



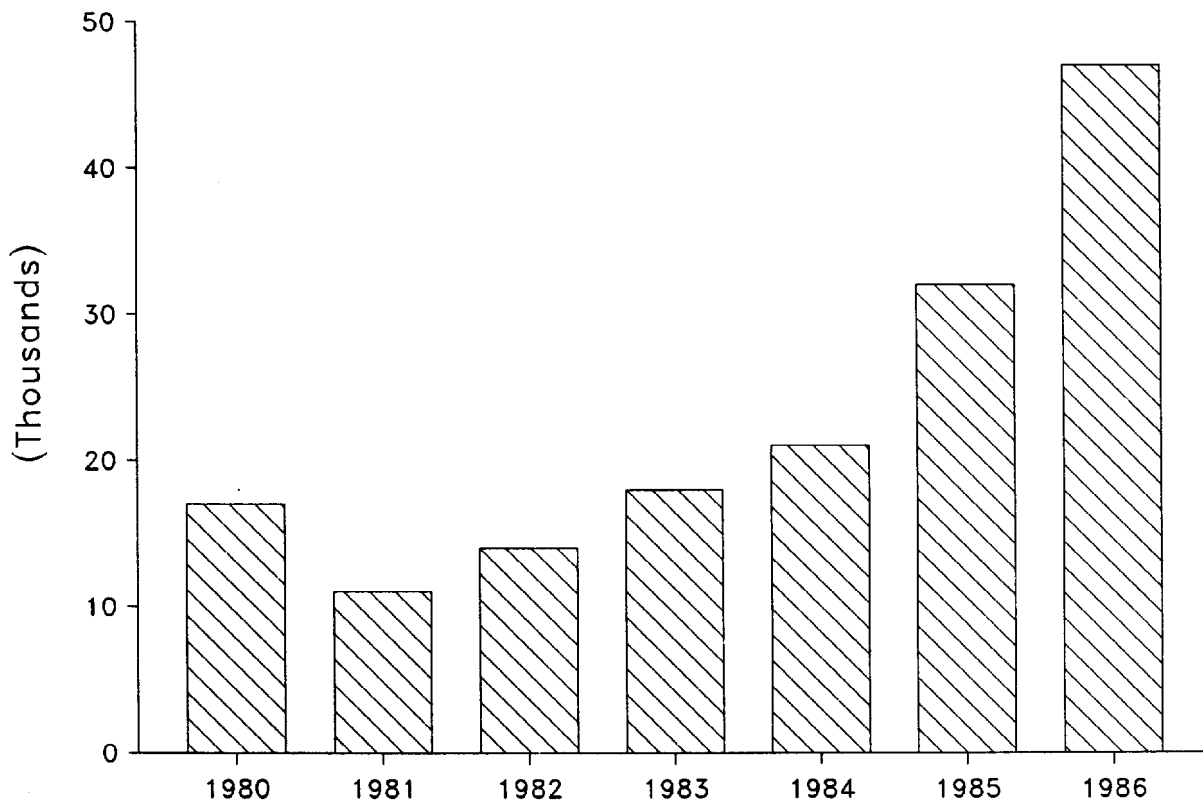
Petroleum Industry Research Foundation, Inc.

122 EAST 42nd STREET

New York, N. Y. 10168

**HOME HEATING OIL AND OIL HEATED HOMES
IN THE NORTHEAST**

December 1987



Oil-Heated New Single Family Homes

**HOME HEATING OIL AND OIL HEATED HOMES
IN THE NORTHEAST**

SUMMARY

- o Last year two-thirds of all distillate fuel oil deliveries to the U.S. residential heating market were made in the Northeast (Maine to Pennsylvania) which now contains over half of all oil-heated homes.
- o Residential deliveries accounted for 45% of total distillate oil sales in the Northeast last year vs. 7% in the rest of the nation.
- o The number and share of new oil-heated single-family homes in the Northeast have grown each year since 1982, reaching 47,000 or 24% of all new homes in 1986. Almost no oil-heated homes were built in the rest of the nation.
- o Oil is the more frequent fuel choice in new homes built by or for owners while gas is the more frequent choice of commercial builders.
- o New oil-heated multi-family units in the Northeast rose last year to 7,000 units.
- o Conversions from oil to gas heat last year, for the first time in this decade, did not exceed the number of new oil-heated homes. Hence, there was no net decline in the total number of oil-heated homes in the Northeast.

- o Last year's sharp decline in heating oil prices, both actually and relative to gas, was a major factor in this change. In the current heating season the two fuels sell at about parity.
- o Residential heating oil consumption in the Northeast rose by 1% to 314 thousand barrels daily (MB/D) last year, following a 4% rise in the previous year. Weather conditions were apparently not a factor in either year's increase.
- o The \$.34/gal decrease and \$.15/gal increase, respectively, in Northeast consumer prices for heating oil between November 1985, November 1986 and November 1987 was primarily a function of preceding changes in crude oil prices.

I. INTRODUCTION

The U.S. market for home heating oil is becoming increasingly concentrated in the Northeast. In 1986 the 9 states from Pennsylvania to Maine accounted for about two-thirds of all distillate fuel oil deliveries to the residential sector in the U.S. More than half of all oil-heated single family homes are located in the region, and only in these 9 states does oil heat continue to get a measurable share of new home construction. Furthermore, conversions of oil heat to gas heat have taken place at a faster rate outside the region, more quickly reducing the share of oil-heated homes outside the Northeast. The importance of oil heat in the Northeast is also reflected in the residential demand for distillate oil: 45% (314 thousand barrels per day) of all the distillate oil sold in the region goes to the residential sector, while in the rest of the country, only 7% of distillate use is residential.

II. OIL-HEATED HOUSING

Oil's prominence as a house heating fuel in the U.S. peaked some time ago. In 1960, nearly one-third of all occupied housing units in the U.S. were heated with oil. By 1983, the most recent Bureau of the Census figures available, oil heated 15% of the housing units. (See Table I.) Of the 13 million oil-heated units, a small portion (450 thousand) were heated with kerosene, and about 2.7 million units were in large multifamily buildings more likely heated with residual fuel oil. Therefore, distillate fuel heated about 7.8 million single family homes and a large portion of the 1.6 million garden apartment units in 1983.

TABLE I

HEATING FUELS IN THE 1983 HOUSING INVENTORY

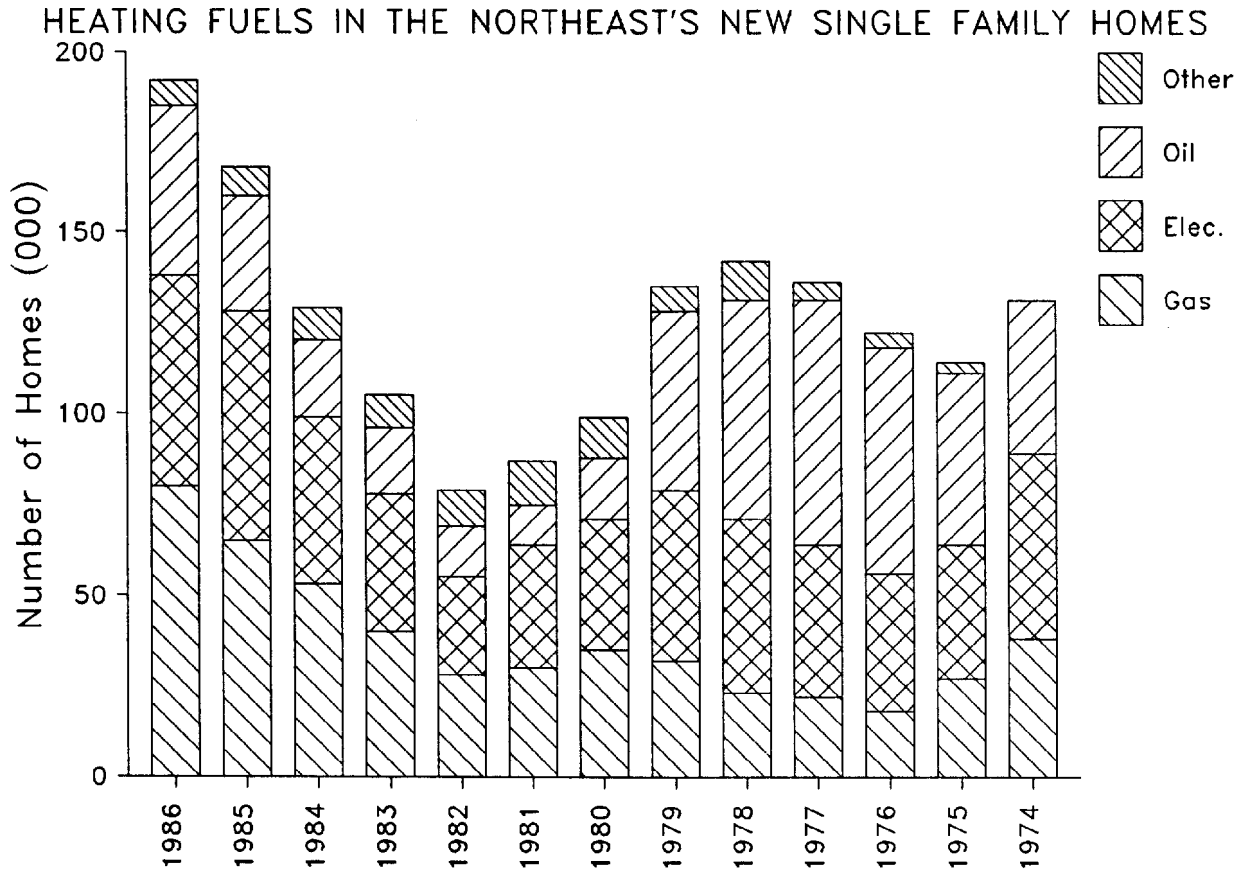
	<u>U.S.</u>	<u>N'east</u>	<u>Midwest</u>	<u>South</u>	<u>West</u>
(Thousand of Units)					
Total	84638	18221	21618	27931	16867
Gas	50570	7886	16823	14515	11345
Oil	13031	8226	1774	2559	471
Electricity	15683	1319	2172	8558	3635
Other or none	5354	790	849	2299	1416
(Fuel Share--%)					
Total	100	100	100	100	100
Gas	60	43	78	52	67
Oil	15	45	8	9	3
Electricity	19	7	10	31	22
Other or none	6	4	4	8	8

Source: Bureau of the Census

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The number and share of oil-heated new single family homes in the Northeast has grown each year since 1982, its nadir following the oil price explosion of 1979/80 and the recession of 1981/82. In 1986 oil heat was installed in 47,000 or 24%, of the Northeast's new single family homes. While this was a substantial increase from the 11,000 additions and 13% share in 1981, the 1986 share does not approach the mid-1970's oil heat additions of more than 60,000 homes annually and 50% share. (See Figure I and Appendix Table.)

FIGURE I



Last year's increase was most likely influenced by the oil price break of 1986 which greatly increased oil's relative cost advantage over other fuels. Given the time lag between the decision on heating fuels and the completion of a home, the 1987 share of newly built oil-heated units may well be as high or higher.

New oil-heated multifamily units in the Northeast, which include those heated with residual fuel oil, also rose last year for the second time in a row in both share and numbers. But the 7,000 units completed in 1986 were still far below the annual average of 18,000 built during the period 1974-79 (Appendix.)

### III. CONVERSIONS TO GAS HEAT

Ongoing conversions from oil to gas reduce the net additions of oil heated units. As Table II shows, while these conversions have declined throughout the 1980's, last year was the first in which they were not significantly larger than the number of new homes, at least in the Northeast. In fact, when adjustment is made for the conversion of multifamily units heated with residual fuel oil (which are included in the data), 1986 may have been the first year of this decade in which the number of oil-heated homes in the Northeast did not register a net decline.

TABLE II

**NET CHANGE IN THE NUMBER OF OIL HEATED HOMES, 1980-1986**  
(000 units)

|                   | <u>Construction</u> | <u>Conversions</u> | <u>Net Change</u> |
|-------------------|---------------------|--------------------|-------------------|
| <b>Total U.S.</b> |                     |                    |                   |
| 1980              | 41                  | 498                | -457              |
| 1981              | 23                  | 390                | -367              |
| 1982              | 26                  | 213                | -187              |
| 1983              | 25                  | 110                | -85               |
| 1984              | 29                  | 106                | -77               |
| 1985              | 39                  | 114                | -75               |
| 1986              | 60                  | 105                | -45               |
| <b>Northeast</b>  |                     |                    |                   |
| 1980              | 27                  | 262                | -235              |
| 1981              | 16                  | 197                | -181              |
| 1982              | 22                  | 98                 | -76               |
| 1983              | 18                  | 61                 | -43               |
| 1984              | 21                  | 56                 | -35               |
| 1985              | 35                  | 63                 | -28               |
| 1986              | 54                  | 57                 | -3                |

Note: Conversions are oil-to-gas only. Net change excludes demolitions. Includes units in multi-family structures.

Source: U.S. Department of Commerce and American Gas Association.

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In part, the conversions are a function of the prevailing oil-gas price differential. In the late 1970's and early 1980's, gas prices for residential heating in the Northeast were generally substantially above distillate heating oil prices. In 1983-84, oil moved close to parity with gas. In 1986, oil prices were substantially lower than gas prices and in the current heating season through November the two fuels are approximately at parity. The substantial reduction in conversions in recent years reflects this change in the price relationship. (See Table (III).)

TABLE III

**SEPTEMBER-NOVEMBER AVERAGE RETAIL PRICES OF DISTILLATE FUEL OIL
AND NATURAL GAS IN THE NORTHEAST, 1984-87**
(\$/MMBTU)

	<u>#2 Oil</u>	<u>Natural Gas</u>
1982	8.83	7.02
1983	7.82	7.42
1984	7.83	7.41
1985	7.77	7.08
1986	5.29	6.66
1987	6.27	6.20

Source: Bureau of Labor Statistics

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Oil's conversion losses are, of course, gas' gains. Thus, gas' share of the total Northeast residential heating market which in 1983, at 45%, was only slightly larger than oil's, has continued to grow more rapidly than is indicated by its share of the new homes market. The loser in last year's fuel choice in



new homes was clearly electric heat, which registered a decline in both market share and number of installations in the Northeast and every other U.S. Census region.

#### IV. FUEL SELECTION

Regarding the selection of heating fuel in new homes in the Northeast, oil is the more likely choice when the owner makes the decision. Gas, in contrast, is more popular with speculative (commercial) builders who built nearly 70% of all new homes last year. Oil heat was installed in 35% of the contractor-built and 40% of the owner-built single family houses but in only 20% of the houses built for sale. Gas is also more popular with speculative builders than with individual owners in the rest of the country but less so than in the Northeast. Electric heat is clearly favored by speculative builders over oil heat in the Northeast, in part because of the low capital cost. However, electric heat gets its highest share in single family homes among those built by contractors. (See Table IV.)

**TABLE IV**

**HEATING FUEL SHARES IN NEW HOMES BY TYPE OF BUILDER**

|                        | <u>Total</u> | <u>Gas</u>    | <u>Elec.</u> | <u>Oil</u> | <u>Other</u> |
|------------------------|--------------|---------------|--------------|------------|--------------|
|                        | (000)        | ----- % ----- |              |            |              |
| <b>U.S.</b>            |              |               |              |            |              |
| <b>Total</b>           | 1120         | 47            | 44           | 5          | 4            |
| Speculative Builder    | 724          | 53            | 43           | 4          | 1            |
| Owner/Contractor Built | 362          | 36            | 47           | 7          | 11           |
| <b>Northeast</b>       |              |               |              |            |              |
| <b>Total</b>           | 193          | 41            | 30           | 24         | 4            |
| Speculative Builder    | 133          | 51            | 29           | 20         | -            |
| Owner/Contractor Built | 56           | 20            | 32           | 38         | 7            |
| <b>Midwest</b>         |              |               |              |            |              |
| <b>Total</b>           | 170          | 78            | 18           | -          | 4            |
| Speculative Builder    | 90           | 84            | 16           | -          | -            |
| Owner/Contractor Built | 76           | 70            | 20           | -          | 7            |
| <b>South</b>           |              |               |              |            |              |
| <b>Total</b>           | 505          | 30            | 66           | -          | 3            |
| Speculative Builder    | 316          | 34            | 65           | -          | -            |
| Owner/Contractor Built | 170          | 22            | 68           | -          | 8            |
| <b>West</b>            |              |               |              |            |              |
| <b>Total</b>           | 253          | 64            | 29           | -          | 7            |
| Speculative Builder    | 185          | 71            | 27           | -          | 2            |
| Owner/Contractor Built | 60           | 43            | 35           | -          | 22           |

Note: Data are as reported by the Bureau of Census. They do not add because of rounding and data withheld.

Source: Bureau of the Census.

V. **CHANGES IN DISTILLATE FUEL CONSUMPTION**

Consumption of distillate heating oil in the Northeast residential market rose in both 1985 and 1986, as Table V shows.

**TABLE V**  
**MIDDLE DISTILLATE CONSUMPTION IN THE NORTHEAST**

(MB/D)

|             | <u>1984</u> | <u>1985</u> | <u>1986</u> |
|-------------|-------------|-------------|-------------|
| Residential | 292         | 308         | 314         |
| Total       | 617         | 629         | 690         |

Note: Northeast includes 9 states from Pennsylvania to Maine.

Source: Delivery estimates of the U.S. Energy Information Administration.

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Neither the 5% increase in residential consumption in 1985 nor the 2% increase in 1986 can be explained by weather conditions, since temperatures, measured in degree days, were only 0.8% colder than in the previous year in 1985 and actually 1% warmer in 1986.

Possibly the increases reflect higher consumption per home since price declines may have blunted consumer motivations to keep thermostats low and/or supplement oil heating with wood or other fuels. However, this would be a more plausible explanation if the increase had been higher in 1986 than in 1985. It would also mean the reversal of the ongoing trend of declining consumption per housing unit.

TABLE VI
RESIDENTIAL HEATING OIL CONSUMPTION
HOUSING UNIT

	(Gallons per Year)		
	<u>New England</u>	<u>Metro N.Y.</u>	<u>Other Mid-Atlantic</u>
1975-76	1,319	1,569	1,311
1980-81	1,015	1,184	993
1986-87	961	1,118	928

Source: Fuel Oil and Oil Heat

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Even if such a reversal occurred in 1985 and 1986, the trend towards lower consumption per housing unit can be expected to continue. All new homes are more energy efficient than existing ones, retrofitting of existing homes for better insulation continues (though on a much smaller scale than in the late 1970's and early 1980's), and the new heating equipment installed in existing homes is much more energy efficient than what it replaces.

The countervailing trend to this decline in consumption is provided by the aforementioned increase in new oil-heated homes. At an average annual consumption of about 1000 gallons, these 47,000 new homes represent a market of about 47 million gallons, equal to about 1% of the Northeast's total residential heating oil consumption. In addition, the pace of conversion is unlikely to quicken and may continue to slow. Looking at both trends, we estimate that the total number of oil-heated single family homes in the Northeast is currently not significantly different from the 4.3 million units reported in the 1983 census data.

## VI. CONSUMER PRICE CHANGES

Retail prices of distillate heating oil declined in 1986 and rose in 1987 closely in line with changes in world crude oil prices. Between November 1985 and November 1986 retail prices in the Northeast declined from \$1.13/gal to \$0.74/gal and then rose to \$0.89/gal in November 1987. In October 1987 (when the distillate oil retailed in November was produced), spot market prices for the most widely traded domestic crude (West Texas Intermediate) and the most widely traded foreign crude (Brent Blend) were about \$5/bbl, or \$.12/gal, above the year-ago levels. Thus the \$.15/gal November '86 to November '87 retail price increase can be attributed principally to this factor. Similarly, between October 1985 and October 1986 spot prices for these two crudes dropped by \$14.60/Bbl, or \$.35/gal, while retail prices dropped by \$.39/gal between November '85 and November '86.

APPENDIX TABLE

HEATING FUELS IN NEW HOMES, 1974-1986

SINGLE FAMILY HOMES

|         |      | Total | Gas           | Elec. | Oil | Other |
|---------|------|-------|---------------|-------|-----|-------|
|         |      | (000) | ----- % ----- |       |     |       |
| U.S.    | 1986 | 1120  | 47            | 44    | 5   | 4     |
|         | 1985 | 1072  | 43            | 49    | 3   | 4     |
|         | 1984 | 1025  | 45            | 48    | 2   | 5     |
|         | 1983 | 924   | 43            | 48    | 2   | 6     |
|         | 1982 | 632   | 40            | 50    | 3   | 8     |
|         | 1981 | 819   | 41            | 50    | 2   | 7     |
|         | 1980 | 957   | 41            | 50    | 3   | 5     |
|         | 1979 | 1301  | 39            | 51    | 7   | 3     |
|         | 1978 | 1369  | 37            | 52    | 8   | 3     |
|         | 1977 | 1258  | 38            | 50    | 10  | 2     |
|         | 1976 | 1034  | 39            | 48    | 11  | 2     |
|         | 1975 | 875   | 40            | 49    | 9   | 2     |
|         | 1974 | 940   | 41            | 49    | 9   | 1     |
| N' east | 1986 | 193   | 41            | 30    | 24  | 4     |
|         | 1985 | 168   | 39            | 38    | 19  | 5     |
|         | 1984 | 129   | 41            | 36    | 16  | 7     |
|         | 1983 | 106   | 38            | 36    | 17  | 8     |
|         | 1982 | 79    | 35            | 34    | 18  | 13    |
|         | 1981 | 87    | 34            | 39    | 13  | 14    |
|         | 1980 | 100   | 35            | 36    | 17  | 11    |
|         | 1979 | 135   | 24            | 35    | 36  | 5     |
|         | 1978 | 141   | 16            | 34    | 43  | 8     |
|         | 1977 | 135   | 16            | 31    | 50  | 4     |
|         | 1976 | 121   | 15            | 31    | 51  | 3     |
|         | 1975 | 114   | 24            | 32    | 41  | 3     |
|         | 1974 | 132   | 29            | 39    | 32  | -     |
| Midwest | 1986 | 170   | 78            | 18    | -   | 4     |
|         | 1985 | 151   | 74            | 21    | -   | 5     |
|         | 1984 | 156   | 71            | 19    | -   | 9     |
|         | 1983 | 142   | 65            | 25    | -   | 11    |
|         | 1982 | 92    | 58            | 26    | 3   | 14    |
|         | 1981 | 140   | 62            | 26    | -   | 9     |
|         | 1980 | 170   | 59            | 27    | 4   | 9     |
|         | 1979 | 294   | 55            | 33    | 7   | 5     |
|         | 1978 | 300   | 50            | 36    | 11  | 4     |
|         | 1977 | 300   | 46            | 40    | 10  | 4     |
|         | 1976 | 271   | 48            | 40    | 10  | 2     |
|         | 1975 | 218   | 49            | 38    | 9   | 4     |
|         | 1974 | 220   | 51            | 36    | 12  | 1     |

**HEATING FUELS IN NEW HOMES, 1974-1986 (cont'd)**

|       |      | Total<br>(000) | Gas | Elec.<br>----- % ----- | Oil<br>----- | Other |
|-------|------|----------------|-----|------------------------|--------------|-------|
| South | 1986 | 505            | 30  | 66                     | -            | 3     |
|       | 1985 | 514            | 28  | 69                     | -            | 2     |
|       | 1984 | 508            | 33  | 64                     | -            | 2     |
|       | 1983 | 476            | 34  | 62                     | -            | 3     |
|       | 1982 | 340            | 33  | 63                     | -            | 4     |
|       | 1981 | 408            | 31  | 64                     | -            | 4     |
|       | 1980 | 455            | 30  | 67                     | 1            | 2     |
|       | 1979 | 535            | 27  | 68                     | 3            | 2     |
|       | 1978 | 571            | 27  | 69                     | 3            | 2     |
|       | 1977 | 512            | 27  | 67                     | 4            | 2     |
|       | 1976 | 410            | 29  | 63                     | 5            | 2     |
|       | 1975 | 362            | 29  | 66                     | 4            | 1     |
|       | 1974 | 397            | 27  | 67                     | 4            | 1     |
|       | West | 1986           | 253 | 64                     | 29           | -     |
| 1985  |      | 239            | 60  | 33                     | -            | 7     |
| 1984  |      | 233            | 55  | 39                     | -            | 6     |
| 1983  |      | 200            | 53  | 40                     | -            | 8     |
| 1982  |      | 121            | 49  | 41                     | -            | 10    |
| 1981  |      | 183            | 51  | 40                     | -            | 8     |
| 1980  |      | 233            | 52  | 42                     | -            | 6     |
| 1979  |      | 337            | 50  | 46                     | -            | 4     |
| 1978  |      | 357            | 52  | 45                     | -            | 3     |
| 1977  |      | 311            | 57  | 42                     | -            | 1     |
| 1976  |      | 232            | 60  | 39                     | -            | -     |
| 1975  |      | 182            | 59  | 39                     | -            | 2     |
| 1974  |      | 191            | 66  | 33                     | -            | -     |

**UNITS IN MULTIFAMILY HOUSING**

|      |      | Total<br>(000) | Gas | Elec.<br>----- % ----- | Oil<br>----- | Other |
|------|------|----------------|-----|------------------------|--------------|-------|
| U.S. | 1986 | 636            | 35  | 63                     | 1            | 1     |
|      | 1985 | 631            | 31  | 67                     | -            | 1     |
|      | 1984 | 627            | 26  | 72                     | 1            | 1     |
|      | 1983 | 467            | 28  | 70                     | 1            | 1     |
|      | 1982 | 374            | 28  | 68                     | 2            | 2     |
|      | 1981 | 447            | 32  | 66                     | 2            | 1     |
|      | 1980 | 545            | 30  | 66                     | 2            | 1     |
|      | 1979 | 570            | 26  | 68                     | 5            | 1     |
|      | 1978 | 498            | 26  | 68                     | 5            | 1     |
|      | 1977 | 399            | 29  | 65                     | 5            | 1     |
|      | 1976 | 343            | 33  | 59                     | 7            | 1     |
|      | 1975 | 442            | 33  | 59                     | 7            | 2     |
|      | 1974 | 788            | 35  | 60                     | 4            | 1     |

HEATING FUELS IN NEW HOMES, 1974-1986 (cont'd)

|         |      | Total<br>(000) | Gas | Elec.<br>----- % ----- | Oil | Other |
|---------|------|----------------|-----|------------------------|-----|-------|
| N' east | 1986 | 61             | 54  | 31                     | 11  | 3     |
|         | 1985 | 46             | 54  | 37                     | 7   | 2     |
|         | 1984 | 40             | 40  | 45                     | -   | 3     |
|         | 1983 | 33             | 64  | 27                     | -   | -     |
|         | 1982 | 41             | 37  | 41                     | 20  | 2     |
|         | 1981 | 40             | 58  | 28                     | 13  | -     |
|         | 1980 | 46             | 35  | 43                     | 22  | -     |
|         | 1979 | 53             | 21  | 40                     | 40  | -     |
|         | 1978 | 41             | 22  | 32                     | 44  | -     |
|         | 1977 | 41             | 22  | 49                     | 24  | 5     |
|         | 1976 | 50             | 22  | 42                     | 32  | 4     |
|         | 1975 | 72             | 24  | 35                     | 33  | 8     |
|         | 1974 | 99             | 28  | 44                     | 22  | 6     |
| Midwest | 1986 | 100            | 43  | 56                     | -   | 1     |
|         | 1985 | 79             | 46  | 53                     | -   | 1     |
|         | 1984 | 65             | 52  | 49                     | -   | -     |
|         | 1983 | 59             | 63  | 37                     | -   | 2     |
|         | 1982 | 51             | 63  | 33                     | -   | 4     |
|         | 1981 | 78             | 54  | 46                     | -   | -     |
|         | 1980 | 104            | 44  | 55                     | -   | 1     |
|         | 1979 | 121            | 41  | 57                     | 2   | 1     |
|         | 1978 | 117            | 38  | 60                     | 2   | -     |
|         | 1977 | 99             | 39  | 55                     | 6   | -     |
|         | 1976 | 84             | 46  | 52                     | 1   | -     |
|         | 1975 | 96             | 50  | 49                     | -   | 1     |
|         | 1974 | 157            | 59  | 39                     | 1   | 1     |
| South   | 1986 | 259            | 13  | 86                     | -   | -     |
|         | 1985 | 298            | 11  | 88                     | -   | -     |
|         | 1984 | 358            | 13  | 87                     | -   | -     |
|         | 1983 | 270            | 11  | 88                     | -   | -     |
|         | 1982 | 199            | 11  | 88                     | -   | 1     |
|         | 1981 | 218            | 15  | 84                     | -   | -     |
|         | 1980 | 242            | 15  | 84                     | 1   | -     |
|         | 1979 | 227            | 10  | 88                     | 2   | 1     |
|         | 1978 | 181            | 9   | 89                     | 2   | 1     |
|         | 1977 | 125            | 13  | 85                     | 2   | -     |
|         | 1976 | 103            | 18  | 76                     | 6   | 1     |
|         | 1975 | 170            | 18  | 78                     | 3   | -     |
|         | 1974 | 359            | 21  | 77                     | 2   | -     |



HEATING FUELS IN NEW HOMES, 1974-1986 (cont'd)

|      |      | Total<br>(000) | Gas | Elec.<br>----- % ----- | Oil<br>----- | Other |
|------|------|----------------|-----|------------------------|--------------|-------|
| West | 1986 | 216            | 52  | 47                     | -            | 1     |
|      | 1985 | 207            | 49  | 50                     | -            | 1     |
|      | 1984 | 164            | 43  | 55                     | -            | 2     |
|      | 1983 | 104            | 42  | 56                     | -            | 3     |
|      | 1982 | 82             | 41  | 55                     | -            | 4     |
|      | 1981 | 111            | 40  | 57                     | -            | 4     |
|      | 1980 | 153            | 44  | 53                     | -            | 3     |
|      | 1979 | 169            | 40  | 57                     | -            | 2     |
|      | 1978 | 160            | 38  | 59                     | -            | 3     |
|      | 1977 | 133            | 38  | 61                     | -            | 1     |
|      | 1976 | 106            | 42  | 57                     | -            | -     |
|      | 1975 | 105            | 46  | 53                     | -            | -     |
|      | 1974 | 173            | 47  | 53                     | -            | -     |

Note: Percentages may not add to 100 because of withheld data.  
Source: Bureau of the Census.