

Petroleum Industry Research Foundation, Inc.

122 EAST 42nd STREET

New York, N. Y. 10017

SHARES OF HEATING FUELS
IN U.S. HOUSING

October, 1979

Nationwide, the shares of heating fuels installed in new homes remained relatively stable in 1978 when compared to the data for prior years, according to preliminary figures from the U.S. Department of Commerce.* The shifts in share which occurred in 1978 were continuations of earlier trends, with the electricity share increasing slightly while the gas and oil heat shares decreased slightly in the one-family home market. In the much smaller multi-family home market, the electricity share rose, the gas share fell and the oil share remained the same.

The most important fuel in each of the four Bureau of Census regions remained almost unchanged from 1977 to 1978. In one-family homes, gas is the prime fuel in the North Central region and the West, electricity in the South, and oil in the North East. In multi-family housing, electricity captures the largest share in each region but the North East, where in 1978 oil replaced electricity as the most commonly installed heating fuel.

Overall, completions of one-family homes rose 9% between 1977 and 1978 to 1.4 million units; completions of multi-family units increased by 25% to 0.5 million units. The fastest growth in both single-family and multi-family housing occurred in the South and the West, as shown in the following table:

*Data will be published in U.S. Bureau of the Census, Construction Report-- Series C25, Characteristics of New Housing, U.S. Department of Commerce, Washington, D.C. Data for 1978 subject to revision. Appendix Tables A and B drawn from same source.

HOUSING COMPLETIONS BY REGION, 1978

	<u>Units Completed</u> (000)	<u>Increase from 1977</u> (%)	<u>Share of U.S. Total</u> (%)
<u>Single-Family</u>			
U.S.	1,369	8.9	100.0
North East	141	4.4	10.3
North Central	300	-	21.9
South	571	11.5	41.7
West	357	14.8	26.1
<u>Units in Multi-family Buildings</u>			
U.S.	498	24.8	100.0
North East	41	-	8.2
North Central	117	18.2	23.5
South	181	44.8	36.3
West	160	20.3	32.1
<u>Total Units</u>			
U.S.	1,868	12.7	100.0
North East	182	3.4	9.7
North Central	417	4.5	22.3
South	752	18.1	40.3
West	517	16.4	27.7

Note: Figures may not add due to rounding. See Appendix Table A for states included in each region.

Source: U.S. Department of Commerce.

As mentioned previously, electricity continues to be the predominant heating fuel for all new housing units in the South, and captures some 60% of the multi-family housing market in the West. Therefore, the rapid growth in housing completions in these regions was an important factor in the nationwide increase in the electric heat share. On the other hand, oil is the dominant fuel only in the North East, whose lagging growth in new home completions has reduced oil heat's share of the national market.

In 1978, some 60% of the single-family homes completed were constructed by speculative builders for resale. The remaining 40% were built either directly by their owners or by contractors on behalf of owners. Because there are many factors that will determine the choice of a heating fuel, it is not surprising that the heating fuel selection of speculative builders varies from that of owner/contractor builders.

In the case of a speculative builder, the most important criterion for heating fuel choice is saleability of the completed homes. The builder must therefore consider the capital cost of the heating system to be installed as well as the acceptability and availability of the fuel to be used. These factors have led to a popularity of gas among speculative builders. Some 80% of the homes constructed by speculative builders were within SMSA's* in 1978, the areas where ready access to existing gas mains is likely highest. As the table on the following page shows, gas captured one-half of this portion of the new home market.

*SMSA's (Standard Metropolitan Statistical Areas) are designated by the U.S. Department of Commerce and represent areas with a large population nucleus. Most areas outside the SMSA's can be classified as rural.

SHARES OF HEATING FUEL IN SINGLE FAMILY HOMES
COMPLETED BY CATEGORY OF BUILDER, 1978

	<u>No.</u> (000)	<u>Share of</u> <u>U.S. Total</u> (%)	<u>Gas</u> (%)	<u>Elec.</u> (%)	<u>Oil</u> (%)	<u>Other</u> (%)
<u>Houses Built For Sale</u>						
Inside SMSA's	670	49	50	43	6	2
Outside SMSA's	168	12	20	74	6	-
Subtotal	839	61	44	49	6	2
<u>Houses Contracted for or Built by the Owner/Occupant</u>						
Inside SMSA's	226	17	31	54	11	4
Outside SMSA's	289	21	23	58	10	10
Subtotal	514	48	26	57	10	7
<u>Total U.S.</u>						
Inside SMSA's	907	66	45	46	8	1
Outside SMSA's	462	34	22	64	8	6
Total	1,369	100	37	52	8	3

The owner/occupant of the home makes the decision among heating fuels for contractor or owner-built homes. Here, it appears that the lower capital cost of electric heat has been a major determinant of fuel choice, as evidenced by the relatively high electric heat share in these homes. The fact that electric heat's operating cost is substantially higher than the operating cost for either gas or oil heat in virtually all areas of the U.S. has therefore apparently been secondary to financial exigencies or other factors at the time the house is constructed. In addition, it is possible that some of these homes are vacation homes used for only a portion of the year, making the cost of heating less significant.

Oil heat got its largest share among the contractor and owner built houses, but even here, its share nationwide is relatively small, reflecting the fact that the oil heat market is geographically far more limited than gas and electricity markets. In the region of oil heat's greatest popularity, the North East, the fuel captured its largest share among houses built for sale, in contrast to the nationwide pattern, and its smallest share among owner-built houses.

The North East

In 1978, the most pronounced changes in heating fuel shares occurred in the North East. In the single family home market, the oil heat share fell markedly--more sharply than in any year since 1971--while electricity rose to account for a portion of the loss. The installation of "other" fuels (wood, for instance) rose substantially, although their share of the market remains relatively small. In the much smaller multi-family home market, the oil heat share increased by 83%. In fact, this sizable increase in the number of new oil-heated multi-family units offset the decrease in the number of new oil heated single family homes. Hence, in both 1977 and 1978, oil heat was installed in approximately 77,000 residential units in the North East. A similar pattern held for the installation of the other major fuels in the region: the numbers of new residential units installing gas heat and electric heat in 1977 and 1978 were essentially the same. Therefore, the increase in total new homes completed in the North East (some 6,000 more in 1978 than in 1977) went to "other" fuels.

The share of "other" fuels in one-family homes rose unusually rapidly last year. The heating fuels which could be included in this category are varied. The figures presented in this memorandum are the results of a survey questionnaire by the Department of Commerce which asks owners or builders to report the "principal" fuel for the residence. Therefore, in installing an airtight wood-burning stove, a homeowner might perceive wood as his principal heating fuel, even though the installation of an additional heat source would be necessary in a region such as the North East. While the proportion of a residence's space heating requirements that can be met by the stove(s) (as against the "auxiliary" system) may be debatable, the homeowner's intention will dictate the answer to the survey question. Similarly, a homeowner installing a solar heating system will likely view it as the principal fuel, regardless of the requirements placed on the back-up system. (Solar heat, however, remains an extraordinarily small portion of the North East's home heating market, by all industry and government reports). In this connection, it should be pointed out that virtually all of the homes for which fuels other than gas, electricity, or oil were reported as the principal fuel were owner-built. In fact, the share of "other" fuels in owner-built homes reached 30% in 1978, reflecting a tripling between 1977 and 1978 of the number of new homes falling into this category in the North East.*

*In examining these data, it is useful to know that liquefied petroleum gas and bottled gas are included in the totals for "gas." Heat pumps are considered as a type of heating system within the category "electricity."

The North Central

In the North Central region, the gas share of the new single-family home heating market rose in 1978 for the first time since 1971. Throughout the period 1971-1978, however, gas has remained the predominant regional fuel in the one-family home market. In the multi-family home market the electric heat share increased, largely at the expense of oil heat.

The continued strength of gas heat in the region's new housing market is attributable largely to the fuel's popularity with speculative builders, as noted previously in the discussion of the national figures. In homes where the owner made the choice among heating fuels (those which are either contractor-built or owner-built), electric heat was most often installed.

The South and the West

The shares of heating fuels in these large regions did not change substantially, but as noted previously the common use of electricity in these fast growing areas was a major factor in fuel's nationwide growth. In addition, the gas share fell in the West's single family home market, where gas maintains its largest regional share.

Price of Heating Fuels

In Appendix Tables C and D, we report estimated prices for fuels in selected cities. In general, the price of electricity is highest on a dollar per million BTU basis, followed by oil and then by gas, which has the lowest price. Exceptions to this pattern are Seattle, where the

region's dependence on hydroelectric power results in a uniquely low electricity price, and New York-Northeastern New Jersey, where the price of gas exceeds the price of oil. In Boston, the price of gas and the price of oil are nearly equal. The table shows January prices for each reported year. It may be noted that since January 1979, heating oil prices have generally risen more rapidly than gas and electricity rates. Current price relationships between oil and the two other fuels are therefore different from those indicated in the table for the beginning of the year.