

ENERGY ADJUSTMENTS OF HOUSEHOLDS

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The oil embargo of 3 years ago and subsequent publicity about the precarious state of our energy resources shocked Americans into the realization that the era of abundant supplies and low prices had ended. Although the energy shortages appear to have subsided, at least temporarily, prices for residential fuels and gasoline have increased sharply. Between 1970 and 1974 prices of electricity, natural gas, fuel oil, and LP gas used in households increased an average of 65 percent while use on a Btu basis declined about 10 percent.

Since energy is an input into almost every household function, these changes in price and use suggest significant changes in lifestyles and possible changes in demand for consumer goods and services, including food and fiber products. In our energy study four questions were addressed:

1. What types of adjustments have occurred or might occur in households as a result of higher energy prices?
2. Who is or might be making energy-related adjustments?

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3. What is the impact on demand for food and fiber products and related appliances?
4. What are the implications for the food and fiber sector and policymakers?

Information and data for this study were collected during spring 1976 by personal interview in over 1,400 households in the 48 conterminous states using a national probability sampling design.

Type and Extent of Energy Adjustment

Compared with 1974, three fourths of the respondents indicated that higher energy prices had resulted in some type of energy reduction in their households. Lighting and heating were most frequently mentioned with slightly over half of the households reducing lighting. About the same proportion were willing to tolerate some environmental discomfort in the colder months and reduced home heating. Likewise, 40 percent of the households with air conditioning or 21 percent of all households reduced the use of this large energy user during the warmer months. Only 9 percent indicated they curtailed the use of energy-using household recreational items such as TV sets, radios, and stereos.

Higher energy prices also affected household laundry activities. Forty percent of the households with dryers, 16 percent of all households, reduced the use of dryers. Temperature settings on hot water heaters were reduced in 14 percent of the households. This adjustment does cause some questions about possible adverse effects on hygienic conditions in the household and on its members.

In the kitchen, the most common adjustment was to reduce the use of ovens — 17 percent indicated such a change. Other cooking methods were also affected, though less frequently. Eight percent reduced the use of specialty cooking appliances such as toasters, electric skillets, and the like, and 6 percent reduced stovetop cooking. Eleven percent of the households or one third of all households with dishwashers also reduced the use of this appliance.

Fortunately, adjustment of temperature settings on refrigerators was seldom mentioned. In an earlier USDA study, it was found that in one third of the households with refrigerators, temperatures were at 45° or higher. Further adjustments in this direction could lower food quality and possibly increase the incidence of food poisoning from bacterial contamination.

Discontinuing the use of freezers or raising the temperature settings was seldom mentioned. Only 2 and 3 percent, respectively, indicated they had made these adjustments because of higher energy prices.

Higher gasoline prices apparently did not have a large effect on household food shopping habits. Only 2 percent of the respondents, located primarily in rural areas, indicated they had reduced their frequency of food shopping trips to save on fuel. However, 6 percent of the households indicated they had shifted their food purchasing to stores located closer to their homes to reduce gasoline use and costs.

A hypothetical situation was presented to respondents about future energy prices. Each was asked what energy-related adjustments would be made as a result of an increase of 25 percent in

energy prices.

Approximately the same proportion of households that had made adjustments would make additional changes to reduce energy use. But there would be some changes in the types of adjustments. Compared with 1975, more households would reduce the use of specialty cooking appliances, clothes dryers, and recreational items. Home heating and lighting would still be the most popular adjustments. However, fewer households would make additional reductions in home heating and lighting, and fewer would reduce stovetop and oven cooking. This indicates that further price increases alone may not result in substantial reductions in energy use. About one eighth of the respondents did not know what additional adjustments might be made.

Who Makes the Adjustments

One might speculate that the proportion of households making energy-related adjustments would decrease with increasing income. But this was not the case.

Higher income households were more likely to have made adjustments and would more frequently try to make further adjustments with increasing energy prices than low income households. For example, almost two thirds of the households in the \$15,000 to \$24,999 annual income group indicated they had made reductions in lighting and home heating compared to 41 and 35 percent, respectively, of the households with incomes below \$5,000 (Table 1). Similarly, a significantly higher proportion of this above-average income group reduced the use of the dishwasher, hot water heater, clothes dryer, and air conditioner than the under-\$5,000 income group. In terms of households making adjustments, only 57 percent of these low income households made any, compared to 88 percent of the higher income group.

Closely related to income levels is the number and variety of large and small appliances in the household. As income levels increased, the inven-

TABLE 1
PROPORTION OF HOUSEHOLDS REDUCING
ENERGY USE BETWEEN 1974 AND 1975
BY HOUSEHOLD INCOME LEVEL

Uses	Under \$5,000	\$5,000-9,999	\$10,000-14,000	\$15,000-24,999	\$25,000 & Over	All
	Percent					
Kitchen & Laundry:						
Oven cooking and/or baking	16	18	17	18	18	17
Specialty cooking appliances	6	9	7	12	3	8
Stove top cooking	6	7	6	7	4	6
Dishwasher	2	8	13	14	22	11
Hot water heater	9	14	16	20	11	14
Clothes dryer	6	17	20	24	11	16
Other uses:						
Lighting	41	53	54	66	62	53
Heating	35	51	52	66	60	51
Air conditioning	11	16	23	30	30	21
Recreational items	10	10	8	12	5	9
No changes	43	26	20	12	20	25

tory of appliances increased correspondingly. Consequently, higher income households have more adjustment alternatives. They may also have more opportunities to adjust heating and lighting in areas of the home not occupied frequently because of larger living quarters.

Age was another important factor. The most adjustments were made by the lower middle age group and the least by the elderly. Those 65 or older resisted changes in lifestyles (Table 2). Unlike younger households where much time is often spent outside the home, elderly persons often spend much time at home, and life's satisfactions are more directly affected by reductions in energy use. Half of the elderly households did not make any adjustments, and a further 25 percent increase in energy prices would not provide the incentive for a significant number of this group to make adjustments.

Education also appears to be an important factor, although some of the observed differences may be related to income and age. As the educational level of the respondent increased,

TABLE 2
PROPORTION OF HOUSEHOLDS REDUCING
ENERGY USE BETWEEN 1974 AND 1975
BY AGE OF RESPONDENT

Uses	Under 25	25-34	35-49	50-64	Over 64
	Percent				
Kitchen and Laundry:					
Oven cooking and/or baking	15	17	18	18	14
Specialty cooking appliances	12	9	8	6	3
Stove top cooking	6	5	7	9	4
Dishwasher	6	12	14	12	7
Hot water heater	11	15	18	13	12
Clothes dryer	13	21	19	16	7
Other Uses:					
Lighting	59	62	56	52	31
Heating	47	55	58	51	34
Air conditioning	22	22	24	20	13
Recreational items	12	13	9	7	4
No changes	27	17	21	22	49

more energy reducing adjustments were made or might be made. Particular differences were found in households where the respondent had only an elementary education. Only about three fifths of these had made adjustments, compared with four fifths of the households where the respondent was a college graduate.

Larger households more frequently made energy-related adjustments as well. About 80 percent of the households with three or more members made some adjustments, compared with 73 percent with two members and 56 percent with only one person. Laundry and cooking adjustments were most frequent among households with five or more members. The fact that single member households seldom made adjustments probably reflects the high proportion of the elderly and young households with a smaller inventory of appliances.

Whether or not households were owner or renter occupied was another distinguishing characteristic. Almost 80 percent of the owner-occupied households had made adjustments and

the same percentage would make additional adjustments if energy prices increased by 25 percent. Only two thirds of the renters had made adjustments, but almost three-fourths would make adjustments if energy prices increased further. The reason for the lower incidence rate among renters is not entirely clear. But payments for the two primary energy sources, electricity and natural gas, were included in the household rent for 20 and 30 percent of the renters, respectively. Renters making indirect payments for energy are not likely to be as aware of how much energy they are using or the cost. Consequently, there is less incentive to make adjustments.

Impacts on Demand for Food and Fiber Products and Related Appliances

Food

In probing for possible effects on food demand, respondents who made cooking adjustments were asked how they reduced the use of ovens, stovetop burners, and specialty cooking items. The most common practices for reducing oven use were: (1) using the oven to cook more foods at the same time, (2) substituting specialty cooking appliances, and (3) purchasing more foods such as precooked or fresh foods which needed little or no cooking or baking.

Respondents reducing stovetop cooking mainly relied on greater use of specialty cooking appliances or using the oven to cook or bake more food at the same time. The reduction in specialty cooking appliance use was frequently accomplished by using the oven to cook or bake more at the same time. For all three groups, there was a very small shift towards more eating away-from-home because of higher energy prices.

How did these adjustments affect food demand? Our results indicate that probably not more than 5 percent of the households make a conscientious effort to shift to foods needing less cooking or heating or no cooking at all. This change could be accomplished by buying more fresh fruits, prepared bakery and cereal products,

dairy products, processed meats, and delicatessen items. About half of the respondents indicating a change in food purchases were less than 35 years of age. Also, the lower income households were more likely to make adjustment, and in the process, some of them may have even increased expenditures for more highly processed foods.

Fiber

Reductions in household heating, hot water temperatures, and use of clothes dryers could have had some indirect effects on fiber and detergent demand. Discomfort from cooler household temperatures during the winter months can be overcome by wearing more clothing such as sweaters and using more blankets. Reducing dryer use can stimulate demand for the wash-and-wear apparel items. Both of these adjustments would tend to increase demand for items made from the manmade fibers and their blends with cotton. Wool demand might also benefit, but woolen items are usually much more expensive.

Colder wash water temperatures probably have little impact on fiber preferences and demand but may have a greater effect on the types of detergents used. Most detergents on the market today are for use with warm or hot water, but there are several brands available for use in cool or cold water, and demand for these could strengthen.

Appliances

Findings from the nationwide survey suggest that the amount of energy used by an appliance is generally not considered before a replacement purchase. Only 10 percent of the households thought energy use would be considered if a stove, refrigerator, or other major appliance costing over \$100 needed replacing. Another 8 percent did not mention energy use per se, but indicated they would consider the cost of running the appliance before purchasing it.

Several other aspects of an appliance were considered more frequently than energy use or costs. Price of the appliance was mentioned most fre-

quently as 57 percent indicated they would consider it before securing a replacement. Half indicated that appliance size and 42 percent said brand name would be considered before purchase. Appliance style or other features (warranty, availability of maintenance service, and type of energy used) were each mentioned more frequently than the amount of energy used.

Respondents in the Northeast and those with higher education levels appeared to be more interested in energy use of appliances. Only 5 percent of those with less than a high school education said energy use would be considered compared with 17 percent with college educations. This probably reflects more knowledge or concern about higher prices or potential shortages in the future. In the Northeast, where energy prices have risen sharply, 13 percent would consider energy use of the appliance compared with 6 percent of respondents in the South.

Comments by appliance manufacturers support our survey findings. In an article in the *Wall Street Journal* on October 22, Richard Donegan of General Electric was quoted as saying, "The typical consumer just isn't interested in something that doesn't pay back the additional cost within 2 or 3 years." He also indicated that more energy efficient air conditioners seem to attract only those buyers whose electric rates are much higher. Mr. Yund of the Whirlpool Corporation also points out in the same article that unlike the auto industry, which can gain efficiency by making lighter weight cars, greater efficiency in home appliances requires making them heavier and more costly because of increased copper, insulation, and other materials.

Implications for the Food and Fiber Sector and Policymakers

Although three fourths of the households indicated they had made some type of adjustment to reduce energy use in 1975, a major question is did these adjustments have any significant effect on aggregate use of the energy sources by households. Slightly more than half of the

respondents in our study thought they were using the same amount as in the previous year, about one-third thought they were using less, and the rest believed they were using more of at least one energy source.

Since we did not collect data on actual utilization by households surveyed, it was not possible to determine changes in total energy use. However, data recently released by the Federal Power Commission and the Bureau of Mines suggest that energy use per household did not change between 1974 and 1975. Consequently, the net result was essentially a year of no growth on a per household basis. However, this was an improvement compared with the average annual growth rate of 2 to 3 percent per household during the '60s. Since more than twice as many thought they reduced energy use compared with those who thought they increased energy use, some of our respondents may have overestimated their efforts to conserve energy.

Food and Fiber Sector

Although one fourth of the households made some adjustment in food preparation as a result of higher energy prices, there is little evidence to suggest that this had any profound effect on food markets. But there was evidence of some substitution between products. However, other factors probably contributed far more towards the unstable market conditions that prevailed during this time period.

Nevertheless, there is reason for concern depending on future developments in energy prices. If prices should increase at a rapid rate, consumers might purchase more ready-to-eat or precooked foods on a large scale to reduce household energy consumption and energy expenditures. This development could present a serious problem to the food industry in the sense that consumers would shift energy demand from the household to food processors and distributors. Industry demand for electricity and natural gas would increase, but the question is whether or not the net effect is more efficient energy use.

The same problem might confront the fiber in-

dustry as well. Although trends are well established towards increased use of manmade fibers, household energy-reducing adjustments might further stimulate demand for these fibers and blends with cotton. This in turn would indirectly increase the demand for energy by the fiber producers both for processing and as a raw material.

Policy

For policymakers, this study revealed several problems. The fact that the low-income, less educated, and elderly made few changes bears out the need for a conservation education program. These households need to be made aware of inexpensive and practical alternatives to conserve energy.

Improvement in the energy efficiency of appliances is another problem. As long as consumers place more emphasis on price or brand than on energy efficiency, little in the way of energy savings can be expected in this area. Technological advancements are one apparent solution, especially if directed towards more energy efficient appliances. Furthermore, the availability of such appliances in the marketplace does not assure rapid adoption by the consuming public. Increased incentives might have to be provided to encourage the manufacture and purchase of the more energy efficient appliances.

Also, an incentive may be needed to encourage the abandonment of still useable but inefficient appliances.

One of the major dilemmas is how to effectively motivate the middle and higher income groups to make further reductions in energy use. Certainly greater conservation education could be helpful. These groups typically have larger homes, more appliances, and more funds to permit substantial energy savings by adopting good conservation practices. However, they are also the ones most likely to have increases in income to offset increases in energy prices and expenditures. Consequently, unless periods of rapid price escalation occur, there is a strong likelihood that the higher income households will try to enhance lifestyles and thus increase energy use.

Whether a policy of increasing household energy prices as fast or faster than increases in income would be an adequate incentive needs further examination. Certainly such a policy could have a major effect on the low income households and the elderly who usually have fixed incomes. Many of these were not motivated by higher prices in 1975. Of course, they may be able to reallocate some part of their income from food, clothing, or some other expenditure items to energy. But there are practical limits, and some other policy measures may have to be devised to resolve this problem.