared to 73 percent in central cities and 76 percent in suburban areas. (Table 21.)

In most of the major regions, including the coldest, startlingly high proportions of low-income households living outside metropolitan areas lack central heating, compared to all poor households in the same region.

... In the **West**, 44 percent of non-metropolitan low-income households lack a central heating system and rely on individual room units. More than a third (36 percent) utilize supplementary units during the winter months.

... In the generally cold **North Central** region, fully a fifth (22 percent) of rural and smalltown poor and near-poor households have no central heating. And 29 percent report the use of supplementary heaters in the winter.

... Only among poor households in the **Northeast** does the presence or absence of a central heating system have little relationship to whether the household lives within a central city or outside a metropolitan area altogether. In both types of communities, at least four out of five households (80 percent and 83 percent respectively) receive their heat from a central unit.

TABLE 20

TYPE OF HEATING SYSTEM IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS IN U.S. BY REGION, 1975

Type of Heating System	West	REGION			
		North Central	South Central	South Atlantic	North East
(Percent of Households)					
All Households	100%	100%	100%	100%	100%
Central system	65	86	34	45	83
Heat only in individual rooms	32	13	65	50	17
(Room heaters with flue or vent)	(26)	(11)	(28)	(36)	(7)
(Portable room heaters or stoves)	(5)	(3)	(37)	(13)	(9)
No regular heating system	2	*	1	4	
Use supplementary room heaters	19	15	21	32-	17

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 21

TYPE OF HEATING SYSTEM IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS IN U.S. BY TYPE OF COMMUNITY, 1975

	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
All Low-Income Households	100%	100%	100%
Central System	73	76	51
Heat only in individual rooms	24	23	49
No regular heating system	2	*	*
Use supplementary room heaters	13	16	28

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

In most regions and types of community, the proportion of low income households without central heating systems is directly related to the proportion who reported use of supplementary heaters during the winter: the higher the proportion without central heating, the more common are supplementary heaters, confirming the general inadequacy of non-central systems in low-income households.

Availability of Temperature Controls in Low-Income Dwellings

Also important to energy consumption is the ability of the individual householder to control the temperature at which he keeps his home. A considerable proportion of low-income households in the United States lack this option—39 percent (Table 22). Thus, a large number of low-income households cannot cut back on their heat consumption, except perhaps by cutting off the heat altogether.

Many cannot even take this action. Almost half (49 percent) of low-income renters do not have temperature controls, and this renter group makes up 70 percent of all low-income households who cannot control their dwelling temperature. For such renters, the availability and amount of heat is usually controlled by the landlord or his agent.

Availability of Controls by Income Level

Lack of control over one's dwelling temperature is infrequent in today's America, except among low-income households. The 39 percent proportion who lack this control at the lowest income level is five times as high as in upper-middle-income households and eight times as high as in households with incomes of \$25,000 and above. Low-income households lacking temperature controls make up 43 percent of all households in the nation, regardless of income, who are without this facility.

Availability of Controls by Community Type

The highest proportion of low-income households lacking temperature controls reside in the central cities (42 percent); most of these are doubtless renters. The next highest proportion (38 percent) live outside metropolitan areas altogether; these non-metropolitan residents make up 42 percent of all low-income households in the nation who cannot control the temperature of their dwellings. A good proportion of these are unquestionably renters as well; but many are among those who still

occupy homes heated by old-fashioned coal, wood or kerosene stoves. For most of those who must rely on these outmoded systems, controlling their dwelling temperature is tricky at best, and well-nigh impossible at worst.

Availability of Controls by Region

The highest proportion of low-income households who lack temperature controls reside in the South Central region (56 percent), with the second highest proportion in the South Atlantic region (46 percent). Both have relatively mild temperatures, on the average. The third highest proportion, however, is in the Northeast, with its low temperatures. Here the high percentage of renters is clearly related.

The higher the proportion of poor households in a region who lack central heating, the higher the proportion usually is with no means to control the home's temperature. In several cases, also, the higher the proportion which use supplementary heaters during winter, the higher the proportion without temperature controls.

In some of these instances, the amount of energy expended by a supplementary heater may be less in volume and cost than would be required if the household was able to set its regular heating system to a desired temperature. Often, however, costs might be lower if there were temperature controls. However efficient supplementary units may be in heating their immediate perimeter, they are often extremely wasteful of energy if used to heat larger areas. Furthermore, most are run by electricity—now the most costly of fuels per unit consumed.

TABLE 22
ABSENCE OF TEMPERATURE CONTROLS IN LOW-INCOME
HOUSEHOLDS IN THE U.S. BY REGION, COMMUNITY TYPE AND
TENURE, COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

	Percent of Households Without Temperature Controls
Households by Income Level:	
Low-Income	39%
\$14,000 - \$20,500	8
\$25,000 and above	5
Low-Income Households by Region:	
West	25
North Central	25
South Central	56
South Atlantic	46
Northeast	38
Low-Income Households by Community Type:	
Central Cities	42
Suburbs of Metropolitan Areas	33
Outside Metropolitan Areas	38
Low-Income Households by Tenure:	
Homeowners	26
Renters	49

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Types of Energy Used for Space Heating in Low-Income Households

American households rely on a variety of fuels to heat their homes. However, the fuel any individual household uses is greatly affected by the location—primarily the region, but also the type of community. How much the household pays for heating is also influenced by both fuel type and region—as is the recent and probable future price trend and the likelihood of severe shortages in the near future. (See Table 23.)

TABLE 23
TYPE OF FUEL USED FOR SPACE HEATING BY LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

Type of Fuel	INCOME		
	Low- Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of All Households)		
Natural Gas	59	59	67
Bottled, tank or LP Gas	7	4	4
Fuel Oil	17	22	19
Electricity	9	13	9
Other (kerosene, coal, coke, wood, other)	10	2	2
None	*	*	*

*Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Natural Gas

Natural gas is the fuel currently used to heat the highest proportion of American homes in all income categories. It is also the least expensive of the major fuels. However, it is now in limited supply in some parts of the nation. Curtailments are already a reality for many industrial users, and could eventually affect residences as well.¹⁰ While opinions differ on the long-run supply prospects, it seems clear that natural gas prices will continue to rise rapidly and could ultimately equal or exceed those of other common fuels.

Natural gas is used for heating by 61 percent of American households overall, but the proportion varies greatly by region of the nation—from a high of 81 percent in the North Central region to a low of 27 percent in the South Atlantic region. Because it is piped in, gas is less common outside metropolitan areas.

Fuel Oil

Oil is the second most-used fuel, employed by about one-fifth of American households to heat their homes. The price of heating oil has risen more rapidly than that of either gas or electricity. Much of it is imported, and foreign producers have recently threatened—and carried out—both large price increases and an oil embargo. The households which use oil must realistically assume that history may be repeated.

¹⁰ For a discussion of natural gas usage and consumption and the potential impact of curtailments for residential use based on the Washington Center's 1973 survey findings, see: Grier, Eunice S. and Lynda T. Carlson. Natural Gas Usage and Consumption by American Households. Report to the Federal Energy Administration. Washington Center for Metropolitan Studies, September 1975.

Oil usage, like that of gas, varies widely by region. The highest proportion is in the Northeast, where 42 percent heat with oil; the second highest, 34 percent, in the South Atlantic states. It is no accident that both regions are comparatively far removed from natural gas sources, and convenient to East Coast ports for imported oil. The lowest frequency of oil heating, less than one percent, is in the South Central region where much of the nation's supply of natural gas originates.

Electricity

Electric power for space heating is in relatively plentiful supply in most regions of the country; but it is also the most expensive major source and its cost has been rising. Because electricity can be produced from a wide variety of fuel resources, the likelihood of severe shortages appears fairly remote. However, since most electricity is made by converting another energy source to heat, its cost will be partly dependent on price trends in other fuels.

Electricity is used for heating by only about eleven percent of U.S. households. Even in this case, however, usage varies widely by region—with the highest percentages in the South Central and South Atlantic states and the lowest in the Northeast.

Bottled Gas

Bottled gas is used by only about five percent of U.S. households. Bottled gas can be prepared from either oil or natural gas; in either case its price is relatively high and its availability subject to the same restrictions as the source fuels from which it is obtained.

Minor Fuels

A variety of minor fuels—including coal, coke, kerosene and wood—are also used for space heating. All told, these fuels account for only about five percent of all American households. The price and supply situation varies widely; in many cases they are obtained from nearby sources, and sometimes may even be harvested on one's own land. Coal is one of these “minor” fuels today despite the fact that coal resources are the most plentiful of any fossil fuel source remaining in the United States.

TABLE 24

TYPE OF FUEL USED FOR SPACE HEATING BY LOW-INCOME
HOUSEHOLDS BY TYPE OF COMMUNITY, 1975

	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
Natural Gas	76	40	52
Bottled, tank or LP Gas	1	10	10
Fuel Oil	14	35	12
Electricity	7	9	10
Other (kerosene, coal, coke, wood, other)	1	9	19
None	1	*	*

*Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Low-income households are somewhat less frequent users of each of the three major sources of heating energy than are households of higher income levels. This is particularly true for electricity and oil—probably due to their higher cost. On the other hand, low-income households tend to use bottled gas and the “minor” fuels more frequently. Although they make up only about one-fifth of all U.S. households, they comprise 26 percent of those who heat their homes with bottled gas, 28 percent of those who heat their homes with kerosene, 40 percent of those who heat with coal or coke, and 47 percent of those who heat with other minor fuels (chiefly wood). Probably this is principally because more low-income households are located distant from major energy supply lines, and many heat with outdated coal, wood or kerosene stoves. As Table 24 indicates, low-income households living outside metropolitan areas are much more likely to use “other” fuels. Overall, however, low-income households' pattern of fuel use is much like that of higher-income households, with a somewhat greater tendency to use fuels that are now “out of style” but may be returning.

Thus, a sizeable majority of low-income households are dependent for home heating on the two fuels which appear most subject to cutbacks or rapid price increases, natural gas and oil. In their dependence on these fuels, they are about as vulnerable as households with higher incomes—except that higher income users are more likely to be able to pay increased prices, or to find alternatives.

On the other hand, a sizable minority of the poor are likely to be relatively unaffected by shortages of these two critical fuels. Their use of other fuels could turn out to be a comfort in the future. At present, however, it is more likely a source of discomfort, expense or both.

IV. ENERGY-RELATED BEHAVIOR IN LOW-INCOME HOMES

This chapter deals with energy-related behavior (both measures to conserve energy and measures which may increase energy consumption) within the homes of low-income households. As already indicated, the major part of all energy consumed in U.S. homes is used for space heating. Moreover, several attributes of the dwelling which are difficult, expensive, or sometimes virtually impossible to modify play an important role in space heating requirements and costs.

However, some modifications can often be made in the dwelling to improve its energy efficiency; some things can also be done, such as adding more space, which will increase energy consumption. And it is possible for the occupants in some cases at least, to modify their behavior in ways that help to conserve energy—or, on the other hand, increase energy use. These energy-related actions by low-income households are the subject of this chapter.

Insulation, Storm Windows and Similar Energy-Conserving Features in Low Income Dwellings

To what extent were low-income dwellings equipped with energy-conserving features in 1975? By this we mean such features as insulation in walls and ceilings; storm doors and weatherstripping to reduce loss of heat through exterior doors; and storm windows, weatherstripping, and insulating glass to cut heat loss through windows.

The presence or absence of such features can be particularly important to low-income households, since their use of energy for other than essential purposes such as heating is already low and the cost of the energy they consume is high in relation to their household incomes. Low-income people may find it difficult to add energy-conserving features to their dwellings, however, due to cost and budgetary considerations; but some changes will be within their capabilities in many cases. Weatherstripping is relatively cheap and easy to install; temporary storm “windows” made of thin plastic sheeting are quite low in cost though not very durable; ceiling insulation can often be added by the occupant at fairly moderate expense. Even these relatively low-cost modifications may prove difficult to manage for those poor households whose budgets are already pinched beyond a liveable minimum or who suffer from infirmities that make it impossible for them to do the work themselves. Low-income renters may not see any point in doing so.

Adding insulation to existing walls, installing storm doors, and installing permanent storm windows usually involve major expenditures, however. While they sometimes can be accomplished by household members with their own hands, in other cases they require professional skills and equipment. In any event, measures like this are not usually practical for renters, since the landlord would usually be the chief beneficiary.

Until recently, moreover, these more expensive modifications would not have reduced heating costs enough to pay off the price of their initial installation for a fairly long period of years. In their book reporting findings of the Washington Center's 1973 survey of household energy use, for example, Newman and Day estimated that only in very cold climates such as that of Boston would a storm window, installed on a common size of double-hung window, pay for itself in natural gas cost savings in less than 10 years.¹¹ The relationship between initial and long-term costs has changed since

¹¹ Newman and Day, *op. cit.*

1973, as fuel costs have risen across the nation; the change is likely to be even more dramatic in the future. Insulation and storm protection of windows and doors are increasingly a good investment both for the country as a whole and for individual American households, even in relatively temperate climates.

However, the Washington Center's 1975 survey found that only a minority of low-income households had such forms of winter protection, at a time when rising energy costs had already become a matter of widespread public awareness and concern. Only about one-fourth of homes occupied by households in the lowest income category contained insulation in both walls and ceiling. About one-fourth reported that all windows were protected with storm windows or insulating glass; fewer than one-fourth had weatherstripping around their windows. And less than a third of low-income households whose dwellings had doors leading directly to the outside reported that all these exits were protected by storm doors. Homes occupied by upper-middle- and high-income households were much more often protected against severe weather. However, the gap between low-income and higher-income families with regard to weather protection had narrowed very little between the two survey years.

Presence of insulation

A high proportion of all low-income households in the U.S.—43 percent—reported in the Washington Center's 1975 survey that their homes contained no insulation at all, either in walls or in ceilings. This was more than three times the proportion of upper-middle-income households without any home insulation, and six times the proportion lacking insulation among high-income homes (Table 25). Insulation was present in both walls and ceiling of 74 percent of high-income dwellings; 60 percent of those occupied by households in the uppermiddle-income categories; and only 24 percent of low-income homes.

A considerable number did not know whether or not they had insulation. The percentage of households which could not say whether or not their dwellings were insulated was inversely related to income, and reached substantial levels among low-income groups. Only four percent of households in the highest income category, \$25,000 or above, reported in 1975 that they did not know whether their dwellings were insulated. This percentage rose to seven percent among households with incomes between \$14,000 and \$20,500, and to 16 percent of low-income households.

TABLE 25

USE OF INSULATION IN HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS COMPARED TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of All Households)		
All Households	100%	100%	100%
With Insulation	40	80	89
(In Walls Only)	(8)	(3)	(3)
(In Ceilings Only)	(8)	(17)	(11)
(In Both)	(24)	(60)	(74)
No Insulation	43	13	7
Don't Know	16	7	4

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

The reasons for this relationship are doubtless complex; but one contributing factor may well be that many of the dwellings occupied by households at lower income levels are old and have not been in the

possession of their present occupants very long. Another may be that a higher proportion of low-income households are renters, and not in a position to examine their dwellings in such detail. (To be sure about insulation, it is sometimes necessary to enter unoccupied parts of the building or even to make a hole in the wall.)

As statistics to be presented later will indicate, the much higher proportion of low-income households who do not know about insulation cannot reasonably be ascribed to general ignorance on the part of such households, or to lack of interest. The percentage who could not say whether or not their windows were weatherstripped was much lower, and was no higher for low-income than for upper-middle-income households.

As might be expected, the proportions without insulation were highest in the South Central and South Atlantic states; in each of these regions over half of all low-income households reported that their homes were uninsulated (Table 26). However, the number lacking insulation was also quite high in the cold states of the North Central region and the Northeast; about a third of poor dwellings in each region were reported to have no insulation at all.

Over one-fourth of low-income households in the Northeast could not say whether or not their homes had insulation in the walls, ceiling, or both. This was the highest proportion for any region. Some of these homes probably were uninsulated; others may have been partially insulated but drafty. Many were doubtless rental apartments where the occupant could not readily determine whether or not the building was insulated. As noted earlier, the proportion of renters in the Northeast is especially high. The greater average age of dwellings in the Northeast than in most other regions was probably a factor as well.

Lack of insulation in low-income dwellings is about as prevalent in central cities as in nonmetropolitan areas. In suburban areas, on the other hand, the proportion of uninsulated homes is much lower among low-income households, perhaps reflecting a larger number of homes built in recent years.

We thought some of these statistics on insulation might reflect a large proportion of renter households among the poor who were unaware of what lay beyond the walls and ceilings, but simply assumed that the dwelling was uninsulated because it was drafty. So we looked separately at those who were homeowners and therefore more likely to be knowledgeable about the construction of their

TABLE 26

	REGION				
	West	North Central	South Central	South Atlantic	North East
	(Percent of All Households)				
All Households	100%	100%	100%	100%	100%
With Insulation	47	50	31	35	38
(In Walls Only)	(6)	(13)	(4)	(5)	(7)
(In Ceilings Only)	(15)	(9)	(6)	(4)	(8)
(In Both)	(26)	(28)	(21)	(26)	(23)
No Insulation	39	33	55	57	36
Don't Know	14	16	14	7	27

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

PRESENCE OF INSULATION IN HOMES OCCUPIED BY
LOW-INCOME HOUSEHOLDS BY REGION, 1975

TABLE 27

PRESENCE OF INSULATION IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS BY TYPE OF COMMUNITY, 1975

	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
All Households	100%	100%	100%
With Insulation	28	58	43
(In Walls Only)	(7)	(9)	(8)
(In Ceilings Only)	(7)	(14)	(6)
(In Both)	(14)	(35)	(29)
No Insulation	50	22	47
Don't Know	22	21	9

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

homes. The proportion who answered that they did not know about insulation dropped sharply among low-income homeowners. However, the number stating that their homes were uninsulated remained quite high nevertheless. For example, in the nation generally, only five percent of poor and near-poor homeowners said they did not know if their homes were protected by insulation, compared to 16 percent of all low-income households. However, 38 percent of low-income homeowners said they were certain there was no insulation in either the walls or ceiling of their homes.

Insulation, of course, will not solve all problems of keeping a home comfortable without excessive wastage of energy. Loose-fitting doors and windows and similar construction defects contribute to heat loss for which no amount of insulation can compensate. It is also easier and less costly to install insulation while a house is under construction than afterward; and as we have noted, many homes occupied by low-income families are older dwellings. Nevertheless, installing insulation is certainly one of the more important conservation measures a household can take to save energy in its own place of residence.

Storm Doors and Weatherstripping

More than half (56 percent) of poor and near-poor households whose homes contained exits to the outside reported to the Washington Center in 1975 that *none* of these exits were equipped with storm doors. A slightly higher proportion (59 percent) stated that there was no weatherstripping on *any* of their outside doors. (Table 28.)

In contrast, the homes in which upper-middle-income and high-income Americans reside are much more likely to be equipped with some form of extra weather protection for doors. More than half in each income group said *all* exits to the outside had storm doors; threequarters had weatherstripping on all doors. The proportion with no storm doors at all was less than one-third in both the high- and upper-middle-income categories. The proportion with no weatherstripping was only about one-fifth in both.

Not surprisingly, the colder the region in which the household lives, the more likely it is to be equipped with storm doors and/or weatherstripping. Nevertheless, even in the relatively cold Northeast region, close to half (45 percent) of poor households with doors that lead to the outside said

TABLE 28

PRESENCE OF STORM DOORS AND WEATHERSTRIPPING IN HOMES
OCCUPIED BY LOW-INCOME HOUSEHOLDS COMPARED TO
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or Over
(Percent of All Households)			
All Households With Doors to Outside	100%	100%	100%
All doors have storm doors	30	55	51
Some have storm doors	13	17	18
No storm doors	56	28	31
All doors with weatherstripping	33	73	77
Some doors with weatherstripping	3	4	4
No weatherstripping on doors	59	21	18

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

they had no storm doors; and well over half (58 percent) reported no weatherstripping. Poor households in the North Central states are somewhat better protected, but still close to half lack storm doors on some or all exits to the outside.

It may surprise some readers that the highest proportions of low-income households whose homes have no storm doors or no weatherstripping are found in central cities. As with insulation, the fact that many central city dwellings are rental units may be an important factor (Table 30).

High proportions of low-income households in non-metropolitan areas also lack storm doors (58 percent) and weatherstripping (55 percent). While a good number of these may be in the warmer climates where energy savings would be relatively small, a substantial number are located in the col-

TABLE 29

PRESENCE OF STORM DOORS AND WEATHERSTRIPPING IN HOMES
OCCUPIED BY LOW-INCOME HOUSEHOLDS BY REGION, 1975

	REGION				
	West	North Central	South Central	South Atlantic	North East
(Percent of All Households)					
All Households With Doors to Outside	100%	100%	100%	100%	100%
All doors have storm doors	7	56	13	25	41
Some have storm doors	18	14	7	15	14
No storm doors	75	30	80	59	45
All doors with weatherstripping	32	47	25	25	32
Some doors with weatherstripping	3	5	1	5	4
No weatherstripping on doors	59	45	72	65	58

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 30

PRESENCE OF STORM DOORS AND WEATHERSTRIPPING IN HOMES
OCCUPIED BY LOW-INCOME HOUSEHOLDS BY TYPE OF COMMUNITY, 1975

	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
All Households With Doors to Outside	98%	100%	100%
All doors have storm doors	27	38	29
Some have storm doors	9	20	12
No storm doors	62	42	58
All doors with weatherstripping	24	39	36
Some doors with weatherstripping	1	6	3
No weatherstripping on doors	69	52	55

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

der regions of the United States where additional weather protection should be encouraged. In the North Central region, for example, where winters tend to be relatively long and cold, an estimated 28 percent of poor and near-poor households living in non-metropolitan areas had homes which were unprotected with storm doors—a projected total of about 410,000 poor households in the North Central region alone.

Window Protection

A majority of homes occupied by low-income households also lack storm windows or insulating glass to cut down on loss of heat to the outside. Fully 60 percent of all low-income households sur-

TABLE 31

PRESENCE OF STORM WINDOWS, INSULATING GLASS, AND WEATHERSTRIPPING
IN HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS IN U.S. COMPARED
TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 and Over
(Percent of All Households)			
All Households	100%	100%	100%
All storm windows or insulating glass	25	45	46
Some storm windows or insulating glass	15	19	17
No storm windows or insulating glass	60	37	38
Have window weatherstripping	23	51	58
No weatherstripping on windows	71	42	39
Don't know about window weatherstripping	6	7	2

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

veyed by the Washington Center in 1975 reported that none of their windows were so protected. In contrast, much smaller proportions of homes occupied by upper-middle and high-income Americans had no storm windows or insulating glass to protect their homes—less than two-fifths in both cases. Poor and near-poor households who owned their dwellings were somewhat better off than renters in this respect. Still, close to half of low-income homeowners had no extra window protection against cold weather.

Weatherstripping around windows—usually a relatively easy and inexpensive method of keeping more heat within the dwelling—is also found infrequently in homes occupied by low-income households. In the Washington Center's 1975 survey, almost three-fourths of poor and near-poor households reported that their windows had not been weatherstripped. The percentages reporting no weatherstripping among both upper-middle- and high-income households were only a bit over half as great.

As with insulation and storm doors, poor households in the colder regions of the nation are more likely to have added window protection than those in regions with more moderate winters. Still, more than a third of poor households in the two coldest regions—the North Central and Northeast—say their homes are unprotected with storm windows or insulating glass. And about two-thirds of poor homes in the North Central region and close to three-fourths in the Northeast have no window weatherstripping.

Extra window protection is also less frequently found in central city homes than in either suburbs or non-metropolitan areas. In central cities, about two-thirds of low-income households report having no storm windows, and more than three-fourths report no weatherstripping on windows. These proportions are somewhat, but not dramatically, lower among nonmetropolitan families—about three-fifths of whom report no storm windows and about two thirds of whom report no window weatherstripping.

Energy-Related Improvements in Low-Income Homes

Only a few low-income households reported in the 1975 survey that they had made improvements in their homes which would conserve energy in the two years since 1973. Considerably larger

TABLE 32

PRESENCE OF STORM WINDOWS, INSULATING GLASS, AND WEATHERSTRIPPING
IN HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS, BY REGION, 1975

	REGION				
	West	North Central	South Central	South Atlantic	North East

All Households	(Percent of All Households)				
	100%	100%	100%	100%	100%
All storm windows or insulating glass	9	45	8	15	37
Some storm windows or insulating glass	9	20	4	14	24
No storm windows or insulating glass	82	36	89	71	38
Have window weatherstripping	20	29	23	22	20
No weatherstripping on windows	73	65	73	75	73
Don't know about window weatherstripping	7	7	3	3	7

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 33

PRESENCE OF STORM WINDOWS, INSULATING GLASS AND WEATHERSTRIPPING
IN HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS
BY TYPE OF COMMUNITY, 1975

	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
	(Percent of All Households)		
All Households	100%	100%	100%
All storm windows or insulating glass	20	32	27
Some storm windows or insulating glass	15	16	14
No storm windows or insulating glass	65	53	59
Have window weatherstripping	15	25	30
No weatherstripping on windows	78	68	65
Don't know about window weatherstripping	6	6	5

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

percentages of upper-middle and high-income households had done so—even though their dwellings were already better equipped with insulation, storm windows and other energy-saving features in 1973. The proportion of low-income households who reported adding insulation was a mere three percent, compared to 12 percent among households in the upper-middle-income group (\$14,000- \$20,500) and 10 percent of high-income households (\$25,000 and more).

TABLE 34

ENERGY-RELATED IMPROVEMENTS REPORTED IN HOMES OCCUPIED BY
LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED TO
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1973-75

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of Households Reporting Change)		
<u>Energy-Conserving Improvements</u>			
New or additional insulation	3%	12%	10%
Storm doors or windows	6	10	9
<u>Energy-Using Improvements</u>			
Addition to size of dwelling	1	5	9
Additional bathroom	1	1	4
Electrical wiring or circuits	4	7	10

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

As noted earlier, by 1975 only seven percent of high-income households still reported no insulation in their dwellings, and only 13 percent of upper-middle-income households; but 43 percent of the low-income respondents in the Washington Center's survey said that their dwellings were totally uninsulated. Thus, there is comparatively little room for further improvement in the insulation of higher-income dwellings; but a great deal can still be done to reduce unnecessary heat loss in the homes of low-income households.

A somewhat larger percentage of low-income households reported adding storm windows or doors, but the proportion was still smaller than among households at higher income levels. Six percent of the low-income respondents reported making such improvements, compared to 10 percent of upper-middle-income households and nine percent of those with high incomes.

Again, much more margin remained for improvement in window and door protection among low-income households than among those which had higher incomes in 1975. Over half of all low-income households still reported having no storm doors in the 1975 survey, compared to less than one-third of households at higher income levels. Among low-income households, an even higher three-fifths reported no storm windows or insulating glass, compared to under two-fifths of households of higher income levels. (There were only small and possibly insignificant variations in either respect between the upper-middle and high-income households, but differences between low-income households and either of the higher income categories were substantial.)

The failure of most low-income households to report making such energy-saving improvements, despite the obvious deficiencies in their homes, may be attributable both to lack of economic capability and lack of incentives. Adding insulation and storm doors and windows is quite expensive. Storm windows and doors are often the cheaper of the two, however, and it is not surprising that more low-income households reported installing them. (The survey did not ask specifically about weatherstripping; but obviously not very much was done along this line either because so few low-income households reported weatherstripping on doors or windows in 1975.) Clear incentives to add weather protection were lacking for most of the poor and near-poor households who rented their dwellings, as well as for those in milder climates. But almost all could have benefitted from it, either directly or indirectly.

In terms of reported energy-using improvements between 1973 and 1975 (also summarized in Table 34), there was also a marked difference with income—and it was consistent with relative economic capability. In general, the higher the income level, the more energy-using improvements had been made. Very few low-income households, about one percent, reported either adding to the size of their dwellings or adding a bathroom. Only four percent reported improvements to electrical wiring or circuits. These improvements are often (though not always) related to installation of more electrical appliances or heavy energy-consuming appliances such as air conditioning.

By contrast, nearly one-tenth of all high-income households reported enlarging their dwellings; the same was true for one upper-middle-income household in twenty. Four percent of high-income households had added a bathroom, compared to only one percent among both low-income and upper-middle-income households. And ten percent of high-income households improved their electrical wiring, compared to seven percent of upper-middle-income households and only four percent among the low-income group.

Thus, while many more high-income households reported adding insulation and other energy-conserving features, many more had also increased the energy-consuming propensities of their dwellings by building on more space, or adding energy-consuming appliances. The two kinds of actions probably offset each other, at least in part. Few low-income households had the resources to do either.

Another way of looking at the same question will be found in the tables which follow. Here we compare the responses to questions about presence of insulation, storm windows, and storm doors from all respondents to the 1973 and 1975 surveys and from those respondents who were in the lowest and highest income groups in the two survey years. These figures are

not directly comparable to those we have just been discussing, which were drawn from the 1975 survey alone and based upon questions which asked specifically whether the household had added such features to its current dwelling. The figures in Tables 35 through 37 deal with whether the dwellings contained specific energy-saving features at the time of each survey. The two sets of figures generally confirm each other.

In these tables we compare the “low-income” and “higher-income” groups with allowance made for changes in the income distribution between the two survey years. Our “low-income” group is defined by the income-vs.-household-size criteria given in Table 1. Our “higher-income” group is roughly equivalent to the upper fifth of the household income distribution in both years. In 1973, it includes all households with incomes of \$16,000 and over; in 1975, all households with incomes of \$20,500 and more.

Table 35 shows that the proportion of households which did not know whether or not their dwellings were insulated dropped sharply between 1973 and 1975. The proportion who could not answer this question was much lower in both years among higher-income households than low-income households; but in both groups the decrease between the two years was substantial and of roughly the same relative magnitude. It seems reasonable to ascribe this change to increased energy awareness on the part of the public. As we have noted earlier, presence of insulation is not always readily apparent and may take some investigation to ascertain.

The percentage reporting that their dwellings had insulation in both ceilings and walls increased somewhat, but not dramatically, for both groups. The number reporting that they had no insulation at all did not decrease substantially for either group, however. There was an increase of a few percentage points among low-income households reporting insulation in walls only, and a similarly small increase in higher-income households reporting insulation in the ceiling only. In part, these changes probably result from increased energy awareness—with some households having shifted out of the “don’t know” category as they looked more closely at their homes—and in part from actual improvements in the insulation of American dwellings. Regardless, the results indicate that in both 1973 and 1975 higher-income dwellings were much better equipped with insulation than low-income dwellings. Moreover, they show that the gap between the income groups in this respect had not narrowed appreciably with the increasing prominence of energy concern.

TABLE 35

PRESENCE OF INSULATION IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO HIGHER-INCOME
AND TOTAL HOUSEHOLDS, 1975 AND 1973

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
All Households 100%	100%	100%	100%	100%	100%	100%
With Insulation:	40	31	90	87	67	62
(In Walls only)	(8)	(3)	(4)	(4)	(6)	(6)
(In Ceilings only)	(8)	(8)	(13)	(17)	(14)	(15)
(In Both)	(24)	(20)	(73)	(66)	(47)	(41)
No Insulation	43	44	6	6	22	22
Don't Know	16	25	4	7	11	16

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

Table 36 shows the proportion reporting presence of storm doors in both years. The changes in this respect for the lower-income group are clear and consistent; they show a rather significant increase in the possession of storm doors among this group between 1973 and 1975, although the proportion having this energy-saving feature in their dwellings is still much lower than among higher-income households.

TABLE 36
PRESENCE OF STORM DOORS IN HOMES OCCUPIED BY LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO HIGHER-INCOME
AND TOTAL HOUSEHOLDS, 1975 AND 1973

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
All Households With Doors to Outside	100%	100%	(Percent of All Households)		100%	100%
All with storm doors	31	27	52	56	46	46
Some with storm doors	13	7	17	12	15	8
No storm doors	57	66	31	30	39	46

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

The changes in the higher-income group are less clear and consistent. The proportion reporting no storm doors is very nearly the same in both years; the increase of one percentage point in the statistics could well be due to sampling variance. There is an increase of several percentage points in the proportion reporting that *some* of their doors have storm doors, and a decrease of about the same size in the proportion reporting that *all* their doors have storm doors. While we cannot be sure of all the reasons, these shifts could be related in part to the space additions reported by a substantial percentage of higher-income households. In any event, the gap between low-income and higher-income households in this respect has decreased slightly, though it is still large.

With regard to storm windows, both lower-income and higher-income households reported substantial gains between 1973 and 1975. While higher-income households remained far ahead of the lower-income group in both years, the slight narrowing of the gap may have been significant given the greater economic sacrifice the poor have to make to weatherize their homes (Table 37). More higher income households reported that *all* their windows were protected in 1975, while there was a decrease in the percentage who said that only *some* of their windows were protected. Among low-income households, both of these categories increased.

Temperature Maintenance Practices in Low-Income Households

How warm do low-income households keep their dwellings in winter? Do they turn down temperatures at night? How do their practices in this respect compare with those of higher incomes?

For a substantial proportion of low-income households, this question cannot be answered. Nearly one in five were unable to tell the person who interviewed them how warm their homes were kept during the winter months. Most of these probably were among the 39 percent of low-income households who reported that their heating systems had no means of controlling the temperature. If there

TABLE 37

PRESENCE OF STORM WINDOWS OR INSULATING GLASS
IN HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS
IN THE U.S. COMPARED TO HIGHER-INCOME AND
TOTAL HOUSEHOLDS, 1975 AND 1973

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
(Percent of All Households)						
All Households	100%	100%	100%	100%	100%	100%
All storm windows or insulating glass	25	19	49	41	39	34
Some storm windows or insulating glass	15	12	17	22	16	16
No storm windows or insulating glass	60	69	34	37	45	50

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

was no thermostat, then in many cases there probably was no thermometer either. Little purpose would be served by paying scarce money for a thermometer if nothing could be done to change its reading, or if one's level of living was so marginal that one still had to get along with a wood-burning stove in the America of the mid-1970s. Few upper-middle and high-income households were unable to report the usual temperature of their dwellings; as with lack of knowledge about insulation, this phenomenon was largely restricted to low-income households.

Usual Temperatures

With the "don't know" category excluded, the figures obtained by the survey indicate that homes occupied by poor and near-poor households tended to be kept at somewhat *higher* temperatures in 1975 than those occupied by upper-middle and high-income households. Altogether, 35 percent of low-income households reported their usual daytime temperatures in the winter as below 70 degrees. This figure compared to a considerably higher 48 percent of those in the upper-middle-income range, and a still higher 51 percent of those with incomes of \$25,000 or more. (See Table 38.)

At the other extreme, 24 percent of the low-income families reported that their homes were kept at daytime temperatures of 73 degrees or higher, compared to only 11 percent of those in the upper-middle income range and six percent of those with high incomes.

These higher temperatures among those who can least afford the energy to maintain them seem paradoxical, but are probably related to the situation of the households. As we noted earlier, low-income households are disproportionately located in southern areas where temperatures are milder. In some of these places, even without the aid of a heater, daytime temperatures sometimes can climb to 70 degrees or above. Also, a disproportionate number of low-income households are elderly, and require higher temperatures for comfort and even for health. More important, many more are renters who cannot control the temperature of their dwellings. In old, uninsulated, drafty buildings such as those occupied by many poor and near-poor households, furthermore, higher thermostat levels are often required to achieve comfortable temperatures than are needed in dwellings with better construction and more reliable

thermostat readings.

TABLE 38

USUAL HOME TEMPERATURE IN WINTER FOR LOW-INCOME
HOUSEHOLDS COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

Temperature Reported	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or Over
(Percent of All Households)			
All Households Reporting Temperature	100%	100%	100%
<u>Day Temperature</u>			
Under 65 degrees	9	7	5
65 - 69 degrees	26	41	46
70 - 72 degrees	42	41	43
73 - 75 degrees	15	8	4
More than 75 degrees	9	3	2
<u>Night Temperature</u>			
Under 65 degrees	30	20	19
65 - 69 degrees	34	51	53
70 - 72 degrees	24	25	24
73 - 75 degrees	8	4	3
More than 75 degrees	5	1	1

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Day vs. Night Temperatures

High proportions of American households at all income levels are lowering the heat in their dwellings during the sleeping hours. In contrast to the 35 percent of low-income households who kept their homes below 70 degrees in the daytime, 64 percent did so at night. The proportions were again higher, however, for upper-middle and high-income households—71 percent and 72 percent respectively. (Among the poor, it is quite possible that some of those who did not know the temperature of their homes nonetheless lowered the heat at night, or even turned it off altogether, but we do not yet have this information available for detailed analysis.)

There is a great deal of variation in the usual winter home temperatures reported by poor households among the nation's five major regions. In the two central regions—North Central and South Central—higher proportions of low-income households report day-time temperatures above 70 degrees than in other parts of the nation. Low-income households in all regions also maintain lower temperatures at night than in the day. But both day and night, the proportion of low-income households in the North Central region who keep their heat below 70 degrees is less than among the poor households throughout the country. The proportion is also lower in the Northeast. The differences are particularly sharp at the under-65 degree level (Table 39).

In both these regions, winters are the longest and most severe in the nation. This means higher fuel costs for heating. The **average annual cost** of natural gas for a low-income household in the North Central region was the second highest in the nation in 1974-75; only in the Northeast was the average household cost higher. The **per unit** cost of natural gas in the North Central region, however, was one of

the lowest. Hence, a degree or two one way or the other may have made less differ-

TABLE 39

USUAL HOME TEMPERATURE IN WINTER FOR LOW-INCOME
HOUSEHOLDS BY REGION, 1975

Temperature Reported	REGION				
	West	North Central	South Central	South Atlantic	North- East
(Percent of All Households)					
All Households Reporting Temperature	100%	100%	100%	100%	100%
<u>Day Temperature</u>					
Under 65 degrees	6	3	11	10	13
65 - 69 degrees	33	21	17	34	29
70 - 72 degrees	38	38	54	39	40
73 - 75 degrees	18	25	11	8	10
More than 75 degrees	5	12	8	9	8
<u>Night Temperature</u>					
Under 65 degrees	47	14	41	40	25
65 - 69 degrees	26	39	25	37	36
70 - 72 degrees	13	25	26	18	30
73 - 75 degrees	11	13	4	4	6
More than 75 degrees	3	9	4	2	3

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

ence to the household than, for example, in the South Atlantic states where the **per unit** cost of natural gas to poor households was more than 60 cents higher.

Another possible contributing factor may be the high proportion of low income households in the North Central states which live in central cities—46 percent. As the next table indicates, low income households who reside within central cities tend to have warmer temperatures both during the day and at night than those who live in suburban rings or in small towns and rural areas. Central city homes more often are apartments or row houses with less exposed wall space; and the heat level is less often under the control of the occupant.

The West and Northeast have about the same proportion of low-income households residing in central cities as does the North Central region. But the North Central region has a higher-than-average proportion of apartment dwellers among its low-income households. Among the nation's five major regions, only the Northeast has more. Even for those apartment dwellers who are able to read the temperature of their dwellings or set it to a desired level, the heating bill is often an integral part of their monthly rent. Hence, they have no obvious incentive to cut back.

We have very little systematic knowledge about heating practices in multi-unit apartment structures where all temperatures are controlled from a central location. The Washington Center's two surveys obtained data on individual households, and not on structures—which might be occupied by more than one household unit. About half of all apartment dwellers in the Washington Center's 1973 and 1975 surveys of household energy did not have a separate meter to record their use of natural gas and/or electricity. Some of these may also not have had separate thermostats which they could set to a desired temperature. Many of these were undoubtedly low-income households.

Between 1973 and 1975, there was a decided shift toward lower dwelling temperatures in winter both

during the day and at night. This shift occurred among low-income and higherincome groups. There was also a rather interesting reversal in the positions of these groups.

TABLE 40
USUAL HOME TEMPERATURE IN WINTER FOR LOW-INCOME
HOUSEHOLDS BY TYPE OF COMMUNITY, 1975

Temperature Reported	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
(Percent of All Households)			
All Households Reporting Temperature	100%	100%	100%
<u>Day Temperature</u>			
Under 65 degrees	9	8	8
65 - 69 degrees	19	30	29
70 - 72 degrees	35	42	47
73 - 75 degrees	21	14	11
More than 75 degrees	15	6	4
<u>Night Temperature</u>			
Under 65 degrees	24	27	37
65 - 69 degrees	25	40	38
70 - 72 degrees	28	25	19
73 - 75 degrees	13	7	5
More than 75 degrees	10	2	1

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 41
USUAL HOME TEMPERATURE IN WINTER IN LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO HIGHER-INCOME
AND TOTAL HOUSEHOLDS, 1975 AND 1973

Temperature Reported	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
(Percent of All Households)						
All Households Reporting Temperature	100%	100%	100%	100%	100%	100%
<u>Day Temperature</u>						
Under 65 degrees	9	8	5	2	6	4
65 - 69 degrees	26	9	46	11	37	11
70 - 72 degrees	42	49	42	55	43	52
73 - 75 degrees	15	23	5	26	9	25
More than 75 degrees	9	11	1	6	5	9
<u>Night Temperature</u>						
Under 65 degrees	30	36	17	13	23	20
65 - 69 degrees	34	21	55	33	46	30
70 - 72 degrees	24	27	23	38	24	34
73 - 75 degrees	8	9	3	13	5	12

More than 75 degrees	5	6	1	3	2	4
----------------------	---	---	---	---	---	---

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

In 1973, only 13 percent of higher-income households and 17 percent of lower-income households reported day-time temperatures under 70 degrees. The percentage reporting nighttime temperatures under 70 degrees was 46 percent for higher-income households and 57 percent for lower-income households (Table 41).

In 1973, therefore, more lower-income households had dwelling temperatures under 70 both day and night than those with higher incomes. By 1975, the practice had been reversed. Higher-income households and lower-income households had **both** reduced dwelling temperatures, in the aggregate. However, the reductions to under-70 levels had been greater among those with higher incomes—so much so that higher percentages of higher-income dwellings were now being kept at temperatures below 70 degrees both day and night. For higher-income households, the proportion with under-70 daytime temperatures had increased to 51 percent in 1975, vs. 35 percent for low-income households. At night, the 1975 proportions were 72 percent for higher income households vs. 64 percent for low-income households.

However, it should not automatically be concluded that higher-income households were sacrificing more. The percentages who maintained their dwellings at temperatures **below 65**—which must be regarded as uncomfortably chilly by most persons—had increased for both income groups—but among low-income households they were still about twice as large in 1975 as for those with higher incomes. The big shift for both low-income and higher-income households was into the 65-69 degree category—a bit on the cool side, but not too much so for many people. Yet many more households in the low-income group kept their homes at the definitely chilly below-65 level in both years.

The percentages of both low-income and higher-income households which maintained temperatures of 73 degrees or above decreased between 1973 and 1975. However, the shift out of these higher-temperature categories was so much greater for higher-income households that, by 1975, the percentages in this group whose dwellings were kept above 72 degrees had declined almost to the vanishing point—while percentages among the lower-income group were reduced but still substantial. The reasons for this apparent failure of many low-income households to conserve may be related not to motivation but to the situations of the two groups.

In summary, the findings indicate that most households in both low-income and higher-income groups have responded to the energy crisis by accepting lower dwelling temperatures. The shift toward more energy-conserving levels has been more pronounced among those with higher incomes; but the reason may be chiefly that they can manage the change more readily.

Other Uses of Energy in Low-Income Dwellings

While over half of all energy consumed within the average American home goes for space heating, there are also numerous other energy-using features in the dwelling.

Water Heating

One of the most important is water heating for washing clothes, dishes, and the person. Water heating has been estimated to consume about 10 percent of all energy used within the average dwelling unit.¹²

We cannot measure the amount of energy used for heating water separately from that used for other purposes—any more than can any individual householder. Both come in on the same utility bill. Hence we are not able to determine how much of the energy consumed by low-income households goes for heating water, and how this relates to consumption by households of other income levels. It is reasonable to assume that, since the total energy consumption of low-income households is less, their consumption for water heating is also less—but we cannot say this for certain. Our survey data do indicate the kinds of fuel used by low-income households to heat water. The pat-

¹² Newman and Day, op. cit.

tern does not differ very substantially from that for households of other income levels.

Appliances

Virtually every American home is now supplied with electric power. If for nothing else, this power is utilized for lighting. But most, if not all, households use it for other purposes also.

In general, the survey results indicate that America's low-income households are less likely to possess most kinds of major appliances than those of higher income. The possession of most appliances is closely and directly related to incomes, with the percentage of households reporting them increasing as the household income level rises (Table 42). For most of the appliances on which we obtained data, a majority of households at the highest income level (\$25,000 or over) reported having them. The percentage was lower among upper-middle-income households (\$14,000-\$20,500). Among low-income households, it was usually much lower.

Yet even among households at the lowest income levels, substantial though often minor percentages reported possession of most common appliances. A few appliances were virtually universal at all income levels. However, where there were two common forms of an appliance, one of which was considerably cheaper to buy and usually more energy-conserving than the other—for example, wringer washers vs. automatic washers, or black-and-white TVs vs. color TVs—low-income

TABLE 42
MAJOR APPLIANCES POSSESSED BY LOW-INCOME HOUSEHOLDS
IN THE U.S. COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of All Households)			
Central air conditioning	6%	23%	43%
Window air conditioning	20	40	32
Automatic washing machine	47	85	91
Wringer washing machine	15	4	3
Automatic dishwasher	5	35	70
Separate food freezer	26	49	53
Gas clothes dryer	8	25	34
Electric clothes dryer	21	46	51
Gas range or stove	66	49	42
Electric range or stove	33	52	61
Electric refrigerator	98	99	99
(Frost free)	(33)	(67)	(82)
(Requires defrosting)	(64)	(31)	(17)
Gas refrigerator	1	1	1
Black and White TV	70	57	63
Color TV	35	78	84

NOTE: Detail will not add to 100 percent because of multiple responses.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

households were more likely to have the less costly and more energy-conserving type.

Thus, in short, even the lowest-income group of households in America are doubtless much better off than their counterparts in most other nations with respect to possession of appliances which make life more pleasant and often conserve on human energy—while at the same time using other forms of energy that must be purchased. But some of these appliances have become so much a part of the generally-accepted “American way of life” that they are not usually viewed as luxuries. It might well come as a surprise to many Americans with uppermiddle and high-incomes that many of the conveniences they take for granted are found in the homes of only a minor fraction of their compatriots of the lowest income levels. Many may be owned by elderly households who acquired them earlier, before their incomes were reduced.

Some appliances, however, are nearly universal. Almost every American home now has an electric refrigerator. The overall proportion having refrigerators is almost identical for poor and for higher-income households. Refrigerators in poor homes usually require defrosting, however—whereas higher income families more often have the convenience (and also the higher energy costs) of frost-free units. Cook stoves are almost universally found in American homes, with gas ranges being more common among the poor and electric ranges more common among those with higher incomes. Since gas is cheaper, this helps to hold down low-income households' energy expenditures. On the other hand, it may make them more vulnerable to future curtailments. Most homes also have at least one television. For poor households, it is most likely to be a black and white set, while better-off households more often have a color TV.

With the possible exception of television, all of these items are now considered virtual necessities for any American home—almost as necessary as food, clothing, and basic shelter. Other cultures have managed to get along without them, of course; but Americans of every income level have become so accustomed to them that they would probably give them up only with great difficulty, if at all. Living and working patterns have become adapted to them.

Alternatives—like the once-ubiquitous iceman—have often disappeared. Frozen foods have become widely adopted. Corner grocery stores, in which food supplies could be purchased daily, have been replaced by supermarkets in many areas—to the point where many inner-city residents face difficulty obtaining food within reasonable walking distance of their homes. These changes have been widespread, gradual, and often subtle—but they add up to patterns which would make it very hard to return to the simpler and less energy-consuming ways of earlier years.

Among other major appliances found in the home, poor and near-poor households are much less likely to possess them than households with more money to spend. Even so, many of these are by no means unknown in their homes. Nearly half of all low-income households reported that they owned an automatic washing machine in 1975. However, 15 percent said they used a wringer-type washer while at least 38 percent did not report having a washer of any kind. Among households of higher income levels, automatic washers were the almost invariable rule. About a fourth of low-income households reported using an air conditioner (usually a window unit). About the same proportion reported a separate food freezer and a clothes dryer. Again, the proportions were much larger at higher income levels—reaching a majority among those with incomes of \$25,000 or more.

Automatic dishwashers—a decided convenience but certainly not a necessity—were found in only five percent of low-income dwellings but were in the possession of 35 percent of households with upper-middle-incomes and 70 percent of those at the \$25,000-and-over level. This appliance is the most income-sensitive of all those for which we obtained data. This fact seems to confirm our earlier observation that possession of some appliances is virtually forced upon most households by the society. One can hardly manage without a refrigerator in an era when supermarkets are the rule and icemen have almost vanished. Yet one can always wash the dishes by hand.

Changes in Energy-Conserving Behavior

The households questioned in the 1975 survey were asked whether they had recently changed their behavior in a number of specific ways which could conserve energy. The answers of low-income, higher-income (defined here as households with incomes of \$20,500 or more), and all households to key questions relating to energy conservation within the home are shown in Table 43.

Almost without exception, more higher-income households reported that they had “definitely done” the things suggested in the questions. In most instances, however, whether or not they had done so probably was related as much to opportunity as to motivation. For example, 49 percent of higher-income households reported that they had “changed or cleaned furnace filters more frequently,” compared to only 16 percent of low-income households. Many more low-income households, however, were apartment dwellers, and thus not in a position to change the furnace filter. In addition, filters cost money although they are not usually very expensive. Many others did not have central heat; and a good number still used heating devices made long before furnace filters were in general use.

We have already discussed dwelling temperatures. Thus, it is not surprising that only 44 percent of low-income households reported that they had “reduced heating or turned down thermostats,” compared to 75 percent of higher-income households.

The income differentials for other types of energy-conserving behavior were generally much smaller. About 30 percent of both groups reported that they “used major appliances like washers less often”; the difference of only one percentage point is well within the range of sampling variability. Somewhat fewer low-income households reported that they “tried to use less hot water,” but the difference of four percentage points is a minor one and may be related to the higher proportion who rent their dwellings. Similarly, more low-income households reported that they had “replaced light bulbs with smaller bulbs,” but by a margin of only three percentage points. The proportion of low-income households who said that they “tried to turn off lights when not needed” was smaller by six percentage points—but low-in-

TABLE 43
RECENT CHANGES REPORTED IN ENERGY USE IN THE HOME
BY LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED
TO HIGHER-INCOME AND TOTAL HOUSEHOLDS, 1975

	INCOME		
	Low-Income	Higher-Income	Total Households
(Percent of Households Reporting “Definitely Have Done This”)			
Reduced heating or turned down thermostats	44%	75%	61%
Changed or cleaned furnace filters more frequently	16	49	34
Used major appliances like washers less often	29	30	30
Tried to use less hot water for washing clothes or other household purposes	42	46	44
Replaced light bulbs with smaller bulbs	38	35	36
Tried to turn off lights when not needed	78	84	81

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

come households have fewer lights to turn off. Judging by the relative size of their electric bills, they did not often use them unnecessarily even in 1973.

In short, higher-income households appear to have changed their behavior somewhat more often in the interest of conservation, probably because they had much more margin to conserve. At all income levels, moreover, the relative frequency of various types of conservation related behavior appears to have been related more to the comparative ease of the behavior in question than to other factors. For example, turning off unneeded lights requires little effort or inconvenience, and involves no cash outlay. It was by far the most frequently reported kind of conservation behavior within the home, regardless of income. Turning down the heat ranked second; again, this is a relatively easy action to take, and will result in a visible cost-saving. Replacing furnace filters costs money and takes more effort, however. Using washing machines less, or using less hot water, involves no out-of-pocket cost; but it does involve a change in lifestyles that is of some importance in a nation attuned to high standards of personal cleanliness.

V. HOW LOW-INCOME PEOPLE USE ENERGY IN PERSONAL TRAVEL

Almost half of all energy consumed in the United States for personal needs is used for transportation. And most of the transportation is via automobile.¹³ Today, about six out of every seven American households own at least one auto, and almost half have two or more at their disposal. For many American households, these cars are a necessity rather than a luxury. It is virtually impossible for them to get from home to any location farther than walking distance except by car. Public transportation is often non-existent, inconvenient, or expensive. It is used infrequently, if at all, by most Americans.

Automobiles come in a variety of sizes and types, with seemingly inexhaustible options for comfort, convenience, and style. The most commonly owned auto in the United States is the so-called "standard" model—in recent years, bearing such names as Chevrolet Impala, Plymouth Fury, and Ford Galaxie, to name a few of the more popular cars. The second most common is the slightly-smaller "intermediate" type, such as Chevrolet Chevelle, Dodge Charger or Ford Falcon. Both luxury cars and economy models are much less popular among auto owners in the United States.

Automobiles are used by Americans for a variety of purposes—commuting to work, doing the family shopping, for recreation and social occasions, and for many other travel needs. But commuting and shopping take up a large proportion of the mileage. According to estimates derived from responses to the Washington Center's 1975 survey, more than half of all American households owning cars drive more than 10,000 miles a year. Most of this mileage is piled up in local trips, rather than by long-distance travel. Public transit, when it is used at all for local travel, is most often used for shopping expeditions.

Car Ownership in Low-Income Households

Despite the almost universal acceptance of the automobile as a way of life in the United States, nearly half of all low-income households did not own a car at all in 1975. This compared with only about three percent of middle-income households who were carless. And for all practical purposes, there is no such thing as a high-income American household which does not own at least one automobile. The vast majority have two or more. Only 15 percent of low-income households in the Washington Center's 1975 survey said they had access to two or more cars. In the upper-middle- and high-income groups more than this proportion owned at least three automobiles.

In part, the relatively lower level of car ownership among low-income households reflects not only their poverty but the fact that many are central-city residents where public transportation is likely to be somewhat more accessible than in suburban communities or in places completely outside metropolitan areas. An estimated two-thirds of low-income American households residing within central cities do not own a car, compared with only about one-fourth of those outside the cities in suburban rings. However, there is also a sizeable minority—about 40 percent—liv-

¹³ According to a recent report prepared by a distinguished committee for the National Academy of Sciences, well over half of all energy consumed in transporting persons and goods in the United States is used for transporting persons in their own cars. See "Interim Report of the Committee on Energy Consumption Measurement." Report to the Assembly of Behavioral and Social Sciences, National Research Council. National Academy of Sciences, Washington, D.C., 1976.

TABLE 44

NUMBER OF AUTOS IN LOW-INCOME HOUSEHOLDS IN
THE U.S. COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of All Households)			
All Households	100%	100%	100%
No autos	48	3	*
One auto	37	28	14
Two autos	13	52	57
Three autos or more	2	17	29

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

ing outside metropolitan areas altogether who do not own an automobile. How this latter group manages to get around is something of a mystery since ownership of an auto was broad enough in the Washington Center's survey to include pickup trucks, vans, and similar vehicles. Even where one's work place is the same as one's residence or within easy walking distance, shopping close to home is not always possible in small towns and rural areas. Nor is a visit to the doctor, or attendance at worship services, or simply a social evening with friends or relatives. Some of these households without cars are probably elderly persons or couples who are no longer able to drive or afford even an old car, but can rely on younger relatives or neighbors for meeting most of their transportation needs. Many, however, probably do without when a helpful relative or neighbor is not available. At the other extreme, nearly one-fifth of low-income households living outside metropolitan areas own two or more cars; the proportion in the suburbs is even higher—about one-fourth.

TABLE 45

NUMBER OF AUTOS IN LOW-INCOME HOUSEHOLDS
BY TYPE OF COMMUNITY, 1975

Number of Autos	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs Metropolitan Areas	Outside Metropolitan Areas
(Percent of All Households)			
All Low-Income Households	100%	100%	100%
No autos	67	28	39
One auto	26	46	42
Two autos	7	21	15
Three autos or more	*	5	3

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

There are also variations in car ownership among low-income households, depending on the region of the country in which they reside. Generally as one moves from east to west across the United States, car ownership increases. The same is true of movement from north to south. The proportion of multiple-car households also increases somewhat with westward and southward movement.

TABLE 46
NUMBER OF AUTOS IN LOW-INCOME HOUSEHOLDS
BY REGION, 1975

Number of Autos	REGION				
	West	North Central	South Central	South Atlantic	North East
	(Percent of All Households)				
All Low-Income Households	100%	100%	100%	100%	100%
No autos	36	48	41	52	58
One auto	47	34	43	32	31
Two autos	16	14	14	13	10
Three autos or more	1	4	2	3	1

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Both of these directions of increased car ownership correspond, of course, with a generally lower availability of public transit even in large cities and with more recent development, much of it since the start of the “automobile age.” In the West, for example, little more than a third of low-income households report that they do not own an automobile, compared to well over half of the poor and near-poor of the Northeast region. On the other hand, 17 percent in the West own two or more cars, compared with only 11 percent in the Northeast. In the North Central states, 48 percent of low-income households do not own a car, compared to 41 percent in the South Central part of the country.

Types of Autos Owned by Low-Income Households

While low-income American households are less likely than those with higher incomes to have more than one auto on the road, the cars they do own are of similar model type. In other words, low-income households are just about as likely to own so-called “standard” or “intermediate” models as are upper-middle- and high-income households. Since a majority of poor households with cars have only one, these must serve as “family” transportation as well as for meeting all other needs of individual household members, such as commuting. Low-income households are somewhat less likely than those with higher incomes to own **either** luxury models or small economy cars. On the other hand, a substantial minority of both low-income and upper-middle-income households own vehicles in the “other” category, which includes pickup trucks, vans, motor homes, and the like. (See Table 47.)

Despite the similarity of the distributions for the three income groups, there is little chance that they reflect either a similarity in tastes for certain sizes and types of cars, or a similarity in the way the cars are used, or the amount of usage they are given. The distributions also do not reflect similarity in fuel consumed, either in terms of miles driven per gallon or gallons of gas used in the course of a year. In most households—low-income and higher-income alike—the intermediate or standard model is probably most often the “family car.” In poor households, however, it usually serves all other travel purposes as well. In better-off homes, on the other hand,

TABLE 47

TYPES OF AUTOS¹⁴ OWNED BY LOW-INCOME HOUSEHOLDS
IN THE U.S. COMPARED TO UPPER-MIDDLE AND
HIGH-INCOME HOUSEHOLDS, 1975

Types of Autos	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of All Cars)		
All Cars in Household Combined	100%	100%	100%
Subcompact	7	10	10
Compact	15	17	17
Intermediate	19	20	17
Standard	29	28	29
Luxury	4	4	10
Other	15	16	10
Unknown	11	5	7

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

an “economy” model may also be acquired for father or mother's daily commute to work, for one individual's shopping trips, or for a child's travel to high school or college.

Vehicles in the “other” category may also be utilized by low-income households for multiple purposes. A pickup truck may not only take the family on outings; it may also be used to carry tools and supplies needed on the job. A motor van can serve as a more-or-less permanent place to live, as well as a means of getting from one location to another. These multiple uses of vans and pickups may be fairly common in small towns and rural areas where almost one out of five cars owned by low-income families was classified as “other.” The proportion was almost as high in the suburbs of metropolitan areas where low-income residents often live in outlying communities which are still essentially rural in character.

Almost three-fourths of all vehicles owned by low-income households were reported to be acquired secondhand, compared to about half the cars owned by upper-middle-income households and only a third of those in high-income households. Small wonder, then, that the model types are similar. By the same token, the trends in car ownership patterns of low-income households will tend to lag behind those of higher-income households by a few years.

For example, small cars are still relatively new in America. Thus, they are less often available in the used-car market. In addition, cars of the same model type have tended to be laden with more and more energy-consuming features such as air conditioning, automatic transmission, and pollution controls. Thus, the typical older car now owned by a low-income American household will often get higher gas mileage than a newer car of the same model type owned by a higher-income household. However, as more recent cars are “traded down” to low-income households, the gas consumed per mile of driving among this group is likely to rise. If small cars become more popular with higher-income owners, this trend will also be reflected among the low-income—but a few years later.

¹⁴ These types are based on a classification scheme which takes into account make, model, and year. The interview schedule used by the Washington Center in 1975 asked only for make, model, and year; classification was then made separately in the coding process. In 1973, households were asked to classify their autos by type themselves, but many were unable to do so. Even in the more-careful 1975 survey, a substantial proportion of low-income respondents could not furnish all the requested information needed for classification. Since many of them had acquired used cars, the missing information was most often the model year.

TABLE 48

TYPES OF AUTOS OWNED BY LOW-INCOME
HOUSEHOLDS IN THE U.S. BY TYPE OF
COMMUNITY, 1975

Types of Autos	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
(Percent of All Cars)			
All Cars in Low-Income Households Combined	100%	100%	100%
Subcompact	9	9	5
Compact	19	15	13
Intermediate	15	19	21
Standard	37	28	26
Luxury	6	4	2
Other	7	17	18
Unknown	8	9	15

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975

Fuel Consumption in Cars Owned by Poor Households

Some of our speculation about car models and fuel consumption can be examined in terms of the estimates which the surveyed households were asked to make about the gas performance they get from their cars, and the number of miles which they drive in the course of a year. In general, low-income households report that they get better gas mileage from their cars than do higher-income households although they usually own cars of similar model type. They also say they drive many fewer miles annually.

Our figures in this section should be viewed with appropriate caution. To obtain the most reliable data possible, it would be necessary to check actual odometer readings and gasoline purchases for a number of automobiles over a reasonable period of time and under varying driving conditions.¹⁵ It was not possible to do this in the Washington Center's two household surveys, in light of overall cost limitations as well as requirements to obtain many other kinds of survey data about household use of energy. Instead, respondent households were asked to estimate the miles each of their cars covered during the year preceding the survey and the number of miles each car usually goes on a gallon of gas for local and long-distance driving. There were a number of households in all income categories who could not or would not furnish these estimates.

Despite the considerable margin for error in the figures to be cited below, however, there are unlikely to be any massive biases in the estimates which could lead to erroneous conclusions about the relative behavior of various population groups and the cars they drive. Our principal caveat to the reader is to treat these figures as rough approximations of what "harder" data would be likely to reveal.

¹⁵ See Cheslow, Melvyn D. "Useful Information for Estimating the Transportation Impacts of Gasoline Price Increases." Working Paper 1216-6. The Urban Institute, Washington, D.C. March 1976. Cheslow found two studies in which odometer readings were measured—one by the New York State Department of Motor Vehicles in 1971 and the other by the University of North Carolina Highway Safety Research Center in 1968. Even this seemingly "objective" method, however, did not always produce closely similar results.

Mileage Driven

Low-income households with cars say they drive many fewer miles during the course of a year than do households with more money to spend. Nearly half of the low-income households responding to the question about miles driven estimate that they drive **all cars in their household combined** a total of less than 5,000 miles a year (or less than 100 miles per week). This estimate compares to 10 percent of those with upper-middle-range incomes and four percent of those with high incomes. Less than one in ten low-income households report driving 20,000 miles annually, but this is typical annual mileage for many high-income households. Thus, not only do many fewer poor and near-poor families own an automobile at all, but those who do usually drive much less often and/or shorter distances than higher-income households.

The difference in reported annual mileage reflects in part the smaller number of cars per household unit among those in the lowest income group. It also reflects differences in how these households use their cars. Well over half, or 55 percent, of the automobiles owned by low-income households in 1975 were **never** used for long distance travel. This compared with 42 percent of cars owned by households in the upper-middle-income category, and 40 percent of cars owned by high-income families.

In addition, the poor are less likely than higher-income households to use an automobile **principally** for commuting purposes or for driving on the job—a function usually requiring daily use of an auto. In the Washington Center's 1975 survey, only 41 percent of cars owned by low-income households were reported to be used principally for commuting to work and five percent for driving on the job. Among cars owned by upper-middle-income households, on the other hand, 56 percent were used principally for commuting and nine percent for driving on the job. On the other hand, a higher proportion of low-income households reported shopping—a task which can be accomplished once or twice weekly, or even less often—as a principal use. Recreation and social uses were about as common among all income groups, but these activities can be undertaken either frequently or seldom.

These differences in principal auto usage are not surprising, given the concentrations of low-income households in certain types of locations and among certain segments of the population. Poor

TABLE 49

ANNUAL MILES DRIVEN AS ESTIMATED BY LOW-INCOME HOUSEHOLDS
WITH CARS IN THE U.S. COMPARED TO UPPER-MIDDLE
AND HIGH-INCOME HOUSEHOLDS, 1975

Annual Miles Driven	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of Households reporting miles driven)			
All Cars in Household Combined	100%	100%	100%
Less than 5,000 miles	46	10	4
5,000 - 9,999 miles	21	21	17
10,000- 14,999 miles	13	20	13
15,000- 19,999 miles	11	17	21
20,000 - 24,999 miles	4	11	16
25,000 - 34,999 miles	4	15	20
35,000 - 49,999 miles	1	5	6
50,000 miles or more	*	10	3

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

TABLE 50

PRINCIPAL USES OF AUTOS OWNED BY LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO UPPER-MIDDLE
AND HIGH-INCOME HOUSEHOLDS, 1975

Principal Uses of Autos	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of all cars combined)			
Commuting to work	41%	56%	49%
Driving on the job	5	9	13
Shopping	36	25	26
School	10	9	11
Recreation/social	21	21	24
Other	10	4	3

NOTE: Percentages may add to more than 100 percent since some respondents cited more than one principal use for a car.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use,

and near-poor households in the United States reside in disproportionate numbers both in central cities (where some form of public transit is more likely to be available than outside the city) and in non-metropolitan areas (where many jobs are either at home or within walking distance). In either case, a car may not be essential for getting to work. Indeed, the Washington Center's survey found that more than 10 percent of employed persons in low-income central city households reported using public transit for commuting; and about one-fifth of employed poor outside metropolitan areas either walked or bicycled to work. Both modes of transportation were seldom used in the suburbs.

TABLE 51

MEANS OF COMMUTING TO WORK REPORTED BY EMPLOYED PERSONS IN
LOW-INCOME HOUSEHOLDS BY TYPE OF COMMUNITY, 1975

Means of Commuting	TYPE OF COMMUNITY		
	In Central Cities	In Suburbs of Metropolitan Areas	Outside Metropolitan Areas
(Percent of Employed Persons)			
Total Employed Household Heads and Spouses	100%	100%	100%
Use automobile	77	88	81
Use public transit	11	8	*
Walk or use bicycle	12	4	19

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies, National Survey of Household Energy Use, 1975.

In addition to the factor of location is the relatively lower participation in the labor force by members of low-income households. Many cannot use their autos for commuting to work because they have no work. As already noted in Chapter I, households headed by elderly persons or by women are disproportionately represented among low-income units; and both groups are less likely to be employed or able to work than young or middle-aged men.

Finally, there is the greater number of uses to which the single auto typically owned by a low-income household must be put. The middle- or high-income husband who drives his own car to work each day will not leave the rest of the family bereft of transportation to their own jobs and for shopping or other uses when the household has two or more vehicles at its disposal.

Gas Mileage

Although their cars are often of the same model types as those owned by upper-middle and high-income households, low-income households on the average report getting better gas mileage (i.e., miles driven per gallon of gas) from their cars. As already noted, their cars are usually of an earlier vintage since they are usually acquired used. Thus, they are often lighter in weight, have fewer extras, and are less likely to have economy-reducing pollution controls. Almost two-thirds of all cars owned by high-income households estimating gas mileage are said by their owners to get less than 15 miles per gallon of gas in local driving. Only 40 percent of cars owned by low-income households are reported to perform this poorly in terms of gas mileage. Among those cars which are used for long distance trips, where gas performance is usually much better than in the "stop-and-go" driving of cities and towns, there is still a large difference between cars owned by poor households and those belonging to those with higher incomes. Only 13 percent are said by their low-income owners to get less than 15 miles per gallon of gas, compared to 28 percent for cars used by high-income households in travelling long distances.

TABLE 52

GAS MILEAGE AS ESTIMATED FOR CARS OWNED BY LOW-INCOME
HOUSEHOLDS IN THE U.S. COMPARED TO CARS OWNED BY
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

Miles per Gallon	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of All Cars)			
<u>Total Cars With Gas Mileage Reported for Local Driving</u>	100%	100%	100%
Less than 15 MPG	40	51	63
15-19MPG	41	34	23
20 MPG or more	19	15	15
<u>Total Cars With Gas Mileage Reported for Long Distance Driving</u>	100%	100%	100%
Less than 15 MPG	13	20	28
15 - 19 MPG	48	52	47
20 MPG or more	39	28	25

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Gas Consumption

What do all of these estimates of miles driven and gas performance add up to in terms of the actual volume of fuel consumed by the autos of low-income Americans? On this score, our figures must be even rougher than those above, which were based on estimates of a single variable by the respondent households. To derive an estimate of the volume of gasoline used it was necessary to know for each auto both its gas performance and the distance it had been driven during the past 12-month period. Since we used gas mileage in local driving only, the estimates must overstate somewhat the annual consumption. Nevertheless, they are adequate to show the overall dimensions of gasoline usage by various types of American households and to point up major differences among these groups.

Even with our caveats, it is abundantly clear that low-income households consume far less fuel in their cars over the course of a year than do those who are better-off. According to our method of estimating total gasoline consumption, two-thirds of households in the lowest fifth of the income distribution used less than 500 gallons of gas during the year preceding the Washington Center's 1975 survey. Only about 17 percent used 1,000 or more gallons of gas. By contrast, well over half of households in the highest income category consumed 1,000 gallons or more of fuel in their cars; almost a fourth used 2,000 gallons or more. Households in the upper-middle income range used much more gas on the average than poor households, but less than those in the high-income bracket.

These distributions, of course, include only households which own automobiles. If we added in that proportion of households in each income group who do not own a car at all, it would be even more apparent that higher-income Americans consume far more than their proportionate share of the gasoline used in this country for personal automobile travel. By our calculations, the highest income group examined in our study—households with incomes of \$25,000 or more annually—comprise roughly the top 10 percent of the population in annual income but consume in their cars roughly 17 percent of all gasoline sold for personal use. Those with low incomes as defined in our study, who comprise roughly the lowest fifth in terms of income, used approximately eight percent of the gasoline sold for personal travel during the year prior to the Washington Center's 1975 survey.

TABLE 53

ESTIMATED ANNUAL GAS CONSUMPTION FOR LOW-INCOME HOUSEHOLDS WITH CARS IN THE U.S. COMPARED TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

Gallons of Gas Used	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of Households With Cars for Which Estimates Could be Made)			
Total Households With Cars For Whom Gas Estimates Made	100%	100%	100%
Less than 500 gallons	66	18	19
500 - 999 gallons	17	29	21
1,000 - 1,999 gallons	14	32	38
2,000 - 3,999 gallons	3	10	20
4,000 gallons or more	*	1	3

* Less than one percent.

NOTE: Estimates were derived as follows: Miles traveled in past 12 months divided by miles per gallon used locally summed over all cars in the household.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Public Transit Use by Low-Income Households

The principal alternative to local automobile use in the United States, except for walking or cycling, is public transit—usually bus, streetcar or subway. A well-run and a well-used system of local transit could mean a substantial aggregate reduction in energy consumption for personal travel in the locality where it exists. Yet, like the rest of the American population, members of low-income households seldom use public transportation in their daily lives. We estimate that in more than three-quarters of all U. S. households (77 percent), no person had used public transit **for any purpose** during the month preceding the 1975 survey interview. Among low-income households, transit usership was not quite as low. Still, an estimated two-thirds, or 67 percent, had not used transit during the month before the survey. An estimated 82 percent of upper-middle-income households had not used public transportation, and 78 percent of high-income households.

In many cases, these households could not have used a public bus, streetcar, or subway, even had they wanted to—either because the service did not exist in their locality or it did not go where members of the household needed to go. In many cases, the cost of transit at the present time may even be higher than the cost of using one's own car. However, this situation would change if the prices of automobiles and gasoline rose in the future at a faster rate than public transit fares.

Among households at all income levels which do utilize public transit, commuting to work via this mode of travel **increases** as income level rises. Use of transit for all other activities, except going to school, has an inverse relationship to income. To illustrate: among those low-income households where one or more members had used a bus or other mode of public transportation during the month preceding the Washington Center's survey, only 13 percent reported that it was used to get to work. Among transit-user households with incomes of \$25,000 or more, almost half had used it for commuting. On the other hand, most low-income users of public transit used it for shopping expeditions; 84 percent reported this use. Many also used transit for getting to the doctor or dentist—62 percent of the rider households—and for visiting or other social activities—50 percent. Public transit was used much less often for these purposes by the higher-income groups.

Some of these differences may seem surprising, especially in the use of transit for commuting. However, they suggest that higher-income households may use public transit when it is convenient to do so—that is, where a transit system exists, and when they go to the same location on a regular basis and are not burdened with packages, illness, and the like. In these cases, the well-to do use

TABLE 54

USES OF PUBLIC TRANSIT BY LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED TO UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, 1975

Uses of Public Transit	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
(Percent of all households reporting public transit use)			
Head or spouse going to work	13%	31%	48%
Shopping	84	50	33
Visiting doctor or dentist	62	35	15
Visiting friends, relatives or for other social activities	50	39	32
Going to a religious service	20	11	11
Going to school	20	35	19

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

their cars. Members of poor households, on the other hand, are less likely to have jobs to commute to. They are also less likely to own an automobile which they can use as an alternative when greater convenience in travel may be needed.

Recent Changes in Transportation Behavior Among Low-Income Households

Many American households stated in 1975 that they had recently begun to take steps to reduce their use of energy in transportation as well as in the home. Over half, for example, said they were driving more slowly—a tactic mandated by law for many—in order to save gasoline. A substantial number claimed that they were driving less often or going shorter distances. And some reported that they were making more use of cars that get good gas mileage rather than the big “gas guzzlers” they had enjoyed before. Only a few had switched to public transportation or car-pooling, however, as a means of getting to work or school. (Table 55.)

Not unexpectedly, fewer low-income than higher-income households usually said they had taken these fuel-saving measures. Since they owned fewer automobiles to begin with, and drove them fewer miles, options involving car use were less often available to them.

What are the actual facts behind these statements of increased “gas conservation consciousness” expressed by such a substantial proportion of the American population, including its low-income households? Certainly they reflect awareness that energy-saving is considered desirable. But do they translate into fewer autos per American household, smaller and more economical cars, fewer miles driven, shorter trips taken, and most important, less fuel consumed? From a comparison of the Washington Center's 1975 survey data with the data collected in 1973, it appears that there have been some sporadic efforts at savings among both low- and high-income groups, as well as by the population generally. However, these savings have had very little effect on miles driven or the volume of gas consumed per household unit and in the aggregate. Low-income households may have reduced driving a little bit more than higher income groups in response to higher auto and gas prices, but not by a great deal.

TABLE 55
RECENT CHANGES REPORTED IN ENERGY USE FOR PERSONAL
TRANSPORTATION BY LOW-INCOME HOUSEHOLDS IN THE U.S.
COMPARED TO HIGHER-INCOME AND TOTAL HOUSEHOLDS, 1975

	INCOME		
	Low Income	\$14,000- \$20,500	\$25,000 or More
	(Percent of households reporting “definitely have done this”)		
Have driven slower to save gas	32%	67%	53%
Make more use of car that gets good gas mileage	27	42	39
Shopped less often or closer to home	47	50	48
Driven less to places of recreation	28	37	38
Taken fewer Sunday drives or other drives for pleasure	29	46	41
Visited friends or relatives less often	33	31	33
Taken fewer or shorter vacation trips	33	43	41
Used public transportation or car-pooling more in traveling to work or school	16	15	15

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Auto Ownership

There was virtually no change in auto ownership among low-income households in the two-year period from 1973 to 1975. In both years, nearly half of all poor Americans did not own a car at all, and only a small proportion owned more than one. Among higher-income households, multiple car ownership increased during the two-year period; for the approximately top 20 percent of the population in terms of income, the proportion with more than one automobile rose from 79 percent to 84 percent.

TABLE 56

CHANGE IN NUMBER OF AUTOS IN LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED TO HIGHER-INCOME AND TOTAL HOUSEHOLDS, 1973-1975

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
(Percent of All Households)						
All Households	100%	100%	100%	100%	100%	100%
No autos	48	47	"	1	16	16
One auto	37	37	16	21	36	40
Two autos	13	14	58	58	37	34
Three autos or more	2	2	26	21	11	10

* Less than one percent

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975

Miles Driven Annually

Low-income households continued to drive many fewer miles annually on the average than those with higher incomes. Still, they reported driving more miles per year in 1975 than in 1973. An estimated 75 percent of low-income households with cars said they had driven all cars in the house-

TABLE 57

CHANGE IN ANNUAL MILES DRIVEN AS ESTIMATED BY LOW-INCOME HOUSEHOLDS WITH CARS IN THE U.S. COMPARED TO HIGHER-INCOME AND TOTAL HOUSEHOLDS, 1973 AND 1975

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
All Households Reporting Mileage	100%	100%	100%	100%	100%	100%
Less than 5,000 miles	46	52	5	14	20	24
5,000 - 9,999 miles	21	23	17	15	23	23
10,000 - 14,999 miles	13	13	15	22	18	19
15,000 - 19,999 miles	11	5	20	21	14	16
20,000 - 24,999 miles	4	3	14	11	9	7
25,000 - 34,999 miles	4	3	21	9	12	8
35,000 - 49,999 miles	1	*	8	5	4	3

50,000 miles or more	*	*	2	2	1	1
* Less than one percent						

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975 and 1973.

hold combined less than 10,000 miles during the year before the 1973 survey was taken; in 1975, 67 percent said they had driven so few miles. In 1973, only six percent of low-income households drove as much as 20,000 miles or more compared to nine percent in 1975.

The amount of driving increased far more for higher-income households, however. In 1973, 29 percent of these households estimated their annual mileage for all cars combined at less than 10,000 miles, but this proportion fell to only 22 percent by 1975. At the other end of the scale, 27 percent of the well-to-do said they put 20,000 miles or more on their cars in 1973, but this proportion rose to almost half—45 percent—by 1975. While drivers in many of these households may, indeed, have been driving more slowly in response to the 55-mile speed limit, they were clearly covering a lot more territory. The small increase for the poor and near-poor may simply have reflected the continued spreading out of jobs and other facilities in many areas, and the necessity of traveling ever-longer distances to reach them. For some high-income households, however, one compromise may have been to shift from long distance vacation trips by plane to shorter-distance vacations by private automobile.

Gas Mileage

Although American households, on the average, increased the number of miles driven annually between 1973 and 1975, they reported a large decline in the proportion of automobiles used for long-distance trips. This decline was reported by households at all income levels combined as well as by both low-income and high-income households. For some households—especially those with only one car—this undoubtedly meant that they cut out long-distance trips altogether. Others who owned two or more cars may have begun to rely on only one—perhaps the one with the best gas performance—for lengthy trips.

For all American households combined, the proportion of automobiles used only for local driving rose from 14 percent of the total in 1973 to almost half, or 44 percent, in 1975. The

TABLE 58

CHANGE IN GAS MILEAGE AS ESTIMATED FOR CARS
OWNED BY LOW-INCOME HOUSEHOLDS IN THE U.S. COMPARED
TO HIGHER-INCOME AND TOTAL HOUSEHOLDS, 1973 AND 1975

	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
(Percent of All Cars)						
Total Cars With Gas Mileage Reported in Local Driving	100%	100%	100%	100%	100%	100%
Less than 15 MPG	40	27	60	59	52	53
15-19 MPG	41	51	24	27	33	32
20 MPG or More	19	22	15	15	15	15
Total Cars With Gas Mileage Reported for Long Distance Driving	100%	100%	100%	100%	100%	100%
Less than 15 MPG	13	16	25	31	20	26
15-19 MPG	48	51	50	46	51	49
20 MPG or More	39	33	26	23	30	25
Total Cars Used Only for Local Driving	55	26	38	13	44	14

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

change was considerably greater for automobiles owned by higher-income households than for cars in households which were poor. Still, the percentage of automobiles used only for local trips remained much higher among the poor. In 1975, poor households reported that well over half—55 percent—of the cars they owned were restricted to local trips. Since most poor Americans who were car owners in 1975 had only one car per household, many were undoubtedly no longer making trips to other cities or states.

For households with higher incomes, long-distance travel may have been reduced some what in the aggregate, but many of these households may also have begun to use only one car for out-of-town trips—possibly the one which used the lowest volume of gasoline per mile traveled.

The suggestion that some households with more than one car may have begun using a car with better gas performance for their long-distance trips is supported by Table 58 above. However, the table does not support the notion that many Americans were putting a higher premium on gas economy for their local travel. For all American households combined and for higher-income households, there was very little change in the gas performance reported between 1973 and 1975 for the cars they used in local driving. For low-income households, the proportion of high gas-consuming automobiles used for local trips increased substantially—from 27 percent of all automobiles owned by the poorest fifth of the population in 1973 to 40 percent in 1975. Rather than reflecting a greater interest in large cars among the poor, this increase probably was due to the fact that low-income households usually acquire used cars, and relatively few of the second-hand cars on the market from 1973 to 1975 were economy models. In addition, cars traded in during this period contained more energy-consuming amenities and pollution controls than those a few years older.

Among automobiles used for long-distance travel, on the other hand, there was a decline for all income groups between 1973 and 1975 in the proportion which were reported to get less than 15 miles per gallon of gas, and an increase in the proportion getting 20 miles to the gallon or better.

Gas Consumption

These reported changes in automobile usage—more mileage driven annually, fewer cars used for long-distance travel, and some limited switching to better-performing cars for certain kinds of travel—add up to very little change in the estimated average consumption of auto fuel per American household between the two survey years of 1973 and 1975. According to figures derived from the Washington Center's two national surveys, the proportion of all households consuming less than 500 gallons of gas per year in all automobiles owned combined increased somewhat from 35 percent to 39 percent; but the proportion consuming 2,000 gallons or more per year remained the same—10 percent.

For low-income households, the proportions using either relatively little gas or a great deal remained exactly the same—an estimated 66 percent consuming less than 500 gallons of gas yearly, and less than four percent consuming 2,000 gallons or more. Higher-income households not only did not reduce their consumption of gas, on the average, but instead the estimates indicate an increase in consumption. The proportion of higher-income households who were estimated to consume less than 500 gallons of gas per year fell slightly from 22 percent in 1973 to 20 percent in 1975. But at the other end of the scale, the proportion using 2,000 gallons or more grew from 16 percent to 20 percent in the two-year period.

Problems Due to Lack of Transportation

Most Americans do not state that lack of transportation presents them with serious problems. Problems from this source were reported by only 11 percent of all U.S. households in 1975. Yet for low-income Americans, the percentage—while still a minority—increases to substantial levels. About one-fourth of all low-income households reported in 1975 that they had encountered some problems due to lack of transportation in the past year, compared to only six

TABLE 59

CHANGE IN ANNUAL GAS CONSUMPTION FOR LOW-INCOME HOUSEHOLDS WITH
CARS IN THE U.S. COMPARED TO HIGHER-INCOME

AND TOTAL HOUSEHOLDS, 1973 AND 1975

Gallons of Gas Used	INCOME					
	Low-Income		Higher-Income		Total	
	1975	1973	1975	1973	1975	1973
(Percent of Households with Cars for Which Estimates Could be Made)						
Total Households with Cars for Whom Gas Estimates Made	100%	100%	100%	100%	100%	100%
Less than 500 gallons	66	66	20	22	39	35
500 - 999 gallons	17	20	22	23	25	26
1,000 - 1,999 gallons	14	11	38	39	26	30
2,000 - 3,999 gallons	3	3	18	13	9	9
4,000 gallons or more	*	*	2	3	1	1

* Less than one percent.

SOURCE: Washington Center for Metropolitan Studies. National Surveys of Household Energy Use, 1975 and 1973.

percent among upper-middle income households and a virtually insignificant two percent of higher-income households (Table 60).

These problems were often of a serious nature. For example, 12 percent of low-income households reported being unable to get to a doctor or dentist; six percent said they had not been able to apply for a particular job; and nine percent stated they had not been able to take a particular job. Fourteen percent said that lack of transportation had prevented them from shop-

TABLE 60

FREQUENCY OF PROBLEMS CAUSED BY LACK OF TRANSPORTATION
REPORTED BY LOW-INCOME HOUSEHOLDS COMPARED TO
UPPER-MIDDLE AND HIGH-INCOME HOUSEHOLDS, U.S. 1975

	INCOME		
	Low Income	\$14,000-\$20,500	\$25,000 or More
All Households	100%	100%	100%
No Problems in Past Year	76	94	97
Some Problems in Past Year	24	6	2
Unable to:*			
Go to Doctor or Dentist	12	3	0
Apply for a Particular Job	6	1	1
Take a Particular Job	9	2	1
Shop at Less Expensive Stores	14	3	1
Visit Friends and Relatives	13	2	1
Attend a Religious Service	7	1	0

* Specific problems do not add to total because many households had more than one.

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

ping at less expensive stores—thus adding further economic burdens to those presented by the rising cost of energy and other essentials of living.

The fact that lack of transportation did not create more problems for low-income households can probably be attributed in part to the fact that a slight majority have cars at their disposal. Others have probably worked out arrangements for obtaining needed transportation from friends, relatives and neighbors.

But many other low-income Americans may have adapted their lifestyles to transportation inadequacies so completely, and over such a long period of time, that they do not even recognize many of the inconveniences they cause. Some of these people may be in the most serious plight of all.

VI. IMPLICATIONS FOR POLICY AND PROGRAMS

In the first chapter of this report, we made the point that low-income Americans are not a unitary group by any means. Quite the contrary, they consist of households with many different kinds of characteristics living in many different kinds of circumstances. About the only thing they have in common is their economic situation. While some types of households are disproportionately represented among Americans of low incomes, no such group can be categorized as **“the poor.”** Nor can they be pigeonholed into one or a few neat classifications. Many other Americans with similar characteristics have higher incomes; and the variations among low-income households are at least as striking as their similarities.

As a result, public policies and programs concerned with energy use and conservation measures among low-income households must deal with them as a group who require several program approaches keyed to a variety of needs and living situations. The most feasible ways for them to conserve energy and to cope with rising energy costs are largely set by these conditions. To overlook this fact will merely be to make the policies and programs less effective, both from the standpoint of overall energy conservation and in terms of meeting the needs of the low-income households themselves.

The purpose of this final chapter is to consider some of the policy implications of the findings presented in earlier sections of the report. In so doing, we shall draw some conclusions about the overall energy situation of low-income households. We shall also consider the differing situations of a few selected groups among these households as a means of illustrating the need for specificity and flexibility in the programs which must be developed to aid them. Our aim is not to try to usurp the authority of Federal officials for policy formulation—which we could not do in any case—but to assist in this difficult task by pointing up key facts with which policies and programs must deal.

The Overall Energy Situation of Low-Income Households

Considered as a group, and with due regard to the wide differences among them, one fact stands out very sharply from the findings of the Washington Center's two national surveys: low-income households consume far less than their proportionate share of U.S. energy supplies. In fact, the roughly 20 percent of American households who fall at or below 125 percent of the Federal poverty line use considerably *less* electricity in the aggregate than the 10 percent with incomes of \$25,000 or more. They consume only slightly more natural gas, the major fuel which is used mainly for home heating and which presents the least room for flexibility in consumption. They also own fewer cars, drive fewer miles, and consume fewer gallons of gasoline than higher-income groups.

Thus, where overall energy conservation is the primary goal of policy, low-income families can do much less than other income groups to aid the nation. Many already hold their consumption down at least as far as they can without risking harm to themselves or expending relatively large sums to change their living situations. On the other hand, where policies concerned with human welfare are involved, the nation can do much to aid its low-income families in coping with the budgetary impact of energy shortages and rising costs. Many low-income households are already spending more than twice the percentage of their household incomes for energy bills as those with incomes of \$25,000 or more—despite their much lower rate of consumption.

Part of the reason is the pricing policies which historically have rewarded larger consumers of energy with considerably lower per-unit costs. These policies are now being challenged as energy has moved from a seemingly surplus commodity to one which is in increasingly scarce supply. Still, those with low incomes continued to pay a somewhat larger average per-unit price for both electricity and natural gas than did all households regardless of income. And, of course, even uniform “flat-rate” pricing would leave low-income families paying a much higher proportion of their budgets for energy than middle- and upper-income Americans. As energy costs continue to rise, the budgetary impact can be expected to grow, and low-income households in particular will increasingly face hard budgetary choices.

These choices will not be like those which higher-income households will face at least in the short run. Some reduction in living standards appears almost inevitable for most Americans. But those who are better off will find that they are increasingly forced to choose between spending for life's conveniences and luxuries and meeting their energy bills. For low-income households, the choices will more often be between necessities: between the gas bill and the doctor, the electric bill and the landlord, the bus or auto to work and the grocer. Many poor households already face these dilemmas regularly. More will probably do so in the future unless public policies come to their aid.

Home Heating as a Central Focus for Energy Programs

Already, low-income households are conserving energy in the home in many ways. They possess many fewer energy-consuming appliances. Those appliances which the majority of low-income households do have in their homes, like refrigerators, can usually be classed as necessities rather than luxuries in today's America. Where an appliance is available in more than one form, low-income families more often possess the kind that is cheaper and uses less energy. And many report taking steps to cut their energy consumption even further. Realistically, however, not much more saving can be achieved in appliance use—either from the standpoint of overall energy conservation or of reducing the impact on individual budgets.

Home heating is clearly another matter. While we cannot separate out heating consumption and costs from other household energy uses in our data from utility billings, it is very likely that low-income households use even more of their total residential energy consumption to heat their homes than the average for all U.S. households. One clue to this is the relationship between natural gas and electricity consumption; low-income households use about 81 percent as much natural gas, on the average, as U.S. households of all income levels, but only 64 percent as much electricity. Since the principal use of gas is for heating, while electricity is used mainly for lighting and appliances, the figures seem to confirm the assumption.

At the present time, many low-income homes are seriously deficient in insulation, storm windows, and other features which conserve energy used for space heating. At the same time, the **average** low-income dwelling is now kept at a somewhat higher temperature than the average higher-income home. However, most of this difference appears to be accounted for by renters, who often cannot control their dwelling temperatures, and by old people, who often need higher temperatures for comfort and health. As noted earlier, draftiness in many poorlyweatherized low-income dwellings may require higher thermostat settings for comfort. Despite the averages, more low-income dwellings than high-income are kept at below-65 temperatures, both day and night.

Comparatively few low-income households report having recently made changes in their dwellings in an effort to conserve energy—changes such as adding insulation, storm doors and windows, and weatherstripping. Only about three percent have added insulation and six percent have added storm doors or windows, compared to 12 percent and 10 percent respectively among households in the upper-middle income range. Yet the latter were already much better equipped with these features when we first surveyed them in 1973. It seems obvious that programs to encourage and aid low-income households in these respects could have high payoff from the standpoint of the families' own welfare—and to a somewhat lesser degree, in terms of reducing the overall amount of heat en-

ergy lost unnecessarily to the outside air. In the long run, they should also help hold down the cost of income maintenance programs.

The magnitude of the weatherization need for low-income dwellings is shown by Table 61. The table shows the estimated number of housing units occupied by low-income households which lack specific kinds of weather protection in the five major regions of the United States, as well as in the U.S. as a whole.

TABLE 61
ESTIMATED NUMBER OF LOW-INCOME DWELLINGS
LACKING WEATHER PROTECTION, BY REGION, 1975

	REGION					
	West	North Central	South Central	South Atlantic	North East	U.S. Total
	(Number x 1,000)					
No Insulation	681	1,224	1,928	1,067	1,127	6,027
No storm doors	1,215	933	2,720	1,111	1,209	7,188
No storm windows	1,422	1,336	3,104	1,326	1,200	8,388
No weatherstripping on doors	963	1,391	2,481	1,212	1,575	7,621
No weatherstripping on windows	1,168	2,297	2,384	1,323	2,199	9,373

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

The figures show that weather protection is least frequent where it usually is least needed—in the relatively warm South Central states. But they also demonstrate that even in the coldest regions of the nation, the North Central and Northeastern states, roughly one million low-income households or more lack each type of weather protection listed.

Transportation as a Focus for Energy Programs

Low-income Americans are faced with the problem of surviving in a society which has become almost totally dependent on personal automobiles—to the point where many of its physical structures have been built around them, and mass transit systems have often been neglected. Only slightly more than half of all low-income households have cars, however, although 84 percent of American households at all income levels possess them. Low-income households make up 58 percent of *all* U.S. households without cars, and most of the rest are in the category of households who have incomes below \$9,000 but whose households are too small to be classified as low-income. Only 12 percent of carless households have incomes above \$9,000.

Low-Income Households with Cars

The cars which most low-income households possess are bought used. As long as low-income Americans predominantly “inherit” cars that have been traded in by the more affluent, their own gasoline consumption patterns will tend both to mirror and to lag behind those of higher incomes. It almost certainly is futile to think of developing an “economy” car that is cheap enough to be bought new by those who are most in need of economizing. But as long as one does not exist, low-income Americans will be particularly vulnerable to the car-buying patterns of their compatriots who do not share their economic burdens. Moreover, they must live with those patterns for years after the conditions under which they were established have changed. In a few years, perhaps, most low-income Americans may be buying used subcompacts—assuming that affluent households soon begin to switch to these smaller cars. Now,

they are mostly buying the

larger “standard” types—increasingly loaded with “extras.” They will continue to do so for at least several years to come.

One approach to reducing the cost of car ownership for low-income households would be better maintenance. Even though their cars tend now to be somewhat more economical of gasoline than the average, their gas consumption has been getting worse. This probably reflects their greater recency—which mean more “extras”; and gas-using anti-pollution devices. Regardless of such features, gas economy can often be improved by tuneups. Regular maintenance can also help keep older cars from falling apart. But both cost money—especially if one lacks the skills, time or energy to do them himself. Major repairs, once needed, can cost more than the older car could fetch on the market. Preventive maintenance can often head off big repair jobs. But many used cars driven by low-income households fall prey to ills that come from years of little or no maintenance. Some of the resulting defects can be dangerous to others as well as to the driver—like faulty brakes, bad wheel bearings, or worn steering parts.

It may be worthwhile for the Community Services Administration to explore the possibility of establishing a nationwide network of auto maintenance and inspection centers for low-income car owners. These centers could be coupled with job programs to provide low-income youth with supervised on-the-job training in auto repair work, while at the same time providing low-income owners with tuneup, lubrication, inspection, and regular maintenance services at subsidized rates. Major repair jobs might be beyond their scope, but these centers probably could prevent many such repairs from becoming necessary. Eligibility restriction would probably be needed of course. Patronage should not be limited merely to welfare or old-age assistance recipients, however, since many of those most in need are the working poor.

Possibly such centers would encounter opposition from established repair shops and used car dealers—although it is doubtful that they would take away much if any valuable business. A possible alternative under such circumstances, might be a variant of the food stamp program—with vouchers to give low-income households financial assistance toward periodic tuneups and preventive maintenance by regular service establishments. But care would be required to prevent unscrupulous operators from abusing the system—for example, using the tuneup-inspection service to “persuade” low-income owners to undertake costly repairs that were not necessary before the repairman dismantled the car.

There are numerous obstacles in the way of developing practical programs which would help low-income drivers keep their cars fit and energy-efficient. The savings in overall gas consumption, though meaningful, would not be as important as the benefits to low-income householders—and the greater safety they would bring to all drivers.

Low-Income Households Without Cars

By far the largest proportion of low-income households without cars are located in central cities. In fact, central-city residents make up over half of this group. Probably this reflects in part the greater availability of public transit in central cities. But it is doubtless no accident that central-city residents are one of the subgroups among the poor who report the largest number of problems due to lack of transportation.

The difficulty most frequently cited is inability to shop at less expensive stores (cited by 18 percent of this group). Inability to visit a doctor or dentist (12 percent) and inability to take a particular job (nine percent) also are frequently mentioned. The shopping problem seems to reflect in part the adaptation of American society to the car—with large supermarkets and suburban shopping centers replacing the small neighborhood merchant. Those merchants who remain in lower-income neighborhoods of the central city usually charge higher prices. While there is controversy over why they do so and whether they must, there is no question that their customers suffer an added financial burden as a result. Those who cannot get to doctors, dentists and jobs suffer even more seriously.

The rebuilding and restructuring of our mass transit systems to meet the demands of an energy-short society will no doubt be a subject of discussion and study for years to come. Its achievement will take even longer. But even in the short run, many things could be done to improve the access of central-city residents without cars to essential services and facilities. A frequent problem with transit is that those who need it most cannot "get there from here." Routes are frequently oriented toward patterns that no longer exist. Where appropriate, they are oriented mainly toward commuters. More flexible systems, using minibuses, vans, and other small vehicles, are already coming into existence in many places. These systems could help meet many of the transportation needs of low-income households. But they must be available at prices these people can afford, and they must go where they need to go—not only to jobs, but to shopping and other facilities.

The Community Services Administration might want to undertake a major effort to examine in greater depth than was possible in this report the transportation needs of low-income households without cars and to develop strategies for more effective ways of serving them.

Some Important Sub-Groups Among Low-Income Households

At the start of the chapter, we made much of the wide differences in characteristics and life situations among households of low income. By way of illustrating the varied kinds of program focus which may be required to deal most effectively with these differences, we proposed to examine three particular sub-groups in the low-income population. Each is somewhat overrepresented among low-income groups, although there are also many households in similar circumstances who are not poor. We would not, of course, wish to leave the impression that any of these sub-groups is itself uniform in characteristics—any more than is the entire category of low-income households. However, we are using them both to stress the disparities in the needs and attributes of the low-income population and to illustrate what these disparities imply in terms of program requirements.

Low-Income Households Outside Metropolitan Areas

An estimated total of 5.9 million households with incomes at or below 125 percent of the poverty line resided outside metropolitan areas at the time of the Washington Center's 1975 survey. These households lived both in rural settings and in smaller towns and cities. They made up 42 percent of all low-income households in the United States.

The picture which emerges quite graphically from the statistical profile of these households is that they live predominantly in rural shacks and in the shabbier sections of America's small towns (Table 62). They are overwhelmingly single-home dwellers, but their homes are generally small. About half contain four rooms or less; only 22 percent have as many as six rooms.

Their homes are poorly protected against the weather; 47 percent reported no insulation at all. They are often badly heated as well; only 51 percent have central heating, and 28 percent of their occupants use supplementary room heaters. Not surprisingly, the proportion who report both day and night temperatures below 70 degrees are considerably larger than among low-income households as a group. Yet these non-metropolitan residents use considerably more natural gas than the average low-income household; in fact, their consumption approaches fairly closely to the average amount for all U.S. households regardless of income.

Clearly, there is high payoff potential for programs aimed at helping non-metropolitan dwellers with low incomes to improve both the weather protection and heating adequacy of their homes. Weatherization programs should probably provide both help with the cost of needed improvements and technical assistance as well. But many of the dwellings which are in the worst shape from this standpoint may not be worth fixing; many are probably too rundown. Expansion of rural housing assistance programs could assist in replacing these inadequate units with homes that not only provide their occupants with decent accommodations but also use less energy.

TABLE 62

SELECTED ASPECTS OF HOMES OCCUPIED BY LOW-INCOME HOUSEHOLDS IN
NON-METROPOLITAN AREAS, 1975

	Low-Income Households in Non-Metropolitan Areas	All Low-Income Households
	(Percent)	
All Households	100%	100%
Live in single-family detached homes	70	54
Live in mobile homes	9	6
Live in South Central region	33	25
Live in South Atlantic region	20	13
With 4 rooms or less	50	53
With 5 rooms	28	24
With 6 rooms or more	22	23
Have central heating	51	64
Using supplementary room heaters	28	20
Have no temperature controls	38	39
Day temperature below 70 degrees	37	35
Night temperature below 70 degrees	75	64
All or some outside exits have storm doors	42	43
All or some windows have storm sashes or insulating glass	41	40
Have insulation in both walls and ceiling	29	24
Have no insulation in either walls or ceiling	47	43
Report making energy-saving changes in dwelling since 1973	10	8
Average BTUs of natural gas annually (millions)	123	110

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

Low-Income Renters

Renters comprise another sub-group of low-income households with specific problems and needs from an energy standpoint. Renters comprise a 55 percent majority of all households with incomes at or below 125 percent of the poverty line. There were an estimated 7.7 million low-income renter households in the U.S. in 1975. They were distributed fairly evenly among the major regions, with some concentration in the Northeast. (See Table 63.)

The dwellings of low-income renters are, on the whole, much less adequately protected against the weather than those of other low-income households. Much smaller-than-average percentages have storm doors or storm windows—under 30 percent for each. Nearly half say that their dwellings are totally uninsulated, even though the proportion who do not know whether or not they have insulation is much higher than for homeowners.

Central heating is slightly more frequent among units occupied by renters than among all low-income homes. However, nearly half of all low-income renters report that they cannot control the temperature of their dwellings. A somewhat higher-than-average percentage report daytime temperatures under 70 degrees, but fewer report nighttime temperatures below this level.

While most low-income renters occupy apartments, many do not. In all, about 44 percent occupy

single-family dwellings—and of these, about three-fourths are detached or free-standing homes. Re-
TABLE 63

SELECTED ASPECTS OF DWELLINGS OCCUPIED BY LOW-INCOME RENTERS
IN THE U.S., COMPARED TO ALL LOW-INCOME HOUSEHOLDS, 1975

	Low-Income Renters	All Low-Income Households
	(Percent of Households)	
All Households	100%	100%
Live in Apartments:	56	33
(8 units or less in structure)	(36)	(22)
(9 units or more in structure)	(20)	(11)
Live in Northeast region	27	22
Live in North Central region	24	27
Live in South Central region	24	25
With 1 - 3 rooms	34	23
With 4 rooms	34	31
With 5 rooms or more	32	47
Have central heating	65	64
Use supplementary room heaters	16	20
Have no temperature controls	49	39
Day temperature below 70 degrees	37	35
Night temperature below 70 degrees	57	64
All or some outside exits have storm doors	26	43
All or some windows have storm sashes or insulating glass	29	40
Have insulation in both walls and ceilings	16	24
Have no insulation in either walls or ceiling	47	43
Report making energy-saving changes since 1973	4	8

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

ardless, comparatively few renters report having made energy-saving improvements since 1973.

Our data on energy consumption and costs cover only those renters who pay their heating bills directly. We are, therefore, not in a position to estimate these figures for those whose utility costs are included in the rent. We suggest that the Community Services Administration may want to conduct a separate study of apartment buildings where utilities are measured by a single meter. The data we have suggest that avoidable heat energy wastage in rented dwellings is quite high.

Natural gas consumption in apartments with separate meters is much lower than in single-family homes. However, this difference may be attributed largely to their generally small size and to the fact that their walls are less exposed to the elements. The poor weather protection of low-income apartments is a source of concern both from the standpoint of overall energy conservation and of the tenants' welfare—since even where they do not pay for heat directly, they pay ultimately as part of the rent.

However, most low-income apartments are not in large complexes but in small buildings—many probably converted from single-family homes. Moreover, many dwellings rented by low-income ten-

ants are not apartments at all. In fact, an estimated 2.5 million are single detached homes. In many of these cases, the landlord may not be a great deal better off than the tenant. The rented dwelling may be the second story of a modest-income home, or a house formerly occupied by an elderly person and now held for income. Whatever the situation, it would be unwise to assume that the landlord has the resources to make energy-saving improvements, just as the tenant cannot be assumed to have the motivation.

As noted earlier, existing public policies give landlords—large or small—few incentives for weatherizing their buildings. We recommend that the Community Services Administration devote further analysis to this problem, with particular attention to measures which would be required to encourage landlords to install insulation where it is practical to do so, as well as storm windows, storm doors, and weatherstripping.

The Low-Income Elderly

Households with heads aged 65 or over and incomes at or below 125 percent of the poverty line were estimated to number 5.2 million at the time of the Center's 1975 survey. They comprised 37 percent of all low-income households in the nation and about the same percentage of all elderly households. Average incomes of elderly households in the U.S. are sharply lower than those of younger households; the median household income in 1974 dropped from \$11,490 for those headed by persons in the 55-64 age bracket to \$5,168 among those with heads who had passed their 65th birthdays.¹⁶ Many more of the elderly would be classified in the low-income group if their household size were not predominantly small. But however classified, most have very little money to spare.

For the low-income elderly, rising energy costs must pose especially severe problems. (See Table 64.) Altogether, 51 percent live in the colder-than-average North Central and Northeast regions—a slightly higher proportion than among low-income households of all ages. The 21 percent who reside in the Northeast are hit particularly hard by the high fuel costs of that region. In natural gas consumption, the elderly rank somewhat above the average for all low-income households; their gas bills are somewhat higher also. But they use considerably less electricity than average. Obviously, more of their total energy consumption goes for home heating.

The statistical picture of the low-income elderly is that of a very diverse group. Some of them undoubtedly enjoyed considerably higher incomes in their earlier years, and the kind of housing that went with these incomes. Others apparently have never been comfortably off. A slightly larger-than-average proportion live in detached houses—57 percent vs. 54 percent for all low-income households regardless of age. Somewhat fewer live in apartments, but 28 percent are in this situation.

Elderly households tend to live in older dwellings, and the survey data reflect this fact. Somewhat fewer have central heating than the average for all low-income households; somewhat more use supplementary heaters. However, the differences are not great. Not surprisingly, a considerably smaller-than-average proportion of the low-income elderly report that their homes are kept at daytime temperatures below 70 degrees. Yet a higher-than-average proportion report nighttime temperatures below 70.

The homes of the low-income elderly are somewhat better equipped with storm doors and windows than the average low-income household; but many are considerably less well-equipped with insulation. This may be because storm windows and doors are much easier to install after construction than is insulation. Comparatively few elderly householders report having made energy-saving changes to their dwellings since 1973.

Elderly people, by reason of their age, will often find it harder to adapt to lower home temperatures. Many have infirmities, such as chronic respiratory ailments and arthritis, that can become

¹⁶ U.S. Bureau of the Census, *Current Population Reports*. Household Money Income in 1975 and Selected Social and Economic Characteristics of Households. Series P-60, No. 100. Issued August 1975.

TABLE 64

SELECTED ASPECTS OF DWELLINGS OCCUPIED BY
ELDERLY LOW-INCOME HOUSEHOLDS IN THE U.S.
COMPARED TO ALL LOW-INCOME HOUSEHOLDS, 1975

	Households with Elderly Heads	All Low-Income Households
	(Percent of Households)	
All Households	100%	100%
Live in single detached homes	57	54
Live in North Central region	20	27
Live in South Central region	25	25
Live in Northeast region	21	22
Have central heating	62	64
Use supplementary room heaters	23	20
Have no temperature controls	39	39
Day temperature below 70 degrees	26	35
Night temperature below 70 degrees	66	64
All or some outside exits have storm doors	52	43
All or some windows have storm sashes or insulating glass	44	40
Have insulation in both walls and ceiling	22	24
Have no insulation in either walls or ceiling	50	43
Reported making energy-saving changes since 1973	4	8
Average BTUs of natural gas annually (millions)	116	110
Average annual cost of natural gas	\$186.70	\$182.70

SOURCE: Washington Center for Metropolitan Studies. National Survey of Household Energy Use, 1975.

worse under cold and drafty conditions. At the same time, their already-stretched budgets and the fact that most of their energy expenditures already go for home heating leave them with fewer options for change.

Many older people would undoubtedly prefer to remain where they are, in homes they have lived in much of their lives. Yet many others might welcome housing alternatives that meet their needs more effectively, cost less work and money to maintain, and were closer to shopping, religious and social activities. Many might also prefer housing that was designed with the needs of older people in mind. This housing could also be more energy-efficient, and the houses they sold or rented to others when they moved into it could often bolster their life savings, their retirement income or both. The new occupants might also be better able to weatherize and maintain the home.

Special Federally-assisted programs of housing for elderly people, active only a few years ago, have been virtually shut down. Many of the projects built under these programs—often sponsored by church and civic groups—have long waiting lists. These attest to the fact that by no means all people past 65 are unwilling to make basic changes in their life situations. More may wish to do so as energy prices continue to rise. In the long run, reinstatement of these special programs of housing for older people might contribute to energy conservation, as well as to housing improvement and to the welfare of many older

citizens.

For those elderly households who wish to remain in their present homes, weatherization programs can be particularly valuable. However, many will lack the stamina to do the necessary work themselves. The labor required can provide opportunities for special job programs, which can teach youth new skills and provide useful work experiences at the same time that they help people at the other end of the age spectrum to cope with the burdens created by the energy shortage.

CSA might wish to explore the possibilities for joint action with other Federal agencies which have particular responsibility for programs concerned with elderly citizens, as well as with agencies such as the Departments of Housing and Urban Development, Labor, and others which have programs that can aid older people in dealing with energy problems.

One of the principal purposes of this final "summing up" chapter has been to suggest some directions for Federal policy and programs which would aid low-income American households to cope with the growing shortage and rising cost of energy in the United States. One of the most important actions which the Community Services Administration could take, however, would not really be a "program" or "policy" in the usual sense at all. It would be to intensify its efforts to make policymakers throughout the Federal establishment and Congress aware of the critical impact that the energy crisis is having on the lowest-income citizens, not only by disseminating the findings of this report and other studies, but also its knowledge of and experience with these people's special needs.

As energy becomes a more and more critical issue in the United States, the fact that it is impacting on the lives of all Americans will become increasingly evident. The response of the nation to this fact, however, must not simply be one which takes into account mainly the needs and options of the majority of Americans—the broad group in the middle for which most public programs are designed. It must also be one which meets the needs and options of the groups at the outer limits of the scale, and particularly those whose incomes are too low to give them much flexibility for change.