Conservation
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Residential Energy Use to the Year 2000: A Regional Analysis

Eric Hirst
James B. Kurish

MASTER

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Eric Hirst
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ABSTRACT

A previous ORNL report evaluates the national energy and direct economic effects of implementing various residential energy conservation programs. This report evaluates the effects of these programs in each of the ten Federal regions. The programs considered are those proposed in the *National Energy Plan*: appliance efficiency targets, thermal standards for construction of new residences, and weatherization of existing housing units.

Implementation of these programs might cut cumulative (1977-2000) national residential energy use by 41 QBtu. Relative energy savings are highest in regions 7 and 8 (11 and 10% respectively, of their baselines) and smallest in region 9 (7%). The net economic benefit to the nation's households of these three federal programs is \$21 billion. Benefits exceed costs in each region; the benefit/cost ratio ranges from a low of 1.4 in region 10 to a high of 2.0 in region 6.

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INTRODUCTION

The purpose of this report is to evaluate the energy and economic effects in each of the ten Federal regions of implementing the residential energy conservation programs of the *National Energy Plan* (NEP). This involves a presentation of regional differences and an explanation of why the programs affect regions differently.

This work follows from our recent analysis of the national effects of these conservation programs.¹ Five of the same residential energy "futures" are evaluated here. The first (our baseline) involves increases in real fuel prices to the year 2000, as estimated by FEA and ERDA. However, no government conservation programs are implemented. Changes in energy use are voluntary and come about because of normal market forces only.

The second, third, and fourth cases consider the residential conservation programs authorized by the 94th Congress and expanded upon in the April 1977 energy message: appliance efficiency targets, thermal performance standards for new construction, and a retrofit program to affect 90% of the nation's housing stock. The final case is the combination of these three programs.

Each program is evaluated for its effects on regional residential energy use (by fuel, end use, and in aggregate) and on household economics (fuel bills, capital costs for equipment and structures) between 1977 and 2000. Tables 1 and 2 summarize the estimated energy and economic effects

Table 1. Alternative regional residential energy use projections: energy use (QBTu)

Federal region	Baseline			Appliance efficiency program		New construction standards		Retrofit program		Combined federal program	
	1976 fuel use	Cumulative energy use ^a	Annual growth rate ^b	Cumulative energy use ^a	Annual growth rate ^b	Cumulative energy use ^a	Annual growth rate ^b	Cumulative energy use ^a	Annual growth rate ^b	Cumulative energy use ^a	Annual growth rate ^b
1	0.9	26.8	1.8	26.4	1.7	26.1	1.7	25.5	1.6	24.4	1.3
2	1.7	49.6	1.6	48.7	1.5	48.6	1.5	47.5	1.4	45.6	1.2
3	1.7	51.6	1.8	50.6	1.7	50.7	1.7	49.1	1.6	47.1	1.4
4	2.4	78.3	2.1	77.1	2.0	76.9	2.0	74.3	1.9	71.8	1.7
5	3.9	115.1	1.5	112.3	1.3	112.5	1.3	110.1	1.2	104.8	1.0
6	1.6	46.4	1.5	45.1	1.3	45.8	1.4	43.7	1.2	41.9	1.0
7	1.0	30.3	1.5	29.3	1.3	29.7	1.3	28.7	1.2	27.1	0.9
8	0.5	14.3	1.4	14.0	1.2	13.8	1.2	13.6	1.1	12.8	0.8
9	1.5	45.6	1.9	45.0	1.8	44.9	1.8	43.8	1.7	42.4	1.6
10	0.6	18.6	1.4	18.4	1.3	18.3	1.3	17.9	1.2	17.2	1.0
U.S.	15.8	476.6	1.7	466.9	1.6	467.2	1.5	454.2	1.5	435.1	1.2

^aRefers to 1977-2000 period.^b1976-2000 average annual growth rate (%/year).Table 2. Alternative regional residential energy use projections: direct economic effects
Present worth of cumulative (1977-2000) expenditures at 8%
real interest rate (1975 dollars, in billions)

Federal region	Baseline		Appliance efficiency program		New construction standards		Retrofit program		Combined federal program	
	Fuels	Total ^a	Fuels	Total ^a	Fuels	Total ^a	Fuels	Total ^a	Fuels	Total ^a
1	44.2	54.0	43.7	53.8	43.3	53.4	42.3	53.2	40.9	52.4
2	81.3	102.6	80.1	102.2	80.0	101.8	78.1	101.3	75.7	100.1
3	73.8	97.4	72.6	97.1	72.7	96.7	70.4	96.0	68.0	94.9
4	95.9	134.5	94.6	134.7	94.5	133.7	91.1	132.4	88.5	131.8
5	147.7	191.1	144.4	190.0	144.9	189.4	141.6	188.5	135.6	185.8
6	63.3	86.1	61.5	85.0	62.6	85.6	59.7	84.5	57.3	83.1
7	34.5	45.7	33.5	45.2	33.9	45.3	32.9	45.0	31.2	44.1
8	14.5	19.4	14.2	19.4	14.1	19.3	13.8	19.1	13.2	19.0
9	63.7	86.8	62.9	86.8	62.9	86.4	61.3	85.8	59.6	85.4
10	16.8	22.0	16.6	22.1	16.6	21.9	16.1	21.8	15.6	21.7
U.S.	635.8	839.7	624.1	836.2	625.4	833.4	607.3	827.6	585.6	818.3

^aTotal expenditures includes both fuel expenditures and capital expenditures for improved equipment and structures.

of each of the five cases for each of the regions.* Figure 1 is a map of the United States showing the ten Federal regions.

Table 1 shows 1976 energy use for each of the ten regions. The table also shows cumulative (1977-2000) energy use for each of the five

*Quantities are given in British units. 1 QBTu = 1 Quad = 10^{15} Btu. 1 Btu = 1055 joules. Electricity use figures are in terms of primary energy (11,500 Btu/kwhr); that is, they include losses in generation, transmission, and distribution. Figures for gas and oil do not include losses associated with refining and transportation.

Fig. 1. Map of the United States showing Federal regions.

simulations. Differences in energy use between the baseline and any other simulation show energy savings due to that program. The energy benefits of the retrofit program are roughly double those due to either the appliance efficiency program or new construction standards. Although the combined program reduces national annual energy growth by 0.5% (from 1.7% to 1.2%), the reduction in annual growth rate among regions ranges from 0.3% (regions 9 and 10) to 0.6%/year (regions 5, 7, and 8).

Table 2 shows cumulative (1977-2000) household energy-related expenditures for each region and simulation. These expenditures are presented in terms of their present worth (in 1977) at a real interest rate of 8%. As with the energy savings, the retrofit program offers the largest economic benefit of the three programs considered. The regional variation in economic benefits is larger than is the variation in energy benefits.

The two U.S. maps of Fig. 2 show the regional variation in energy and economic benefits for the combined federal program. These maps show the energy (or economic) benefit per household in each region relative to the national per household benefit. Regions which are "average" have a per household energy (or economic) savings of 90% - 110% of the national average savings per household. Reasons for these differences among regions are discussed later.

These analyses were conducted with a detailed engineering-economic model of residential energy use developed at ORNL.² Development of the input data required to run these models for regions (rather than for the nation as a whole) is discussed in ref. 3.

Section 2 discusses the baseline projection for each region and the inputs required to generate these projections. Sections 3, 4, and 5 evaluate the regional effects of the three conservation programs noted above, and Section 6 discusses the combined federal program. Section 7 reviews the different futures and summarizes regional variations in energy and economic benefits for these programs.

Although the results of our projections are given as certainties, there is considerable doubt about what will happen between now and the year 2000. Part of this relates to the exogenous variables such as fuel prices, regional migration, and household formation. The rest relates to the model itself, both its structural form and the particular coefficients used in the model equations.

These doubts about future energy use patterns are compounded when we attempt to explain differences among regions. The major thrust of this report is to present the results of these fifty cases (ten regions

ECONOMIC SAVINGS

BELOW AVERAGE AVERAGE ABOVE AVERAGE

ENERGY SAVINGS

BELOW AVERAGE AVERAGE ABOVE AVERAGE

Fig. 2. Regional variation in per household energy and economic benefits of the combined Federal program. ("Average" is defined as regional per household benefit in the range of 90% - 110% of national per household benefit.)

x five cases/region); however we also try to explain why the projections differ among regions in terms of the explanatory variables used in the model: household formation, housing choices, incomes, fuel prices, and climate. This is a more difficult and uncertain task.

2. BASELINE

Inputs to the ORNL energy use model required to develop a projection include: population, fuel prices, per capita income, and specifications for government conservation programs. Each of these inputs must be provided for the 1970-2000 period.

We assume that national population grows according to the Bureau of the Census Series II projection.⁴ National per capita income is derived from a recent GNP projection prepared for FEA⁵ and the Series II population projection. These projections show population growing at an average rate of 0.8%/year and real per capita income growing at 2.4%/year between 1976 and 2000.

Projections of household formation, stocks of occupied housing units, and new construction are obtained from our housing model² using the per capita income and population projections noted above. The ORNL housing model produces estimates for each region as well as for the nation. The nation's households are distributed among regions on the basis of the most recent federal government projection of population distribution (from the Water Resources Council).⁶ Distribution of households among housing types is based on assumed national trends and regional variations in 1970.⁷ We assume that trends in housing choices (among single-family, multi-family, and mobile homes) between 1960 and 1970 will continue

through the end of the century:^{2,7} increases in multi-family and mobile home occupancy and declines in single-family unit occupancy.

The regional variation in per capita income is derived from the national projection using the Water Resources Council projections of income growth.⁶

National fuel price trajectories for electricity, gas, and oil are from the Federal Energy Administration⁵ and the Brookhaven National Laboratory⁸ energy models. These large energy supply/demand models integrate energy flows from resources in the ground to final demands. These national projections were regionalized using FEA projections for 1980, 1985, and 1990.⁹ These projections give residential fuel prices for each region for these three years. For the 1991-2000 period, we assumed the same regional variation in fuel prices as for 1990.*

Tables A1-A10 (in Appendix A) show the values used for population, households, housing distribution, per capita income, and fuel prices for each region from 1970 through 2000. These inputs remain constant for each of the five cases discussed in this report.

Based on information from Owens-Corning Fiberglas¹⁰ and the Bureau of the Census,¹¹ we assume that 14.3 million single-family units and 2.0 million multi-family units will be retrofit during the 1974-1980 period. (See Section 3 of ref. 1 for a discussion of this.) These retrofit units are shared among Federal regions on the basis of the regional variation in 1975¹¹ (fraction of occupied single-family detached

* Projecting future fuel prices, particularly on a regional basis, is a very difficult and uncertain task. Unfortunately, because fuel prices are important determinants of residential energy use, errors in fuel price projections will significantly affect results.

homes in each region that had some retrofit action taken in 1975, compared with the national fraction).

Finally, we assume that there are no Federal or state conservation programs in the baseline cases. That is, we ignore the programs mandated by the Energy Policy and Conservation Act (EPCA)¹² and the Energy Conservation and Production Act (ECPA),¹³ in particular the state energy conservation plans required by these Acts. These programs are considered explicitly in the following sections.

These inputs are provided to the ORNL residential energy use model. This model simulates household energy use at the regional level for four fuels, eight end uses, and three housing types. Each of these 96 fuel use components is calculated for each year of the simulation as functions of: stocks of occupied housing units and new construction, equipment ownership by fuel and end use, thermal integrity of housing units, average unit energy requirements for each type of equipment, and usage factors that reflect household behavior. The model also calculates annual fuel expenditures, equipment costs, and capital costs for improving thermal integrity of new and existing structures at the same level of detail. See refs. 1-3 for additional details on the model.

Table 3 shows the model's estimates of baseline energy use by fuel for each region; see also Table 1.* National household energy use grows at 1.7%/year, from 15.8 QBtu in 1976 to 23.5 QBtu in 2000.† Region 4

*The first ten tables in Appendix B are the summary sheets from the computer outputs generated for the baseline cases.

†National results for the baseline obtained by summing across regions agree closely with those obtained with the national model in ref. 1. The national projection in Table 3 is 4% lower than the one reported in ref. 1. This difference is due to assumptions on residential petroleum use. The national model assumes that all kerosene and fuel oil used for heating (as reported by the Bureau of Mines) is assigned to the residential sector. In the regional models, some of this petroleum is assigned (more properly) to the commercial sector. Thus, national estimates of residential petroleum use are about 25% less here than in ref. 1.

Table 3. Regional baseline projections: energy use by fuel
(QBTu/year)

Federal region	Electricity		Gas		Oil		Total ^a	
	1975	2000	1975	2000	1975	2000	1975	2000
1	0.32	0.77	0.16	0.28	0.37	0.28	0.86	1.33
2	0.52	1.26	0.56	0.75	0.56	0.43	1.67	2.45
3	0.69	1.66	0.59	0.70	0.30	0.18	1.66	2.56
4	1.59	3.25	0.47	0.61	0.19	0.07	2.40	3.98
5	1.36	3.32	1.94	1.99	0.47	0.19	3.91	5.55
6	0.83	1.61	0.57	0.59	0.05	0.01	1.57	2.25
7	0.39	0.90	0.48	0.51	0.05	0.02	1.01	1.45
8	0.17	0.42	0.25	0.23	0.03	0.01	0.48	0.68
9	0.67	1.63	0.77	0.72	0.01	0.00	1.48	2.36
10	0.46	0.72	0.09	0.15	0.06	0.02	0.63	0.90
U.S.	7.00	15.54	5.88	6.53	2.09	1.21	15.67	23.51

^aIncludes electricity, gas, oil, and "other" fuels (coal, coke, and LNG).

has the highest growth (2.1%/year); regions 8 and 10 have the lowest growth (1.4%/year). Most of this variation is explained by differences in household growth among regions.

Energy use per household declines in all but one region. In region 7, energy use per household remains constant between 1976 and 2000, while in region 5 the decline is greatest at 0.4%/year. Fuel prices increase more rapidly in region 5 than in region 7 (Tables A5 and A7). Growth in per capita income is the same in both regions so this is unlikely to cause differences in energy use. The fraction of homes retrofit in region 5 is slightly higher than the fraction in region 7.

Energy use per household varies considerably across regions. For example, in 1976 per household fuel use in regions 7 and 10 was more than 50% greater than in region 9. To some extent, higher fuel use in regions 7 and 10 is due to much colder winters [5800 heating degree days (HDD) in region 7 and 5600 HDD in region 10, compared with 2600 HDD in region 9]. Also fuel prices were lower in region 7 than in region 9 during the early 1970's. Electricity prices were lower in region 10

than in any other region during the early 1970's. Finally, the fraction of households in single-family units was higher in regions 7 and 10 than in region 9 (75% versus 65%); single-family units require more fuel for heating and air conditioning than do either multi-family or mobile home units. These differences in per household energy use across regions persist to the end of the century.

The average fuel bill also varies considerably among regions. In 1976, region 1 had the highest average fuel bill (\$690/household), while region 9 had the lowest (\$440). In the year 2000, fuel bills are still highest in region 1 (\$850) but the lowest fuel bill is now in region 10 (\$580 compared with \$610 in region 9). Fuel bills are high in region 1 because of cold winters and high fuel prices. Fuel bills are low in region 9 because mild winters lead to low energy use per household. Fuel bills are low in region 10 because of their very low electricity prices. (The tables in Appendix B provide more detail on these regional baseline projections.)

The distribution of household energy use by fuel changes over time. Shares of total fuel use accounted for by electricity increase and shares accounted for by oil decrease in every region. The shares accounted for by gas decrease in all regions except 1 and 10; in these regions the gas share increases only slightly. Electricity's share increases in all regions primarily because increases in electricity prices are less than increases in gas and oil prices.

The distribution of energy by end use also changes over time in the baseline. Space heating decreases and air conditioning increases as a fraction of the total in all regions.

These results show that there are large differences among regions in household energy growth patterns and expenditures; see Tables 1-3. While it is difficult to quantify the influence of each determinant on these changes and differences, it appears that the following variables influence residential energy use patterns: climate (heating and cooling degree days), income, fuel prices, housing choices; as well as other factors not explicitly included in our analyses (e.g., construction characteristics, lifestyles, income distribution, age composition of households, gas availability constraints).

The following sections evaluate the regional effects of government conservation programs. Table 4 summarizes existing authorizations^{12,13} and the NEP proposals¹⁴ concerning residential energy conservation. We evaluate the programs in four elements:

Table 4. Recent federal legislation and proposals affecting residential energy use

Energy Policy and Conservation Act (PL 94-163, Dec. 22, 1975)
Residential equipment and appliance labeling (FEA, FTC)
Residential equipment and appliance efficiency targets (FEA)
State energy conservation plans (FEA):
Thermal efficiency standards for new and renovated buildings
Energy Conservation and Production Act (PL 94-385, Aug. 14, 1976)
Thermal standards for new buildings (HID)
Financial assistance to weatherize existing buildings (FEA)
State conservation plans (FEA):
Public education programs
Energy audits
Conservation assistance for existing buildings (HUD)
Demonstration programs
Financial assistance
Energy conservation obligation guarantees (FEA)
President's Energy Program (Apr. 20, 1977)
Replace voluntary appliance efficiency targets with mandatory standards
Thermal standards for new buildings by 1980 (HUD)
Retrofit 90% of existing residences:
Tax credits
Utility conservation programs
Provision of capital at low interest rates
Rural home weatherization program
Increase funding for low-income weatherization program

Source: ref. 1.

1. appliance efficiency targets
2. thermal performance standards for new construction
3. weatherization (retrofit) of existing housing units
4. all of the above.

The time between Congressional authorization and full program implementation can involve several years. The programs discussed here were all authorized by the 94th Congress; the President has proposed stronger programs in each area. However, none of the programs is yet implemented.

Each of these programs is compared to the baseline in terms of energy use and household costs in each region. The inputs discussed earlier (Tables A1-A10) remain unchanged for these runs.

3. APPLIANCE EFFICIENCY TARGETS

The Federal Energy Administration administers a program to develop and implement a set of appliance efficiency targets. These targets must ensure that the average efficiency of new appliances sold in 1980 is at least 20% higher than the 1972 average.^{12,13} The president proposed that the existing voluntary program be made mandatory.¹⁴ The FEA targets* used in this analysis are shown in Table 5.⁵ The numbers in Table 5 show the maximum allowable annual energy use for new equipment relative to annual energy use averages for 1970.

Inputs to the model require that the appliance targets of Table 5 be met for each year, 1980-2000. The model chooses either the given

*Targets published in the *Federal Register* ("Energy Conservation Program for Appliances," 42(36), July 15, 1977) do not include central heating and air conditioning systems. Otherwise, these targets agree with those provided to us earlier by FEA (ref. 5).

Table 5. Assumed improvements in 1980
energy requirements for new equipment
from FEA appliance efficiency
targets (1970 = 1.0)

Space heating	
Electric	1.0
Gas	0.81
Oil	0.93
Water heating	
Electric	0.85
Gas	0.80
Oil	0.81
Refrigerators	0.68
Freezers	0.77
Air conditioners	
Room	0.65
Central	0.80
Other appliances	0.90

Source: ref. 1.

appliance efficiency target or the voluntary response to fuel price changes, whichever yields more efficient equipment. Thus the standards affect equipment choices only when the assumed price response in the energy model does not.

Table 6 and Fig. 3 summarize the energy and economic effects of adopting these appliance efficiency targets in each region.* The cumulative (1977-2000) energy saving for the nation is 9.7 QBTu, equal to 2.0% of the baseline. The percentage savings range from a low of 1.4% in regions 1, 4, 9, and 10 to a high of 3.4% in region 7.

The relatively low prices for natural gas throughout the forecast period and the slow growth in electricity prices in region 7 account for the relative strength of the appliance program. Low fuel prices lead to only slight voluntary improvements in appliance efficiency; hence the standards have a large effect.

* The "normalized" savings refer to the per household energy (or economic) benefit in the region compared to the national per household energy (or economic) benefit. Thus, households in regions with normalized savings greater than 1.0 enjoy larger than average benefits.

Table 6. Cumulative (1977-2000) energy and economic effects of appliance efficiency program^a

Federal region	Energy savings				Economic benefits ^b			
	QBtu	Percent of baseline	Percent of national savings	Normalized savings ^c	1975 dollars (in billions)	Benefit ^d Cost	Percent of national savings	Normalized savings ^c
1	0.37	1.4	3.8	0.7	0.13	1.3	3.8	0.7
2	0.87	1.8	8.9	0.7	0.45	1.6	13.0	1.1
3	1.01	2.0	10.4	0.9	0.35	1.4	10.1	0.9
4	1.13	1.4	11.6	0.7	-0.17	0.9	-4.9	-0.3
5	2.81	2.4	28.9	1.4	1.10	1.5	31.9	1.5
6	1.30	2.8	13.3	1.4	1.13	2.7	32.8	3.4
7	1.03	3.4	10.6	2.1	0.55	2.0	15.9	3.2
8	0.32	2.2	3.3	1.3	-0.02	0.9	-0.6	-0.2
9	0.64	1.4	6.6	0.6	0.03	1.0	0.9	0.1
10	0.26	1.4	2.7	0.9	-0.10	0.7	-2.9	-1.0
U.S.	9.74	2.0	100	1.0	3.45	1.4	100	1.0

^aThe energy and economic changes are calculated relative to the baseline.^bPresent worth of economic benefits at 8% real interest rate.^cPercent of national energy or economic savings divided by percent of 1990 households.^dFuel expenditures savings divided by incremental capital costs.

Fig. 3. Energy and economic effects of appliance efficiency targets. (Normalized savings refer to the regional energy or economic benefit per household divided by the national energy or economic benefit per household.)

Fuel prices increase rapidly in the four regions where the appliance standards have little effect on energy use. For example, electricity prices increase by almost 50% between 1975 and 2000 in regions 9 and 10. In these regions, the voluntary response to fuel price increases robs the targets of their potency.

The variation in economic benefits among regions is larger (and more difficult to explain) than the variation in energy savings; see Table 6 and Fig. 3. Nationally, the economic benefits (reduced fuel bills) exceed the economic costs (higher capital costs for more efficient equipment) by \$3.5 billion. However, in some regions the costs exceed the benefits (regions 4, 8, and 10).

Economic costs exceed benefits in regions 4 and 10 because of their very low electricity prices throughout the projection period. Electricity prices have historically been low because of the presence of large federal power agencies (Tennessee Valley Authority in region 4 and Bonneville Power Administration in region 10). Thus, even though electricity prices increase faster in these regions than in the nation as a whole, prices start from such a low level that they are generally lower in regions 4 and 10 than anywhere else. Because of low electricity prices, electricity is the dominant fuel in these regions, accounting for about 75% of cumulative household fuel use.

In region 8, on the other hand, gas is the dominant household fuel. Gas prices in region 8 are always lower than in any other region. Also, electricity prices remain roughly constant in region 8 between 1970 and 2000. Thus, the price of electricity in region 8 is lower during the projection period than is the price of electricity in region 4.

It appears that low prices for the dominant household fuels in regions 4, 8, and 10 account for the economic cost of the appliance program in these regions. The dollar value of the fuel saved does not exceed the extra cost of efficient equipment because fuel prices are so low.

The relative economic benefits are highest in regions 6 and 7. The energy savings due to the appliance program are also largest in these regions. Natural gas prices remain low in both regions throughout the projection period. Thus, it appears that the large energy and economic benefits are due to the lack of voluntary improvement in gas appliance efficiency and the large changes in efficiency required by the standards.

4. NEW CONSTRUCTION STANDARDS

The ECPA requires the Department of Housing and Urban Development (HUD) to develop thermal standards for construction of new buildings within three years (by 1979).¹³ These standards must then be implemented by the states, but only if Congress first approves them. The President proposed to "advance by one year, from 1981 to 1980, the effective date of the mandatory standards required for new residential and commercial buildings."¹⁴ Table 7 summarizes the likely improvements in space heating and air conditioning loads because of these standards.¹⁵ These standards provide larger percentage savings in multi-family units than in single-family units. This is consistent with the changes likely from implementing the ASHRAE 90-75 standards or the June 1974 HUD standards.¹⁶ We also assume that all mobile homes constructed between 1976 and 2000 meet the recent HUD standards.¹⁷

Table 7. Assumed improvements in thermal integrities for space heating of residential structures (1970 = 1.0)

	1980 new construction standards	Retrofit actions ^a	
		Voluntary	Federal
Single-family units	0.70/(0.48-0.68 ^b)	0.80	0.65
Multi-family units	0.48	0.80	0.72
Mobile homes	0.80		

^aVoluntary retrofits are assumed to apply to 14.3 million single-family and 2.0 million multi-family units between 1974 and 1980. The federal program is assumed to apply to 42.3 million single-family and 7.3 million multi-family units between 1974 and 1984; this includes the voluntary retrofits. See Table 9 for regional allocations of these totals.

^bThe first number applies to electrically heated homes; the range of the second and third numbers applies to homes heated with gas and oil. For the regional value within this range see Table A11 and Fig. 2.

We assume that there is no regional variation in the standards for multi-family units and for mobile homes.^{16,18} This implies that the standards will require approximately the same percentage reduction in annual space heating load (relative to construction practices of the early 1970's) in each region.

Figure 4 shows the assumed regional variation in construction standards for gas-and oil-heated single family homes.^{16,18,19} These standards require greater percentage improvements in cold climates (high HDD) than in mild climates. This regional variation is based on variations in the ASHRAE 90-75 standards and the 1974-FHA standards.

As Fig. 4 shows, we assume that the ASHRAE standards are adopted in all regions in 1978 and that tougher standards are adopted in 1980. (This type of two-part standard is also assumed for multi-family units, but not for mobile homes.)

Table 8 and Fig. 5 summarize the regional effects of adopting these assumed HUD standards in 1980. The cumulative national savings amount to 9.4 QBtu, 2.0% of the baseline. This is almost as much as the savings due to the appliance program.

Fig. 4. Effects of thermal performance standards on annual space heating thermal loads relative to 1970 thermal loads for new single-family units.

Table 8. Cumulative (1977-2000) energy and economic effects of new construction program^a

Federal region	Energy savings				Economic benefits ^b			
	QBTu	Percent of baseline	Percent of national savings	Normalized savings ^c	1975 dollars (in billions)	Benefit ^d / Cost	Percent of national savings	Normalized savings ^c
1	0.67	2.5	7.1	1.2	0.58	2.9	9.3	1.6
2	1.00	2.0	10.6	0.9	0.82	2.6	13.2	1.1
3	0.98	1.9	10.4	0.9	0.73	2.7	11.7	1.0
4	1.35	1.7	14.3	0.8	0.82	2.6	13.2	0.8
5	2.61	2.3	27.6	1.3	1.68	2.5	27.0	1.3
6	0.64	1.4	6.8	0.7	0.50	2.8	8.0	0.8
7	0.65	2.1	6.9	1.4	0.41	3.0	6.6	1.3
8	0.46	3.2	4.9	1.9	0.16	1.7	2.6	1.0
9	0.74	1.6	7.8	0.7	0.41	1.9	6.6	0.6
10	0.34	1.8	3.6	1.2	0.11	1.9	1.8	0.6
U.S.	9.44	2.0	100	1.0	6.22	2.5	100	1.0

^aThe energy and economic changes are calculated relative to the baseline

^bPresent worth of economic benefits at 8% real interest rate.

^cPercent of national energy or economic savings divided by percent of 1990 households.

^dFuel expenditures savings divided by incremental capital costs.

As Fig. 5 shows, the regional variation in relative energy savings is much smaller than for the appliance standards. The saving in region 8 is 3.2% of its baseline while that in region 6 is 1.4%. This variation can be explained primarily by differences in climate between the two regions. Region 8 is the coldest in the nation (Table All); thus

Fig. 5. Energy and economic effects of new construction standards.

the standards offer the largest savings here in both absolute and relative terms. Region 6, on the other hand, has the mildest winters (2600 HDD compared with 7800 HDD in region 8). The other regions with larger than average energy savings due to the standards (regions 1, 2, 5, 7, and 10) all have colder than average winters.

In contrast with the appliance standards, the benefits exceed costs in each region for the new construction standards. Nationally, benefits exceed costs by \$6.2 billion. The relative economic benefits are highest in region 1 (Fig. 5), probably because of the high fuel prices in this region. The benefits are relatively small in region 10 because of the region's very low fuel prices. In region 9, the relative benefits are low because of the mild climate (2600 HDD).

5. FEDERAL RETROFIT PROGRAM

A number of provisions in EPCA¹² and ECPA¹³ encourage weatherization of existing structures. For example, ECPA authorizes FEA to provide financial assistance to low-income households to weatherize their structures and authorizes HUD to conduct demonstration programs to provide financial assistance for improving the energy performance of existing buildings. The April 1977 energy message¹⁴ proposes a number of measures to meet the goal of "insulating 90% of all residences." These measures include tax credits for retrofits, requirements that electric and gas utilities assist their customers in weatherizing structures, increased funding for the low-income weatherization program, and implementation of a rural home weatherization program.

Based on conversations with FEA staff,¹⁵ we assume the parameters for the national retrofit program shown in Table 7. The national average retrofit costs per housing unit are \$580 for single-family and \$240 for multi-family units. These reductions in heating and cooling demands are assumed to be implemented in 42 million single-family homes and 7 million multi-family homes by 1985.

Table 9 shows the number of homes retrofit in each region. In allocating the national totals among regions for the voluntary program (baseline), we assume that the regional variation in retrofit intensity (i.e., the fraction of housing units retrofit in each region) will follow that observed in 1975.¹¹ The 1975 data show that regions 1, 2, 5, 7, and 8 retrofit larger fractions of their housing stocks than did the nation as a whole. These regions all have colder than average winters. Region 10, which also has a colder than average winter, had a much lower

Table 9. Regional distribution of retrofit housing stocks (10⁶)

Federal region	Retrofit intensity relative to U.S. ^a	Voluntary retrofit program (1974-1980)		Federal retrofit program (1974-1984)	
		Single-family	Multi-family	Single-family	Multi-family
1	1.31	0.87	0.21	1.96	0.78
2	1.26	1.44	0.55	3.44	2.02
3	0.96	1.65	0.19	5.08	0.68
4	0.76	1.98	0.14	7.59	0.49
5	1.32	4.11	0.52	9.37	1.91
6	0.76	1.28	0.08	4.93	0.29
7	1.27	1.11	0.09	2.63	0.32
8	1.16	0.49	0.04	1.26	0.17
9	0.65	1.03	0.15	4.60	0.53
10	0.66	0.33	0.03	1.44	0.10
U.S. ^b	1.00	14.29	2.00	42.30	7.29

^aRatios calculated from unpublished data in *Annual Housing Survey: 1975*.

^bU.S. totals are from ref. 1.

retrofit intensity than the nation. Presumably, this is because of low fuel prices in region 10.

FEA assumes that 90% of the 1974 stock of occupied single-family units will be retrofit under the *National Energy Plan*.^{14,15} We assume that this percentage applies to each region. Thus, a larger fraction of homes are retrofit because of NEP in regions that have low retrofit intensities (first column of Table 9): regions 3, 4, 6, 9, and 10. However, for multi-family units (of which about one-third are retrofit because of NEP), we use the regional variation observed during 1975.¹¹

Finally, we assume that the federal retrofit program will encourage households to adopt weatherization practices that are cost-effective in each region. In other words, we assume that the program will recognize regional differences in climate, fuel prices, and historical construction practices (as is roughly true for the new construction standards). This was implemented in our analysis by retrofitting homes in each region to the same benefit/cost ratio.

Table 10 and Fig. 6 summarize the regional energy and economic benefits of implementing the federal retrofit program described above.

Table 10. Cumulative (1977-2000) energy and economic effects of federal retrofit program^a

Federal region	Energy savings				Economic benefits ^b			
	QBTu	Percent of baseline	Percent of national savings	Normalized savings ^c	1975 dollars (in billions)	Benefit ^d Cost	Percent of national savings	Normalized savings ^c
1	1.25	4.7	5.6	1.0	0.77	1.7	6.3	1.1
2	2.08	4.2	9.3	0.8	1.31	1.7	10.8	0.9
3	2.56	4.9	11.4	1.0	1.47	1.8	12.1	1.1
4	3.98	5.1	17.7	1.0	2.10	1.8	17.3	1.0
5	5.00	4.3	22.2	1.1	2.59	1.8	21.4	1.0
6	2.69	5.8	12.0	1.2	1.58	1.8	13.0	1.3
7	1.56	5.2	6.9	1.4	0.72	1.8	5.9	1.2
8	0.70	4.9	3.1	1.2	0.28	1.8	2.3	0.9
9	1.85	4.1	8.2	0.7	1.03	1.8	8.5	0.7
10	0.78	4.2	3.5	1.2	0.28	1.8	2.3	0.8
U.S.	22.45	4.7	100	1.0	12.13	1.8	100	1.0

^aThe energy and economic changes are calculated relative to the baseline.^bPresent worth of economic benefits at 8% real interest rate.^cPercent of national energy or economic savings divided by percent of 1990 households.^dFuel expenditures savings divided by incremental capital costs.

Fig. 6. Energy and economic effects of Federal retrofit program.

The cumulative national energy saving of 22.5 QBTu is more than double the energy savings estimated for either the appliance efficiency or new construction standards. The retrofit energy savings are large both because so many housing units are affected by the program and because of the large improvement in thermal integrity assumed for those units retrofit.

As a percent of baseline energy use, retrofit savings are greatest in region 6 (5.8% of the baseline) and lowest in region 9 (4.1%). Energy savings per household are highest in region 7 and lowest in region 9. The regional variation seems to be due to the interaction of climatic variation (HDD) and the number of additional homes retrofit because of the program. The regional variation in energy savings, however, is much smaller than for either the appliance standards or the new construction standards.

The net economic benefit of the federal retrofit program amounts to \$12 billion for the nation. The benefit/cost ratio is roughly the same for each region (1.8), by assumption. The economic benefit per household is highest in regions 6 and 7 and lowest in region 9. Here again, the regional variation is much smaller than for either the appliance standards or the new construction standards.

6. COMBINED FEDERAL PROGRAM

Table 11 and Figs. 2 and 7 summarize the regional effects of implementing all three of the programs discussed in sections 3, 4, and

Table 11. Cumulative (1977-2000) energy and economic effects of combined federal program^a

Federal region	Energy savings				Economic benefits ^b			
	QButu	Percent of baseline	Percent of national savings	Normalized savings ^c	1975 dollars (in billions)	Benefit ^d Cost	Percent of national savings	Normalized savings ^c
1	2.33	8.7	5.6	1.0	1.52	1.8	7.2	1.3
2	3.93	7.9	9.5	0.8	2.53	1.8	11.9	1.0
3	4.50	8.7	10.9	1.0	2.49	1.7	11.7	1.0
4	6.45	8.2	15.6	0.9	2.69	1.6	12.7	0.7
5	10.34	9.0	25.0	1.2	5.23	1.8	24.6	1.2
6	4.50	9.7	10.9	1.1	2.97	2.0	14.0	1.4
7	3.21	10.6	7.8	1.6	1.61	1.9	7.6	1.5
8	1.48	10.3	3.6	1.4	0.41	1.5	1.9	0.7
9	3.18	7.0	7.7	0.6	1.43	1.5	6.7	0.6
10	1.40	7.5	3.4	1.1	0.35	1.4	1.6	0.5
U.S.	41.32	8.7	100	1.0	21.23	1.7	100	1.0

^aThe energy and economic changes are calculated relative to the baseline.^bPresent worth of economic benefits at 8% real interest rate.^cPercent of national energy or economic savings divided by percent of 1990 households.^dFuel expenditures savings divided by incremental capital costs.

Fig. 7. Normalized energy savings for Federal conservation programs.

5.* National cumulative energy savings total 41 QBTU,[†] slightly less than the sum of the individual savings due to the three programs separately.[‡] The relative savings are largest in regions 7 and 8 (11 and 10% of their baselines) and smallest in region 9 (7%). Because the retrofit program accounts for more than half the energy savings, the regional variation for the combined federal program is similar to that for the retrofit program (compare Tables 10 and 11).

The net economic benefit of the combined federal program is \$21 billion, slightly less than the sum of the benefits from each of the programs individually. The benefits exceed costs in each region. Once again, the regional variation in economic benefits closely follows that for the retrofit program.

Implementing the residential conservation programs of NEP thus reduces regional energy use growth by 0.3 to 0.6%/year. The benefit/cost ratio for the combined program ranges from a low of 1.4 (region 10) to a high of 2.0 (region 6).

As Table 11 and Fig. 2 show, regions 1, 5, 6, and 7 enjoy larger than average economic benefits due to implementation of these conservation programs. Regions 4, 8, 9, and 10 enjoy smaller than average benefits.

* The second set of ten tables in Appendix B is the summary sheets from the computer output generated for each of the runs with the combined Federal program.

[†] National energy savings estimated in ref. 1 total 46 QBtu, about 10% higher than the present estimate.

[‡] Improvements in efficiency of new heating and air conditioning equipment interact with improvements in structure thermal integrity so that the combined saving is less than the sum of the two.

Fortunately, benefits exceed costs in every region. Benefits are particularly low in regions 9 and 10 because of mild winters (region 9) and low fuel prices (region 10).

Figure 7 shows the regional variation in energy savings for each of the three federal programs. The regional variation is greatest for the appliance efficiency targets and least for the retrofit program; the same is true for the economic benefits of each program. Benefits of the appliance targets show such large regional variations because the appliance efficiency targets are the same across regions and do not account for regional variation in fuel prices and climate. The new construction standards and retrofit program, on the other hand, do account for regional differences. Therefore, the regional variations in benefits are less for these two programs.

Figure 8 shows the cumulative (1977-2000) energy savings by fuel for the combined program in each region. Of the total savings (41 QBTU), 66% is electricity and 34% is gas and oil. Electricity savings as a fraction of the total are lowest in regions 1, 2, and 8 (0.46) and highest in regions 4, 6, and 9 (0.81, 0.85, 0.79). These fractions correspond closely to the contribution of electricity to the baseline energy totals in 2000 for the regions (Table 3). Electricity accounts for large fractions of total energy savings primarily because baseline growth in electricity is so much higher than for other residential fuels. This is because of the assumed slower growth in electricity prices and because air conditioning and freezers (the only "growth" markets in the residential sector) are served only by electricity.

Fig. 8. Regional energy savings by fuel for combined Federal program.

7. SUMMARY

We used a detailed engineering-economic model of residential energy use to evaluate the effects of five residential energy futures for each of the ten Federal regions. The five futures include a baseline, appliance efficiency program, thermal standards for new residential construction, a retrofit program, and the combination of these three programs.*

*Many government programs and policies in effect, under development, or under consideration were not analyzed here: information programs, energy-efficiency labels for household equipment and structures, elimination of master-metering in multi-family units, changes in electricity and gas rate structures, and government R&D programs to develop new energy-efficient systems.

Each of these futures is described in terms of annual and cumulative (1977-2000) energy use by fuel, end use, and in aggregate. Outputs from the model also include economic information on the costs to households in each region of fuels, equipment, and thermal improvements to new and existing structures. The major outputs from these runs are shown in Tables 1 and 2; detailed outputs are in Appendix B.

Each of the residential conservation programs in the *National Energy Plan* is likely to reduce energy growth in each of the Federal regions (Fig. 7). However, the energy benefits vary substantially across regions. Cumulative energy savings in regions 7 and 8 are 11 and 10%, respectively, of their baseline energy figures. Savings in regions 9 and 10, on the other hand, are less than 8% of the baseline. Average annual growth rates are reduced by 0.3 - 0.6%/year.

Energy savings are high in regions 7 and 8 because of their harsh winters. Thus, improvements in structures and in heating equipment yield large Btu savings in these regions. Savings in region 9, on the other hand, are low because of its very mild winters.

The combined federal program saves money for households in each of the federal regions. However, the appliance program is likely to cost more than it saves in regions 4, 8, and 10. Regions 1, 5, 6, and 7 enjoy larger than average economic benefits. Regions 4, 8, 9, and 10, on the other hand, receive smaller economic benefits than the average. Benefits are relatively low in regions 4, 8, and 10 because of low fuel prices in those regions. Benefits are small in region 9 because of mild winters.

It is extremely difficult to pinpoint and quantify those factors that account for differences among regions in the energy and economic benefits of these conservation programs. It appears that fuel prices

and climate play particularly important roles. However, levels and growth in income, household formation, new housing construction, housing choices, and other variables not explicitly included in the analysis surely influence the results.

In closing, we note again that these programs are likely to provide large national energy and economic benefits.¹ However, the regional distribution of these benefits varies significantly. Implementation of these conservation programs requires careful attention to issues of equity to ensure that some regions do not suffer economically.

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APPENDIX A: Regional Inputs to the Residential Energy Use Model

Table A1. Assumed inputs for all projections of residential energy use: Region 1

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	11.8	3.7	55.6	42.8	1.6	5,958	3.13	2.57	1.83
1975	12.4	4.1	53.2	44.9	1.9	6,090	3.91	3.06	3.13
1980	12.9	4.7	51.1	46.7	2.2	7,796	3.63	3.19	3.06
1985	13.5	5.2	49.5	48.1	2.5	8,650	3.82	3.88	3.26
1990	14.0	5.6	48.3	49.0	2.7	9,649	4.04	4.39	3.59
2000	15.2	6.6	47.2	49.8	3.1	11,422	4.29	4.70	3.75

Table A2. Assumed inputs for all projections of residential energy use: Region 2

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	25.6	7.9	45.1	53.8	1.1	6,520	3.33	2.07	1.85
1975	26.5	8.8	42.7	56.0	1.3	6,601	4.40	2.50	2.85
1980	27.4	9.9	40.7	57.8	1.5	8,571	3.93	2.94	3.07
1985	28.6	11.0	39.2	59.1	1.7	9,528	4.03	3.52	3.35
1990	29.7	12.0	38.1	60.0	1.8	10,523	4.10	3.89	3.64
2000	32.0	13.9	37.1	60.8	2.1	12,287	4.33	4.14	3.81

Table A3. Assumed inputs for all projections of residential energy use: Region 3

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	23.6	7.3	72.0	25.5	2.5	5,480	2.67	1.70	1.77
1975	24.5	8.1	69.7	27.2	3.1	5,990	3.28	1.93	2.78
1980	25.6	9.3	67.8	28.6	3.6	7,302	3.04	2.53	3.24
1985	26.8	10.3	66.2	29.7	4.0	8,070	3.31	3.06	3.50
1990	27.9	11.3	65.1	30.5	4.5	9,069	3.50	3.33	3.81
2000	29.9	13.0	63.9	31.1	5.0	10,784	3.71	3.55	3.98

Table A4. Assumed inputs for all projections of residential energy use: Region 4

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	32.2	10.0	78.0	16.6	5.4	4494	1.99	1.44	1.75
1975	34.4	11.4	75.7	17.7	6.6	4994	2.43	1.49	2.80
1980	36.8	13.3	73.6	18.7	7.7	5998	2.65	2.09	3.31
1985	39.3	15.1	71.9	19.4	8.7	6749	2.85	2.62	3.57
1990	41.9	16.9	70.6	19.8	9.6	7611	2.91	3.04	3.89
2000	45.9	20.0	69.0	20.2	10.9	9224	3.08	3.24	4.06

Table A5. Assumed inputs for all projections of residential energy use: Region 5

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	44.5	13.8	70.1	27.4	2.5	5,682	2.80	1.36	1.70
1975	46.1	15.3	67.8	29.1	3.0	6,086	2.88	1.53	2.64
1980	47.9	17.3	65.8	30.6	3.6	7,565	2.80	2.08	2.87
1985	50.0	19.3	64.2	31.8	4.0	8,426	3.14	2.53	3.20
1990	52.0	21.0	63.1	32.5	4.4	9,375	3.25	3.18	3.49
2000	55.4	24.1	61.8	33.2	5.0	11,130	3.47	3.40	3.64

Table A6. Assumed inputs for all projections of residential energy use: Region 6

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	20.5	6.3	81.1	15.9	3.0	4693	2.58	1.16	1.72
1975	21.1	7.0	79.2	17.1	3.7	5310	2.35	1.35	2.72
1980	21.8	7.9	77.6	18.1	4.3	6231	3.51	1.67	3.03
1985	22.8	8.8	76.2	18.9	4.9	6978	3.59	1.95	3.30
1990	23.8	9.6	75.1	19.4	5.5	7849	3.77	2.45	3.59
2000	25.2	11.0	73.9	19.9	6.2	9494	4.00	2.61	3.77

Table A7. Assumed inputs for all projections of residential energy use: Region 7

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	11.3	3.5	77.9	19.1	3.0	5,244	2.92	1.19	1.70
1975	11.4	3.8	75.9	20.4	3.7	5,824	2.66	1.29	2.67
1980	11.6	4.2	74.1	21.6	4.3	6,929	2.98	1.56	2.77
1985	11.9	4.6	72.6	22.5	4.9	7,819	3.12	1.80	3.09
1990	12.3	5.0	71.5	23.1	5.4	8,701	3.04	2.49	3.40
2000	12.6	5.5	70.2	23.6	6.1	10,433	3.24	2.65	3.55

Table A8. Assumed inputs for all projections of residential energy use: Region 8

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	5.7	1.8	74.1	21.1	4.8	4878	2.89	1.08	1.83
1975	5.9	1.9	71.7	22.5	5.9	5569	2.43	1.17	2.80
1980	6.0	2.2	69.6	23.6	6.8	6585	2.34	1.58	2.96
1985	6.2	2.4	67.9	24.4	7.7	7407	2.43	1.78	3.28
1990	6.4	2.6	66.5	25.0	8.5	8247	2.60	2.41	3.57
2000	6.6	2.9	65.0	25.4	9.6	9868	2.77	2.57	3.71

Table A9. Assumed inputs for all projections of residential energy use: Region 9

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	23.2	7.2	67.2	29.4	3.4	6,142	2.56	1.35	2.03
1975	24.5	8.1	64.7	31.1	4.1	6,477	2.92	1.53	2.99
1980	26.1	9.4	62.6	32.6	4.8	7,871	3.46	2.27	3.02
1985	27.7	10.7	60.9	33.7	5.4	8,706	3.51	2.35	3.27
1990	29.4	11.9	59.6	34.4	5.9	9,677	3.56	2.97	3.59
2000	32.0	13.9	58.3	35.0	6.7	11,374	3.79	3.17	3.76

Table A10. Assumed inputs for all projections of residential energy use: Region 10

	Population (10 ⁶)	Households (10 ⁶)	Distribution of occupied housing units (%)			Per capita income (1975 \$)	Fuel prices (1975 \$/10 ⁶ Btu)		
			Single-family	Multi-family	Mobile homes		Electricity	Gas	Oil
1970	6.6	2.0	75.5	19.7	4.8	5,383	1.39	1.94	2.03
1975	6.7	2.2	73.2	21.0	5.9	6,117	1.26	2.09	2.93
1980	6.9	2.5	71.1	22.1	6.8	7,175	1.71	3.08	3.02
1985	7.1	2.8	69.4	22.9	7.7	7,972	1.78	3.08	3.27
1990	7.4	3.0	68.1	23.4	8.5	8,938	1.93	2.66	3.59
2000	7.9	3.4	66.6	23.8	9.6	10,596	2.06	2.83	3.76

Table A11. Regional climatic variations: 1970

Federal region	Heating degree days	Cooling degree days
1	6787	479
2	5984	809
3	5367	955
4	2913	2113
5	6677	806
6	2575	2278
7	5763	1273
8	7792	480
9	2611	909
10	5625	259
U.S.	4932	1172

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APPENDIX B: Summary Pages from Computer Outputs for Baseline and Combined Federal Program Cases

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY																
FEA REGION 1 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																
ELECTRICITY IN TERMS OF PRIMARY ENERGY																
SUMMARY OF PROGRAM OUTPUTS																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	20.46	21.83	22.12	22.54	22.99	23.44	23.89	24.23	24.65	24.97	25.31	25.64	27.27	29.28	31.24	
MULT	15.72	16.45	19.04	19.68	20.37	21.10	21.85	22.51	23.13	23.72	24.31	24.91	27.64	30.28	32.95	
MOBL	0.59	0.79	0.84	0.88	0.93	0.98	1.04	1.09	1.14	1.19	1.24	1.26	1.54	1.79	2.04	
TOTAL	36.77	41.07	41.99	43.10	44.29	45.52	46.78	47.83	48.92	49.87	50.86	51.84	56.44	61.36	66.23	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	0.28	0.44	0.58	0.60	0.61	0.61	0.51	0.59	0.45	0.52	0.51	0.49	0.61	0.62	
MULT	0.0	0.56	0.72	0.77	0.83	0.87	0.90	0.81	0.78	0.75	0.76	0.78	0.68	0.73	0.75	
MOBL	0.0	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.12	0.13	
TOTAL	0.0	0.92	1.23	1.44	1.52	1.57	1.61	1.41	1.46	1.23	1.37	1.38	1.28	1.46	1.51	
FUEL USE BY FUEL TYPE OF QFT (QBTU)																
ELEC	2.50	3.22	3.34	3.53	3.73	3.97	4.21	4.43	4.63	4.81	4.98	5.16	5.90	6.86	7.65	
GAS	1.48	1.58	1.64	1.73	1.82	1.91	2.00	2.07	2.12	2.15	2.18	2.20	2.30	2.52	2.77	
OIL	4.26	3.67	3.48	3.39	3.33	3.30	3.28	3.27	3.25	3.22	3.19	3.17	2.99	2.88	2.79	
OTHR	0.20	0.16	0.15	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.08	0.07	0.06	
TOTAL	8.44	8.62	8.62	8.79	9.02	9.31	9.62	9.89	10.12	10.25	10.46	10.63	11.36	12.32	13.27	
FUEL USE BY END-USE FUNCTION QU (QBTU)																
SPACE HEATING	5.35	4.99	4.94	5.00	5.10	5.22	5.35	5.47	5.58	5.64	5.71	5.77	6.03	6.47	6.91	
WATER HEATING	1.16	1.23	1.25	1.28	1.33	1.38	1.44	1.48	1.52	1.55	1.58	1.60	1.73	1.88	2.02	
REFRIG	0.48	0.58	0.59	0.60	0.62	0.64	0.66	0.67	0.69	0.70	0.71	0.72	0.78	0.84	0.90	
FREEZERS	0.10	0.15	0.16	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.23	0.27	0.30	0.34	
COOKING	0.42	0.49	0.50	0.51	0.53	0.54	0.56	0.57	0.59	0.60	0.61	0.62	0.66	0.71	0.76	
AIR COND	0.03	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08	0.08	0.11	0.14	0.17	
LIGHTING	0.48	0.54	0.53	0.54	0.57	0.60	0.63	0.66	0.69	0.71	0.72	0.74	0.82	0.91	1.00	
OTHR	0.46	0.60	0.61	0.63	0.66	0.69	0.72	0.75	0.78	0.80	0.83	0.85	0.96	1.06	1.17	
FUEL USE BY HOUSING TYPE QT (QBTU)																
SNGL	5.85	5.68	5.62	5.69	5.80	5.93	6.08	6.21	6.33	6.40	6.48	6.55	6.85	7.35	7.84	
MULT	2.47	2.79	2.84	2.94	3.06	3.19	3.34	3.46	3.57	3.64	3.70	3.76	4.22	4.62	5.07	
MOBL	0.12	0.16	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.24	0.28	0.33	0.37	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	7.83	12.60	12.88	13.47	14.04	14.66	15.30	16.24	17.27	18.07	18.89	19.71	24.19	28.56	32.84	
GAS	3.82	4.82	5.07	5.37	5.70	6.03	6.37	6.85	7.30	7.74	8.11	8.52	10.11	11.45	13.04	
OIL	7.80	11.48	10.84	10.48	10.31	10.14	10.02	10.10	10.16	10.25	10.28	10.31	10.71	10.55	10.47	
OTHR	0.47	0.54	0.52	0.49	0.47	0.45	0.43	0.42	0.41	0.40	0.39	0.38	0.34	0.28	0.24	
TOTAL	19.91	29.45	29.31	29.82	30.51	31.28	32.12	33.60	35.15	36.45	37.67	38.93	45.35	50.84	56.59	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	6.41	7.08	7.84	8.26	8.61	8.91	8.70	9.03	8.85	9.10	9.27	9.84	11.19	12.14	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.41	0.40	0.43	0.40	0.42	0.43	0.14	0.16	0.15	0.17	0.17	0.20	0.27	0.29	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
GAS	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OIL	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OTHR	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
TOTALS	267.64				442.07				EQUIPT EXPEN 55.05 TI EXPEN 2.46 TOTAL 539.61							

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY																					
FEA REGION 2 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																					
ELECTRICITY IN TERMS OF PRIMARY ENERGY																					
SUMMARY OF PROGRAM OUTPUTS																					
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000						
HOUSING STOCK (MILLIONS)																					
SNGL	35.74	37.48	37.84	38.46	39.11	39.74	40.37	40.90	41.57	42.06	42.60	43.11	45.71	48.78	51.74						
MULT	42.27	49.77	50.57	52.12	53.78	55.54	57.34	58.98	60.56	62.03	63.53	65.04	71.92	78.33	84.70						
MOBL	0.87	1.15	1.21	1.28	1.35	1.42	1.49	1.56	1.63	1.70	1.77	1.84	2.19	2.53	2.87						
TOTAL	79.25	87.81	89.63	91.86	94.23	96.70	99.20	101.44	103.77	105.79	107.90	110.00	119.82	129.65	139.31						
NEW HOUSING UNITS STOCK (MILLIONS)																					
SNGL	0.0	0.33	0.58	0.85	0.87	0.87	0.87	0.77	0.91	0.74	0.79	0.77	0.76	0.91	0.93						
MULT	0.0	1.19	1.68	1.85	1.92	2.08	2.11	1.98	1.94	1.83	1.87	1.90	1.66	1.73	1.76						
MOBL	0.0	0.09	0.11	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.15	0.17	0.18						
TOTAL	0.0	1.72	2.38	2.81	2.97	3.08	3.13	2.89	2.99	2.70	2.79	2.81	2.57	2.81	2.87						
FUEL USE BY FUEL TYPE OF QFT (QBTU)																					
ELEC	4.46	5.16	5.26	5.47	5.75	6.09	6.47	6.83	7.18	7.50	7.82	8.13	9.71	11.26	12.58						
GAS	5.47	5.57	5.59	5.66	5.79	5.91	6.03	6.13	6.22	6.26	6.30	6.34	6.59	7.03	7.53						
OIL	6.64	5.04	5.45	5.32	5.17	5.11	5.06	5.01	4.96	4.90	4.85	4.79	4.57	4.30	4.25						
OTHR	0.42	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.18	0.15	0.12						
TOTAL	16.98	16.70	16.61	16.78	17.08	17.45	17.87	18.28	18.66	18.95	19.25	19.54	21.04	22.82	24.49						
FUEL USE BY END-USE FUNCTION QU (QBTU)																					
SPACE HEATING	9.95	9.19	9.06	9.05	9.09	9.16	9.25	9.36	9.46	9.52	9.57	9.63	9.96	10.54	11.10						
WATER HEATING	2.49	2.24	2.23	2.27	2.32	2.38	2.43	2.50	2.56	2.60	2.65	2.70	2.97	3.28	3.56						
REFRIG	1.03	1.16	1.17	1.20	1.23	1.26	1.30	1.33	1.36	1.38	1.41	1.44	1.57	1.70	1.82						
FREEZERS	0.21	0.29	0.31	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.47	0.55	0.63	0.70						
COOKING	0.84	0.89	0.90	0.92	0.94	0.96	0.98	1.01	1.03	1.04	1.06	1.07	1.15	1.24	1.32						
AIR COND	0.33	0.45	0.47	0.50	0.53	0.56	0.60	0.63	0.67	0.71	0.74	0.77	0.93	1.09	1.23						
LIGHTING	1.03	1.04	1.02	1.05	1.09	1.16	1.23	1.31	1.36	1.41	1.45	1.49	1.68	1.88	2.06						
OTHER	1.25	1.44	1.45	1.49	1.54	1.60	1.67	1.74	1.80	1.85	1.91	1.96	2.22	2.48	2.71						
FUEL USE BY HOUSING TYPE QT (QBTU)																					
SNGL	10.07	5.44	9.30	9.33	9.41	9.53	9.68	9.83	9.90	10.08	10.18	10.27	10.82	11.60	12.31						
MULT	7.72	7.68	7.68	7.64	7.64	7.64	7.62	7.62	7.64	7.64	7.64	7.64	7.64	7.64	7.64						
MOBL	0.19	0.22	0.23	0.24	0.25	0.26	0.27	0.29	0.30	0.31	0.32	0.33	0.39	0.44	0.49						
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																					
ELEC	14.85	22.68	22.58	23.11	23.75	24.53	25.40	27.06	28.46	29.95	31.23	32.78	39.77	47.23	54.48						
GAS	11.31	13.94	14.47	15.17	16.06	16.87	17.71	18.77	19.68	20.61	21.51	22.25	25.62	28.23	31.17						
OIL	12.31	16.10	15.75	15.70	15.65	15.72	15.72	15.66	15.99	16.08	16.18	16.26	16.34	16.22	16.22						
OTHR	0.98	1.07	1.03	1.00	0.96	0.93	0.90	0.88	0.86	0.84	0.82	0.80	0.70	0.60	0.51						
TOTAL	39.44	53.80	53.83	55.00	56.42	58.05	59.74	62.57	64.98	67.48	69.74	72.14	82.76	92.40	102.39						
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																					
TOTAL	0.0	13.77	15.41	17.05	17.94	18.69	19.31	19.22	19.94	19.55	20.12	20.48	21.62	23.91	25.63						
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																					
TOTAL	0.0	0.72	0.71	0.75	0.71	0.74	0.77	0.78	0.33	0.31	0.34	0.36	0.41	0.52	0.57						
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																					
ELEC	TOTAL FUEL USE (QBTU)						TOTAL EXPENDITURES						TOTAL FUEL USE (QBTU)								
GAS	TOTAL FUEL USE (QBTU)						TOTAL EXPENDITURES						TOTAL FUEL USE (QBTU)								
OIL	TOTAL FUEL USE (QBTU)						TOTAL EXPENDITURES						TOTAL FUEL USE (QBTU)								
OTHR	TOTAL FUEL USE (QBTU)						TOTAL EXPENDITURES						TOTAL FUEL USE (QBTU)								
TOTALS	495.79						813.09						EQUIPT EXPEN 208.25					TI EXPEN 4.63		TOTAL1026.00	

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 4 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980															
ELECTRICITY IN TERMS OF PRIMARY ENERGY															
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000
SUMMARY OF PROGRAM OUTPUTS															
HOUSING STOCK (MILLIONS)															
SNG	77.64	86.28	88.11	90.65	92.91	95.43	97.98	100.17	102.57	104.63	106.70	108.64	119.51	128.78	137.87
MUL	16.82	20.19	21.07	22.08	23.29	24.63	25.77	26.66	27.63	28.41	29.32	30.32	33.55	36.88	40.27
MOBL	5.38	7.53	8.02	8.53	9.07	9.66	10.27	10.86	11.44	12.01	12.60	13.21	16.28	18.98	21.69
TOTAL	99.54	114.01	117.14	120.84	124.78	128.88	133.08	136.80	140.67	144.17	147.60	151.47	169.33	184.60	199.83
NEW HOUSING UNITS STOCKN (MILLIONS)															
SNG	0.0	1.60	2.43	2.95	3.10	3.17	3.22	2.88	3.10	2.78	2.89	2.95	2.84	2.75	2.83
MUL	0.0	0.0	0.0	0.0	1.01	1.13	1.12	1.07	1.05	1.08	1.11	1.01	0.91	0.91	0.94
MOBL	0.0	0.69	0.79	0.83	0.89	0.95	1.00	1.00	1.01	1.03	1.07	1.11	1.22	1.28	1.38
TOTAL	0.0	3.26	4.17	4.79	5.06	5.27	5.42	5.00	5.19	4.86	5.04	5.12	5.07	4.94	5.16
FUEL USE BY FUEL TYPE QF (QBTU)															
ELEC	12.10	15.88	16.34	17.00	17.76	18.57	19.40	20.19	20.98	21.68	22.39	23.07	26.69	29.79	32.50
GAS	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	5.64	5.64	6.10
OIL	2.64	1.90	1.77	1.66	1.57	1.48	1.41	1.35	1.29	1.24	1.20	1.15	0.95	0.80	0.72
OTHR	1.81	1.51	1.45	1.39	1.34	1.28	1.23	1.17	1.12	1.07	1.02	0.97	0.77	0.61	0.48
TOTAL	21.17	23.96	24.35	24.94	25.63	26.36	27.10	27.82	28.54	29.16	29.79	30.40	33.73	36.84	39.76
FUEL USE BY END-USE FUNCTION QU (QBTU)															
SPACE HEATING	9.37	9.37	9.43	9.55	9.71	9.88	10.05	10.24	10.44	10.60	10.76	10.82	11.84	12.71	13.48
WATER HEATING	3.00	4.31	4.33	4.39	4.47	4.66	4.64	4.71	4.79	4.85	4.92	4.96	5.30	5.78	6.14
REFRIG	1.29	1.43	1.47	1.51	1.55	1.59	1.64	1.68	1.71	1.75	1.78	1.82	1.99	2.13	2.28
FREEZERS	0.52	0.69	0.73	0.76	0.80	0.84	0.88	0.91	0.95	0.98	1.01	1.05	1.20	1.34	1.48
COOLING	1.25	1.35	1.39	1.43	1.47	1.51	1.55	1.59	1.63	1.67	1.71	1.75	1.95	2.15	2.35
AIR COND	2.11	3.32	3.51	3.74	3.98	4.23	4.47	4.71	4.95	5.17	5.35	5.59	6.60	7.46	8.22
LIGHTING	1.29	1.41	1.38	1.39	1.42	1.46	1.51	1.55	1.59	1.63	1.67	1.71	1.97	2.23	2.49
OTHER	1.76	2.06	2.11	2.18	2.25	2.32	2.38	2.44	2.49	2.54	2.59	2.63	2.87	3.16	3.51
FUEL USE BY HOUSING TYPE QT (QBTU)															
SNG	17.78	19.64	19.87	20.28	20.76	21.28	21.79	22.29	22.82	23.25	23.69	24.10	26.43	28.65	30.70
MUL	3.45	3.78	3.81	3.85	3.92	4.03	4.12	4.18	4.26	4.33	4.39	4.46	4.82	5.07	5.52
MOBL	0.94	1.32	1.40	1.47	1.56	1.66	1.75	1.85	1.94	2.03	2.12	2.21	2.68	3.12	3.54
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)															
ELEC	24.12	38.31	40.39	43.03	45.67	48.49	51.41	54.31	57.27	60.07	62.92	65.76	77.66	89.06	100.39
GAS	6.35	6.98	7.70	8.41	9.11	9.80	10.54	11.14	11.75	12.38	12.95	13.58	16.12	17.66	19.71
OIL	4.95	5.32	5.13	4.98	4.85	4.75	4.65	4.53	4.41	4.30	4.20	4.10	3.70	3.19	2.76
OTHR	3.31	3.41	3.37	3.34	3.28	3.22	3.16	3.08	3.00	2.92	2.84	2.76	2.27	1.84	1.49
TOTAL	38.72	54.32	56.58	59.76	62.91	66.26	69.76	73.06	76.43	79.68	82.90	86.19	99.75	111.74	124.35
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)															
TOTAL	0.0	25.40	28.04	30.75	32.32	33.76	34.99	34.50	35.95	35.65	36.78	33.88	43.68	43.48	46.85
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)															
TOTAL	0.0	0.84	0.84	0.89	0.89	0.95	1.01	0.43	0.50	0.50	0.55	0.60	0.71	0.77	0.88
TOTAL FUEL USE AND EXPENDITURES, 1577-2000, REAL INTEREST RATE = 8.00 PERCENT															
ELEC	TOTAL FUEL USE (QBTU)	107.34													
GAS	TOTAL FUEL USE (QBTU)	129.14													
OIL	TOTAL FUEL USE (QBTU)	25.44													
OTHR	TOTAL FUEL USE (QBTU)	20.79													
	TOTAL EXPENDITURES	30.87													
TOTALS			782.75				958.79		EQUIPT EXPEN	379.52		TI EXPEN	6.48		TOTAL1344.88

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 5 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980 SUMMARY OF PROGRAM OUTPUTS ELECTRICITY IN TERMS OF PRIMARY ENERGY																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	96.44	103.72	105.22	107.35	109.59	111.86	114.13	116.05	118.23	119.58	121.83	123.65	132.39	140.87	148.96	
MULT	37.70	44.58	46.08	47.67	49.39	51.22	53.11	54.83	56.44	57.97	59.53	61.12	68.25	74.11	79.90	
MOBL	3.44	4.66	4.93	5.21	5.51	5.83	6.16	6.48	6.79	7.10	7.41	7.73	9.29	10.70	12.07	
TOTAL	137.58	152.96	156.23	160.23	164.49	168.91	173.40	177.36	181.47	185.05	188.77	192.50	209.94	225.68	240.93	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	1.39	2.13	2.76	2.88	2.93	2.94	2.61	2.88	2.46	2.97	2.54	2.40	2.53	2.55	
MULT	0.0	1.38	1.76	1.87	2.01	2.13	2.20	2.04	1.94	1.87	1.91	1.95	1.67	1.58	1.60	
MOBL	0.0	0.40	0.45	0.48	0.51	0.54	0.57	0.57	0.57	0.58	0.60	0.62	0.66	0.70	0.74	
TOTAL	0.0	3.18	4.35	5.10	5.40	5.59	5.71	5.21	5.39	4.91	5.07	5.11	4.73	4.81	4.89	
FUEL USE BY FUEL TYPE QF, QFT (QBTU)																
ELEC	10.46	13.55	14.20	15.06	16.05	17.11	18.23	19.26	20.21	21.03	21.84	22.58	26.51	30.16	33.23	
GAS	18.20	15.37	19.33	19.37	19.42	19.44	19.46	19.53	19.58	19.57	19.57	19.55	18.93	19.24	19.93	
OIL	5.77	4.71	4.39	4.15	3.95	3.77	3.61	3.48	3.34	3.21	3.05	2.97	2.49	2.17	1.89	
OTHR	1.74	1.43	1.37	1.32	1.26	1.21	1.16	1.11	1.06	1.01	0.97	0.92	0.73	0.58	0.46	
TOTAL	36.17	39.06	39.30	39.90	40.68	41.53	42.45	43.38	44.20	44.82	45.46	46.03	48.66	52.15	55.51	
FUEL USE BY END-USE FUNCTION QU (QBTU)																
SPACE HEATING	20.16	20.67	20.51	20.52	20.60	20.72	20.84	21.08	21.26	21.35	21.47	21.55	21.80	22.92	24.03	
WATER HEATING	4.40	4.71	4.75	4.85	4.97	5.12	5.28	5.43	5.56	5.66	5.78	5.88	6.40	6.98	7.49	
REFRIG	1.79	2.01	2.06	2.12	2.19	2.26	2.34	2.40	2.47	2.52	2.58	2.63	2.86	3.06	3.23	
FREEZERS	0.68	0.92	0.97	1.03	1.09	1.15	1.21	1.27	1.32	1.37	1.42	1.46	1.67	1.85	2.02	
COOKING	1.57	1.73	1.76	1.80	1.85	1.91	1.96	2.01	2.06	2.09	2.13	2.17	2.34	2.52	2.68	
AIR COND	0.57	1.01	1.08	1.17	1.27	1.37	1.48	1.59	1.70	1.80	1.89	1.98	2.40	2.77	3.09	
LIGHTING	1.79	2.05	2.06	2.13	2.21	2.31	2.41	2.51	2.58	2.63	2.68	2.72	3.00	3.31	3.61	
OTHER	5.20	5.56	6.11	6.29	6.49	6.70	6.91	7.09	7.25	7.39	7.52	7.65	8.19	8.74	9.34	
TOTAL	38.22	46.04	46.60	47.35	48.24	49.15	50.08	51.03	51.98	52.93	53.88	54.83	60.15	66.23	72.31	
FUEL USE BY HOUSING TYPE QT (QBTU)																
SNGL	28.12	30.04	30.00	30.29	30.69	31.14	31.61	32.14	32.61	32.92	33.25	33.52	34.79	36.92	38.98	
MULT	6.65	7.95	8.17	8.44	8.76	9.10	9.48	9.82	10.11	10.37	10.63	10.88	12.01	13.12	14.20	
MOBL	0.79	1.08	1.12	1.17	1.23	1.29	1.36	1.42	1.48	1.53	1.58	1.63	1.86	2.10	2.33	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	29.33	35.12	40.59	43.06	45.44	48.44	51.09	55.08	59.50	63.07	66.71	70.25	86.20	101.44	115.49	
GAS	24.72	25.73	31.77	33.94	36.12	38.29	40.42	42.17	44.15	45.57	47.57	49.35	60.15	63.23	67.67	
OIL	9.80	12.40	11.67	11.36	11.00	10.63	10.35	10.22	10.05	9.88	9.66	9.50	8.66	7.69	6.86	
OTHR	3.22	3.09	3.05	3.02	2.97	2.92	2.86	2.81	2.79	2.74	2.69	2.65	2.37	1.94	1.59	
TOTAL	67.07	84.42	87.28	91.38	95.53	100.28	104.72	110.28	116.49	121.66	126.63	132.43	157.38	174.31	191.62	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	28.75	31.97	35.03	36.75	38.18	39.38	38.97	40.42	39.67	40.86	41.67	44.40	48.04	51.18	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	1.68	1.59	1.63	1.58	1.65	1.74	0.52	0.63	0.63	0.72	0.78	1.02	1.26	1.37	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
GAS	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OIL	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OTHR	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
TOTALS	1151.13				1476.90				EQUIPT EXPEN 423.44 TI EXPEN 10.20 TOTAL 1910.53							

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 6 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980 SUMMARY OF PROGRAM OUTPUTS ELECTRICITY IN TERMS OF PRIMARY ENERGY																									
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000										
HOUSING STOCK (MILLIONS)																									
SNGL	51.42	55.54	56.40	57.56	58.79	60.04	61.30	62.46	63.72	64.77	65.88	66.96	72.15	76.69	81.01										
MULT	10.06	11.57	12.39	12.82	13.29	13.79	14.31	14.80	15.26	15.70	16.15	16.60	18.66	20.24	21.80										
MOBL	1.90	2.59	2.74	2.90	3.07	3.25	3.43	3.62	3.80	3.97	4.15	4.34	5.25	6.04	6.81										
TOTAL	63.40	70.11	71.53	73.28	75.14	77.08	79.04	80.87	82.78	84.44	86.17	87.51	96.06	102.97	109.62										
NEW HOUSING UNITS STOCK (MILLIONS)																									
SNGL	0.0	0.79	1.19	1.50	1.57	1.61	1.62	1.53	1.64	1.43	1.49	1.48	1.38	1.36	1.36										
MULT	0.0	0.38	0.48	0.51	0.55	0.58	0.60	0.58	0.65	0.53	0.54	0.56	0.48	0.43	0.43										
MOBL	0.0	0.23	0.25	0.27	0.28	0.30	0.32	0.32	0.32	0.33	0.34	0.35	0.38	0.39	0.42										
TOTAL	0.0	1.40	1.93	2.27	2.40	2.49	2.54	2.43	2.51	2.29	2.37	2.36	2.23	2.18	2.21										
FUEL USE BY FUEL TYPE QF, QFT (QBTU)																									
ELEC	5.50	8.29	8.70	9.08	9.41	9.69	9.92	10.20	10.52	10.84	11.18	11.52	13.22	14.78	16.14										
GAS	5.76	5.05	5.00	5.01	5.03	5.06	5.09	5.14	5.19	5.24	5.29	5.34	5.38	5.43	5.48										
OIL	0.74	0.51	0.47	0.44	0.41	0.39	0.36	0.34	0.33	0.31	0.29	0.27	0.21	0.16	0.13										
OTHR	1.37	1.20	1.15	1.11	1.06	1.02	0.97	0.93	0.89	0.85	0.81	0.77	0.61	0.48	0.38										
TOTAL	13.79	15.65	15.92	16.23	16.51	16.75	16.95	17.21	17.52	17.80	18.12	18.43	19.71	21.13	22.50										
FUEL USE BY END-USE FUNCTION QU (QBTU)																									
SPACE HEATING	5.07	5.03	5.01	5.02	5.02	5.03	5.02	5.05	5.09	5.12	5.16	5.20	5.30	5.56	5.83										
WATER HEATING	1.92	1.99	1.99	2.00	2.01	2.02	2.03	2.05	2.07	2.09	2.12	2.15	2.30	2.55	2.78										
REFRIG	0.62	0.57	0.59	1.01	1.04	1.06	1.08	1.10	1.12	1.13	1.15	1.16	1.24	1.30	1.35										
FREEZERS	0.34	0.49	0.52	0.54	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.71	0.79	0.87	0.94										
COOKING	0.78	0.83	0.84	0.85	0.85	0.86	0.87	0.87	0.88	0.89	0.90	0.91	0.94	0.98	1.02										
AIR COND	1.93	2.65	3.00	3.16	3.32	3.46	3.58	3.72	3.86	3.98	4.10	4.21	4.71	5.09	5.41										
LIGHTING	0.82	1.03	1.05	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.34	1.48	1.67										
OTHER	2.10	2.44	2.52	2.59	2.65	2.70	2.75	2.79	2.84	2.89	2.95	3.00	3.22	3.45	3.71										
TOTAL	13.79	15.65	15.92	16.23	16.51	16.75	16.95	17.21	17.52	17.80	18.12	18.43	19.71	21.13	22.50										
FUEL USE BY HOUSING TYPE QT (QBTU)																									
SNGL	11.72	13.06	13.24	13.47	13.67	13.83	13.97	14.15	14.38	14.58	14.81	15.03	15.93	17.00	18.02										
MULT	1.95	2.16	2.29	2.40	2.49	2.58	2.67	2.75	2.83	2.91	2.99	3.07	3.44	3.74	3.96										
MOBL	0.52	0.63	0.65	0.67	0.69	0.71	0.73	0.75	0.77	0.79	0.82	0.84	0.96	1.07	1.18										
TOTAL	14.19	15.85	16.18	16.54	16.85	17.12	17.35	17.63	17.98	18.28	18.62	18.94	20.33	21.81	23.16										
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																									
ELEC	15.21	19.44	22.42	25.55	28.60	31.70	34.78	35.74	37.14	38.26	39.77	41.30	49.74	57.13	64.47										
GAS	6.69	7.60	7.92	8.25	8.67	9.05	9.50	9.85	10.26	10.64	11.02	11.39	13.89	14.44	15.29										
OIL	1.27	1.39	1.31	1.25	1.19	1.15	1.10	1.06	1.02	0.98	0.94	0.91	0.75	0.59	0.47										
OTHR	2.56	2.35	2.47	2.56	2.64	2.71	2.76	2.66	2.59	2.50	2.42	2.35	2.05	1.67	1.36										
TOTAL	25.74	30.78	34.11	37.56	41.11	44.61	48.15	49.31	51.01	52.38	54.15	55.94	66.42	73.82	81.59										
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																									
TOTAL	0.0	15.64	17.46	18.87	19.60	20.22	20.73	20.71	21.50	21.14	21.77	22.18	23.36	24.61	25.93										
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																									
TOTAL	0.0	0.49	0.46	0.48	0.48	0.53	0.58	0.23	0.26	0.26	0.29	0.31	0.37	0.41	0.45										
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																									
ELEC	TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES					TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES									
GAS	TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES					TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES									
OIL	TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES					TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES									
OTHR	TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES					TOTAL FUEL USE (QBTU)					TOTAL EXPENDITURES									
TOTALS	464.23					633.38					EQUIPT EXPEN 224.13					TI EXPEN 3.49					TOTAL 861.00				

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY																
FEA REGION 7 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																
	SUMMARY OF PROGRAM OUTPUTS										ELECTRICITY IN TERMS OF PRIMARY ENERGY					
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	27.17	28.75	29.07	29.55	30.05	30.56	31.07	31.55	32.09	32.51	32.96	33.35	35.40	37.04	38.50	
MULT	6.65	7.74	7.97	8.22	8.48	8.77	9.06	9.34	9.60	9.84	10.05	10.34	11.43	12.21	12.94	
MOBL	1.05	1.39	1.47	1.55	1.63	1.72	1.81	1.90	1.99	2.07	2.16	2.25	2.68	3.03	3.37	
TOTAL	34.87	37.89	38.52	39.31	40.17	41.05	41.94	42.79	43.67	44.43	45.21	45.98	49.51	52.29	54.81	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	0.29	0.45	0.65	0.68	0.69	0.69	0.67	0.73	0.61	0.64	0.63	0.57	0.54	0.52	
MULT	0.0	0.21	0.28	0.29	0.31	0.33	0.34	0.33	0.31	0.30	0.31	0.31	0.26	0.22	0.21	
MOBL	0.0	0.12	0.13	0.14	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	
TOTAL	0.0	0.62	0.90	1.08	1.14	1.18	1.19	1.17	1.20	1.08	1.12	1.12	1.01	0.95	0.93	
FUEL USE BY FUEL TYPE OF, QFT (OBTU)																
ELEC	2.53	3.88	4.09	4.30	4.53	4.75	4.97	5.19	5.42	5.63	5.84	6.04	7.23	8.26	9.02	
GAS	4.77	4.83	4.85	4.88	4.94	4.99	5.04	5.11	5.17	5.21	5.25	5.28	4.98	4.97	5.06	
OIL	0.65	0.53	0.50	0.47	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.32	0.25	0.21	0.17	
OTHR	1.04	0.85	0.81	0.78	0.74	0.71	0.67	0.64	0.61	0.58	0.55	0.53	0.42	0.33	0.26	
TOTAL	9.43	10.10	10.24	10.43	10.65	10.86	11.08	11.32	11.57	11.77	11.98	12.17	12.88	13.76	14.51	
FUEL USE BY END-USE FUNCTION QFT (OBTU)																
SPACE HEATING	4.88	4.94	4.95	4.99	5.04	5.09	5.14	5.22	5.30	5.35	5.41	5.46	5.48	5.75	6.01	
WATER HEATING	1.06	1.11	1.12	1.14	1.17	1.19	1.21	1.24	1.26	1.28	1.31	1.34	1.45	1.60	1.71	
REFRIG	0.45	0.49	0.50	0.51	0.52	0.54	0.55	0.56	0.58	0.59	0.60	0.61	0.67	0.71	0.75	
FREEZERS	0.21	0.27	0.28	0.30	0.31	0.33	0.34	0.35	0.37	0.38	0.39	0.40	0.47	0.52	0.56	
COOKING	0.41	0.44	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.50	0.51	0.52	0.56	0.59	0.62	
AIR COND	0.43	0.65	0.69	0.73	0.77	0.82	0.86	0.91	0.96	1.00	1.04	1.08	1.25	1.38	1.48	
LIGHTING	0.45	0.52	0.53	0.54	0.55	0.56	0.58	0.59	0.60	0.62	0.63	0.64	0.73	0.80	0.86	
OTHER	1.54	1.68	1.72	1.77	1.81	1.86	1.91	1.96	2.00	2.04	2.08	2.12	2.27	2.39	2.51	
FUEL USE BY HOUSING TYPE QT (OBTU)																
SNGL	8.03	8.37	8.44	8.57	8.71	8.85	8.98	9.15	9.32	9.45	9.59	9.72	10.13	10.74	11.25	
MULT	1.20	1.41	1.46	1.51	1.57	1.63	1.69	1.75	1.81	1.86	1.91	1.96	2.17	2.37	2.55	
MOBL	0.23	0.31	0.33	0.35	0.37	0.39	0.40	0.42	0.44	0.46	0.48	0.50	0.57	0.65	0.71	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	8.55	10.31	11.08	12.05	12.94	13.86	14.78	15.60	16.45	17.24	18.05	18.86	21.93	25.78	29.20	
GAS	5.66	6.24	6.49	6.63	6.74	6.81	6.87	6.93	7.00	7.06	7.11	7.16	6.85	6.71	6.80	
OIL	1.18	1.43	1.34	1.26	1.21	1.16	1.11	1.09	1.06	1.03	1.01	0.98	0.85	0.71	0.60	
OTHR	1.90	1.65	1.63	1.62	1.59	1.57	1.53	1.49	1.45	1.41	1.37	1.33	1.17	0.95	0.78	
TOTAL	17.29	19.63	20.53	21.76	22.88	24.08	25.24	26.35	27.49	28.51	29.57	30.63	36.29	40.16	43.96	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	7.90	8.63	9.54	9.86	10.11	10.31	10.37	10.69	10.44	10.65	10.83	11.19	11.57	11.98	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.43	0.40	0.39	0.36	0.38	0.39	0.40	0.40	0.40	0.41	0.41	0.47	0.50	0.52	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (OBTU)		163.39		TOTAL EXPENDITURES		209.55									
GAS	TOTAL FUEL USE (OBTU)		121.37		TOTAL EXPENDITURES		109.44									
OIL	TOTAL FUEL USE (OBTU)		6.87		TOTAL EXPENDITURES		11.28									
OTHR	TOTAL FUEL USE (OBTU)		11.33		TOTAL EXPENDITURES		15.21									
TOTALS			302.96				345.48		EQUIPT EXPEN		109.55		TI EXPEN		2.02	
										TOTAL		457.49				

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 8 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																			
	SUMMARY OF PROGRAM OUTPUTS							ELECTRICITY IN TERMS OF PRIMARY ENERGY											
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000				
HOUSING STOCK (MILLIONS)																			
SNGL	13.15	13.56	14.12	14.37	14.63	14.89	15.15	15.37	15.61	15.81	16.01	16.21	17.12	17.88	18.85				
MULT	3.75	4.38	4.51	4.65	4.81	4.97	5.14	5.30	5.44	5.57	5.71	5.84	6.44	6.86	7.26				
MOBL	0.85	1.14	1.20	1.27	1.34	1.41	1.49	1.56	1.63	1.70	1.77	1.84	2.18	2.47	2.73				
TOTAL	17.75	19.07	19.84	20.29	20.77	21.27	21.78	22.22	22.68	23.08	23.45	23.85	25.75	27.21	28.85				
NEW HOUSING UNITS STOCK (MILLIONS)																			
SNGL	0.0	0.21	0.30	0.39	0.40	0.41	0.41	0.37	0.40	0.35	0.36	0.36	0.33	0.33	0.32				
MULT	0.0	0.10	0.11	0.19	0.20	0.21	0.22	0.21	0.19	0.19	0.19	0.19	0.17	0.15	0.15				
MOBL	0.0	0.10	0.11	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16				
TOTAL	0.0	0.44	0.59	0.69	0.72	0.75	0.76	0.71	0.73	0.67	0.65	0.65	0.65	0.63	0.63				
FUEL USE BY FUEL TYPE OF, QFT (OBTU)																			
ELEC	1.20	1.68	1.78	1.90	2.02	2.16	2.29	2.42	2.55	2.66	2.77	2.88	3.38	3.83	4.18				
GAS	2.26	2.49	2.47	2.46	2.45	2.43	2.42	2.42	2.44	2.44	2.45	2.46	2.28	2.28	2.33				
OIL	0.45	0.33	0.31	0.29	0.28	0.26	0.25	0.24	0.24	0.23	0.22	0.21	0.18	0.16	0.14				
OTHR	0.38	0.34	0.33	0.32	0.31	0.30	0.30	0.29	0.28	0.27	0.26	0.25	0.21	0.17	0.14				
TOTAL	4.29	4.84	4.89	4.97	5.06	5.16	5.26	5.38	5.50	5.60	5.70	5.80	6.05	6.43	6.78				
FUEL USE BY END-USE FUNCTION QFT (OBTU)																			
SPACE HEATING	2.74	2.88	2.87	2.88	2.90	2.91	2.93	2.97	3.01	3.04	3.07	3.10	3.10	3.23	3.36				
WATER HEATING	0.56	0.66	0.68	0.70	0.73	0.75	0.78	0.81	0.84	0.87	0.89	0.91	0.99	1.06	1.12				
REFRIG	0.23	0.29	0.30	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.41	0.44	0.47				
FREEZERS	0.12	0.17	0.18	0.19	0.20	0.20	0.21	0.22	0.23	0.24	0.25	0.25	0.29	0.31	0.34				
COOKING	0.22	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.38	0.38	0.40	0.42				
AIR COND	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.08	0.10	0.12				
LIGHTING	0.23	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.42	0.43	0.47	0.51	0.55				
OTHER	0.17	0.22	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.34	0.37	0.39				
FUEL USE BY HOUSING TYPE QFT (OBTU)																			
SNGL	3.56	3.88	3.89	3.93	3.97	4.02	4.07	4.14	4.21	4.27	4.32	4.38	4.47	4.69	4.89				
MULT	0.57	0.73	0.75	0.78	0.81	0.84	0.87	0.90	0.93	0.96	0.98	1.02	1.12	1.20	1.30				
MOBL	0.16	0.23	0.25	0.26	0.28	0.30	0.32	0.33	0.35	0.37	0.38	0.40	0.47	0.53	0.58				
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																			
ELEC	3.88	4.09	4.28	4.56	4.80	5.05	5.37	5.68	6.05	6.39	6.66	7.00	8.81	10.29	11.60				
GAS	2.45	2.91	3.10	3.28	3.47	3.64	3.82	3.91	4.04	4.16	4.27	4.35	5.52	5.68	6.00				
OIL	0.82	0.92	0.87	0.83	0.80	0.77	0.75	0.74	0.73	0.71	0.70	0.65	0.63	0.56	0.51				
OTHR	0.65	0.60	0.60	0.60	0.60	0.59	0.59	0.56	0.58	0.57	0.55	0.55	0.53	0.45	0.38				
TOTAL	7.40	8.51	8.84	9.26	9.67	10.06	10.64	10.92	11.29	11.62	12.18	12.62	15.49	16.99	18.48				
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																			
TOTAL	0.0	3.27	3.65	3.99	4.17	4.34	4.48	4.44	4.60	4.52	4.65	4.74	5.03	5.34	5.65				
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																			
TOTAL	0.0	0.19	0.18	0.19	0.18	0.19	0.20	0.06	0.07	0.07	0.08	0.05	0.12	0.15	0.16				
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																			
ELEC	TOTAL FUEL USE (OBTU)						TOTAL EXPENDITURES (\$T)												
GAS	TOTAL FUEL USE (OBTU)						TOTAL EXPENDITURES												
OIL	TOTAL FUEL USE (OBTU)						TOTAL EXPENDITURES												
OTHR	TOTAL FUEL USE (OBTU)						TOTAL EXPENDITURES												
TOTALS	142.83						144.99						EQUIPT EXPEN		47.60	TI EXPEN	1.18	TOTAL	194.07

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 9 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																
SUMMARY OF PROGRAM OUTPUTS										ELECTRICITY IN TERMS OF PRIMARY ENERGY						
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	48.14	52.71	53.67	54.96	56.31	57.69	59.07	60.26	61.60	62.72	63.90	65.07	70.88	76.10	81.21	
MULT	21.06	25.36	26.30	27.31	28.40	29.56	30.77	31.87	32.92	33.92	34.95	36.00	40.90	44.81	48.76	
MOBL	2.44	3.36	3.57	3.79	4.02	4.27	4.52	4.77	5.02	5.26	5.51	5.77	7.05	8.20	9.34	
TOTAL	71.64	81.44	83.55	86.06	88.74	91.52	94.36	96.90	99.54	101.50	104.36	106.84	118.83	129.11	139.31	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	1.10	1.49	1.83	1.90	1.94	1.96	1.78	1.95	1.74	1.81	1.81	1.81	1.80	1.86	
MULT	0.0	0.97	1.20	1.27	1.36	1.44	1.50	1.41	1.37	1.33	1.37	1.40	1.30	1.21	1.26	
MOBL	0.0	0.30	0.34	0.36	0.38	0.41	0.43	0.43	0.44	0.44	0.46	0.48	0.52	0.55	0.59	
TOTAL	0.0	2.38	3.02	3.46	3.65	3.79	3.89	3.62	3.75	3.51	3.64	3.65	3.63	3.57	3.70	
FUEL USE BY FUEL TYPE QF, QFT (QBTU)																
ELEC	5.65	8.65	6.89	7.19	7.50	7.83	8.17	8.50	8.90	9.22	9.75	10.30	12.75	14.61	16.27	
GAS	6.63	7.70	7.65	7.59	7.52	7.44	7.37	7.24	7.07	6.87	6.67	6.46	6.59	6.89	7.18	
OIL	0.14	0.11	0.10	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.06	0.06	0.05	0.04	0.03	
OTHR	0.41	0.35	0.34	0.33	0.32	0.31	0.30	0.28	0.27	0.26	0.25	0.24	0.19	0.15	0.12	
TOTAL	12.18	14.81	14.98	15.20	15.43	15.66	15.91	16.10	16.32	16.53	16.77	17.06	19.58	21.69	23.60	
FUEL USE BY END-USE FUNCTION QU (QBTU)																
SPACE HEATING	4.82	5.71	5.73	5.76	5.79	5.82	5.86	5.88	5.91	5.94	6.00	6.08	7.04	7.66	8.17	
WATER HEATING	2.10	2.47	2.48	2.49	2.51	2.53	2.57	2.58	2.61	2.65	2.70	2.77	3.36	3.78	4.13	
REFRIG	0.93	1.14	1.17	1.20	1.23	1.27	1.30	1.32	1.35	1.38	1.40	1.43	1.56	1.67	1.78	
FREEZERS	0.24	0.33	0.35	0.36	0.38	0.39	0.40	0.42	0.43	0.44	0.46	0.47	0.54	0.60	0.65	
COOKING	0.81	0.98	1.00	1.01	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16	1.30	1.40	1.49	
AIR COND	0.33	0.51	0.54	0.57	0.60	0.64	0.67	0.71	0.75	0.79	0.83	0.87	1.08	1.29	1.51	
LIGHTING	0.33	1.10	1.10	1.12	1.13	1.15	1.18	1.20	1.23	1.26	1.30	1.34	1.55	1.73	1.90	
OTHR	1.99	2.56	2.62	2.69	2.75	2.81	2.86	2.89	2.92	2.94	2.94	2.94	3.15	3.35	3.57	
FUEL USE BY HOUSING TYPE QT (QBTU)																
SNGL	5.65	8.64	10.69	10.79	10.89	11.00	11.11	11.18	11.29	11.38	11.50	11.65	13.20	14.51	15.67	
MULT	2.78	3.62	3.72	3.81	3.91	4.01	4.12	4.21	4.30	4.39	4.48	4.59	5.35	5.97	6.54	
MOBL	0.36	0.54	0.57	0.60	0.62	0.65	0.68	0.71	0.74	0.76	0.79	0.82	1.03	1.21	1.38	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	12.78	19.36	20.80	22.61	24.37	26.24	28.20	29.58	30.97	32.44	34.32	36.10	45.33	53.43	61.58	
GAS	8.54	11.82	12.87	13.90	14.88	15.84	16.67	17.94	19.05	19.55	20.23	21.55	15.53	21.17	22.74	
OIL	0.20	0.32	0.30	0.28	0.27	0.25	0.24	0.23	0.21	0.21	0.21	0.21	0.16	0.13	0.10	
OTHR	0.77	0.77	0.80	0.82	0.84	0.85	0.85	0.86	0.85	0.84	0.84	0.83	0.65	0.53	0.44	
TOTAL	22.18	32.30	34.77	37.61	40.35	43.17	45.97	48.60	51.10	53.50	56.19	58.71	65.68	75.26	84.86	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	14.77	16.47	18.07	18.99	19.79	20.56	20.36	21.24	21.02	21.70	22.12	24.84	26.85	29.17	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.46	0.47	0.52	0.54	0.61	0.67	0.39	0.46	0.45	0.49	0.51	0.62	0.65	0.71	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
GAS	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OIL	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OTHR	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
TOTALS	456.22				637.34				EQUIPT EXPEN 226.10 TI EXPEN 4.85 TOTAL 868.28							

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY																
FEA REGION 10 BASELINE INCLUDING VOLUNTARY RETROFIT PROGRAM FOR 1974 TO 1980																
SUMMARY OF PROGRAM OUTPUTS										ELECTRICITY IN TERMS OF PRIMARY ENERGY						
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	15.32	16.32	16.53	16.83	17.14	17.46	17.78	18.05	18.35	18.59	18.84	19.05	20.23	21.54	22.81	
MULT	3.99	4.68	4.82	4.98	5.15	5.33	5.52	5.68	5.84	5.99	6.14	6.25	6.95	7.56	8.16	
MOBL	0.97	1.31	1.38	1.45	1.53	1.62	1.71	1.79	1.88	1.96	2.04	2.12	2.53	2.91	3.29	
TOTAL	20.29	22.31	22.73	23.26	23.83	24.41	25.00	25.53	26.07	26.53	27.02	27.50	29.71	32.01	34.26	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	0.22	0.34	0.43	0.45	0.46	0.46	0.41	0.45	0.38	0.40	0.40	0.36	0.43	0.44	
MULT	0.0	0.15	0.18	0.19	0.21	0.22	0.23	0.21	0.20	0.19	0.20	0.20	0.17	0.18	0.18	
MOBL	0.0	0.11	0.12	0.13	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.17	0.17	0.19	0.20	
TOTAL	0.0	0.48	0.65	0.76	0.80	0.82	0.84	0.78	0.80	0.73	0.76	0.76	0.71	0.80	0.82	
FUEL USE BY FUEL TYPE QF, QFT (QBTU)																
ELEC	3.40	4.59	4.78	4.95	5.09	5.22	5.33	5.45	5.59	5.72	5.86	6.00	6.44	6.85	7.21	
GAS	0.79	0.93	0.93	0.92	0.91	0.90	0.89	0.89	0.90	0.92	0.93	0.95	1.13	1.33	1.51	
OIL	0.77	0.56	0.52	0.49	0.46	0.44	0.42	0.40	0.39	0.37	0.35	0.34	0.26	0.20	0.16	
OTHR	0.23	0.20	0.20	0.19	0.18	0.18	0.17	0.16	0.16	0.15	0.14	0.14	0.11	0.09	0.07	
TOTAL	5.19	6.28	6.42	6.54	6.65	6.74	6.81	6.91	7.04	7.16	7.29	7.42	7.94	8.47	8.95	
FUEL USE BY END-USE FUNCTION QU (QBTU)																
SPACE HEATING	2.58	3.14	3.20	3.27	3.33	3.38	3.42	3.48	3.55	3.62	3.69	3.76	4.05	4.32	4.55	
WATER HEATING	0.95	1.12	1.13	1.13	1.13	1.13	1.13	1.13	1.14	1.15	1.17	1.18	1.22	1.27	1.32	
REFRIG	0.28	0.36	0.31	0.32	0.32	0.33	0.34	0.35	0.35	0.36	0.36	0.37	0.39	0.41	0.43	
FREEZERS	0.15	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.26	0.29	0.31	
COOKING	0.28	0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.38	0.41	0.43	
AIR COND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	
LIGHTING	0.26	0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.38	0.42	0.46	
OTHR	0.70	0.90	0.93	0.96	0.99	1.01	1.03	1.05	1.08	1.10	1.12	1.16	1.25	1.35	1.45	
FUEL USE BY HOUSING TYPE QT (QBTU)																
SNGL	4.24	4.98	5.07	5.14	5.21	5.26	5.29	5.35	5.44	5.52	5.60	5.68	6.01	6.37	6.69	
MULT	1.07	1.24	1.26	1.27	1.28	1.29	1.30	1.31	1.32	1.33	1.34	1.35	1.41	1.49	1.57	
MOBL	0.21	0.32	0.34	0.36	0.38	0.40	0.41	0.43	0.45	0.47	0.48	0.50	0.59	0.66	0.74	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	4.72	5.79	5.94	6.12	6.27	6.40	6.52	6.66	6.80	6.96	7.10	7.25	7.81	8.37	8.94	
GAS	1.53	1.95	2.12	2.29	2.46	2.61	2.76	2.76	2.79	2.83	2.87	2.93	3.00	3.67	4.27	
OIL	1.56	1.63	1.52	1.44	1.38	1.32	1.27	1.24	1.21	1.17	1.13	1.10	0.93	0.75	0.61	
OTHR	0.36	0.31	0.32	0.32	0.33	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.23	0.19	0.16	
TOTAL	8.16	9.68	10.39	11.18	11.93	12.66	13.44	13.68	14.00	14.29	14.61	14.94	16.58	18.18	19.84	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	3.48	3.91	4.25	4.42	4.57	4.71	4.66	4.85	4.78	4.94	5.05	5.44	6.27	6.90	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.13	0.12	0.12	0.12	0.12	0.14	0.05	0.06	0.05	0.06	0.06	0.07	0.08	0.09	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU) 119.47															
GAS	TOTAL FUEL USE (QBTU) 26.90															
OIL	TOTAL FUEL USE (QBTU) 7.12															
OTHR	TOTAL FUEL USE (QBTU) 2.96															
TOTAL EXPENDITURES 11.95																
TOTAL EXPENDITURES 33.31																
TOTAL EXPENDITURES 12.63																
TOTAL EXPENDITURES 3.15																
TOTALS	186.45															
168.04																
EQUIPT EXPEN 51.52																
TI EXPEN 0.78																
TOTAL 220.34																

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 1 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																	
	SUMMARY OF PROGRAM OUTPUTS																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000		
HOUSING STOCK (MILLIONS)																	
SNGL	20.46	21.83	22.12	22.54	22.99	23.44	23.89	24.23	24.65	24.97	25.31	25.64	27.27	29.28	31.24		
MULT	15.72	18.45	19.04	19.68	20.37	21.10	21.85	22.51	23.13	23.72	24.31	24.91	27.64	30.28	32.95		
MOBL	0.59	0.79	0.84	0.88	0.93	0.98	1.04	1.09	1.14	1.19	1.24	1.29	1.54	1.79	2.04		
TOTAL	36.77	41.07	41.99	43.10	44.29	45.52	46.78	47.83	48.92	49.87	50.86	51.84	56.44	61.36	66.23		
NEW HOUSING UNITS STOCK (MILLIONS)																	
SNGL	0.0	0.28	0.44	0.58	0.60	0.61	0.61	0.51	0.59	0.49	0.52	0.51	0.49	0.61	0.62		
MULT	0.0	0.56	0.72	0.77	0.83	0.87	0.90	0.81	0.78	0.75	0.76	0.78	0.68	0.73	0.75		
MOBL	0.0	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.12	0.13		
TOTAL	0.0	0.92	1.23	1.44	1.52	1.57	1.61	1.41	1.46	1.33	1.37	1.38	1.28	1.46	1.51		
FUEL USE BY FUEL TYPE OF, QFT (QBTU)																	
ELEC	2.50	3.22	3.34	3.51	3.69	3.89	4.08	4.24	4.40	4.52	4.65	4.79	5.47	6.17	6.82		
GAS	1.48	1.57	1.65	1.71	1.76	1.81	1.86	1.89	1.91	1.92	1.93	1.96	2.09	2.29	2.53		
OIL	4.26	3.67	3.50	3.33	3.22	3.14	3.07	2.99	2.92	2.85	2.78	2.78	2.63	2.53	2.46		
OTHR	0.20	0.16	0.15	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.08	0.07	0.06		
TOTAL	8.44	8.62	8.64	8.70	8.81	8.98	9.13	9.25	9.34	9.40	9.46	9.64	10.27	11.07	11.87		
FUEL USE BY END-USE FUNCTION, QU (CETU)																	
SPACE HEATING	5.31	4.98	4.96	4.91	4.89	4.92	4.93	4.92	4.91	4.87	4.85	4.93	5.14	5.44	5.76		
WATER HEATING	1.16	1.23	1.25	1.28	1.32	1.37	1.42	1.45	1.49	1.51	1.54	1.57	1.70	1.85	1.99		
REFRIG	0.48	0.58	0.59	0.60	0.62	0.63	0.64	0.65	0.65	0.66	0.67	0.67	0.71	0.75	0.79		
FREEZERS	0.19	0.15	0.16	0.16	0.17	0.18	0.19	0.20	0.21	0.21	0.22	0.23	0.26	0.29	0.33		
COOKING	0.42	0.49	0.50	0.51	0.53	0.54	0.56	0.57	0.59	0.60	0.61	0.62	0.66	0.71	0.76		
AIR COND	0.03	0.25	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.08	0.10		
LIGHTING	0.48	0.54	0.53	0.54	0.57	0.60	0.63	0.66	0.69	0.71	0.72	0.74	0.82	0.91	1.00		
OTHR	0.46	0.60	0.61	0.63	0.66	0.69	0.72	0.74	0.77	0.79	0.81	0.83	0.93	1.03	1.13		
FUEL USE BY HOUSING TYPE, QT (QBTU)																	
SNGL	5.85	5.68	5.64	5.61	5.64	5.69	5.74	5.76	5.77	5.76	5.75	5.85	6.12	6.52	6.92		
MULT	2.47	2.79	2.84	2.92	2.99	3.09	3.19	3.28	3.35	3.41	3.47	3.55	3.87	4.23	4.59		
MOBL	0.12	0.16	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.24	0.28	0.32	0.36		
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																	
ELEC	7.83	12.60	12.88	13.42	13.88	14.37	14.82	15.55	16.38	16.99	17.61	18.32	22.10	25.72	29.28		
GAS	3.82	4.82	5.08	5.31	5.51	5.73	5.92	6.26	6.58	6.91	7.18	7.60	9.18	10.44	11.89		
OIL	7.80	11.48	10.88	10.31	9.96	9.66	9.38	9.25	9.14	9.06	8.95	9.06	8.44	7.28	6.23		
OTHR	0.47	0.54	0.52	0.50	0.47	0.45	0.43	0.42	0.41	0.40	0.39	0.38	0.34	0.28	0.24		
TOTAL	19.91	29.43	29.36	29.54	29.82	30.21	30.55	31.48	32.51	33.36	34.13	35.37	41.05	45.71	50.64		
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																	
TOTAL	0.0	6.41	7.08	7.85	8.38	8.92	9.45	9.21	9.56	9.37	9.63	9.80	10.34	11.67	12.60		
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																	
TOTAL	0.0	0.40	0.40	2.13	2.35	2.37	2.74	2.64	2.69	2.61	2.63	2.62	0.57	0.67	0.69		
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																	
ELEC	TOTAL FUEL USE (QBTU)			126.13			TOTAL EXPENDITURES			211.21							
GAS	TOTAL FUEL USE (QBTU)			50.13			TOTAL EXPENDITURES			85.81							
OIL	TOTAL FUEL USE (QBTU)			65.88			TOTAL EXPENDITURES			107.15							
OTHR	TOTAL FUEL USE (QBTU)			2.24			TOTAL EXPENDITURES			4.40							
TOTALS				244.39			408.57			EQUIPT EXPEN 99.50			TI EXPEN 16.33			TOTAL 524.39	

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 2 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																				
SUMMARY OF PROGRAM OUTPUTS																				
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000					
HOUSING STOCK (MILLIONS)																				
SNGL	35.74	37.48	37.04	36.46	35.11	33.74	32.37	30.90	29.57	28.26	26.80	25.11	23.71	22.78	21.74					
MULT	42.64	49.17	50.57	52.31	53.78	55.54	57.34	59.08	60.56	62.03	63.53	65.04	71.92	78.33	84.70					
MOBL	0.87	1.15	1.21	1.28	1.35	1.42	1.49	1.56	1.63	1.70	1.77	1.84	2.19	2.53	2.87					
TOTAL	79.25	87.81	88.63	91.86	94.23	96.70	99.20	101.44	103.77	105.79	107.90	110.00	119.82	129.65	139.31					
NEW HOUSING UNITS STOCK (MILLIONS)																				
SNGL	0.0	0.33	0.58	0.85	0.87	0.87	0.87	0.77	0.91	0.74	0.79	0.77	0.76	0.91	0.93					
MULT	0.0	1.29	1.69	1.85	1.98	2.08	2.14	1.98	1.94	1.83	1.87	1.90	1.66	1.73	1.76					
MOBL	0.0	0.09	0.11	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.15	0.17	0.18					
TOTAL	0.0	1.72	2.30	2.81	2.97	3.08	3.13	2.89	2.99	2.70	2.79	2.81	2.57	2.81	2.87					
FUEL USE BY FUEL TYPE CF, QFT (QBTU)																				
ELEC	4.46	5.16	5.26	5.45	5.69	5.97	6.26	6.54	6.80	7.03	7.27	7.54	8.83	10.11	11.22					
GAS	5.47	5.57	5.61	5.62	5.63	5.68	5.70	5.72	5.74	5.74	5.73	5.81	6.12	6.56	7.05					
OIL	6.64	5.64	5.46	5.25	5.08	4.94	4.80	4.67	4.55	4.43	4.33	4.21	4.07	3.90	3.77					
OTHR	0.42	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.18	0.15	0.12					
TOTAL	16.98	16.69	16.64	16.61	16.69	16.86	17.03	17.18	17.33	17.44	17.55	17.88	19.19	20.71	22.16					
FUEL USE BY END-USE FUNCTION QU (CETU)																				
SPACE HEATING	9.99	9.18	9.08	8.89	8.75	8.67	8.58	8.49	8.42	8.34	8.26	8.38	8.67	9.10	9.53					
WATER HEATING	2.29	2.24	2.23	2.27	2.31	2.35	2.41	2.45	2.50	2.55	2.59	2.64	2.92	3.24	3.53					
REFRIG	1.03	1.16	1.17	1.20	1.23	1.25	1.27	1.28	1.30	1.31	1.33	1.34	1.41	1.50	1.58					
FREEZERS	0.21	0.29	0.31	0.32	0.34	0.36	0.38	0.40	0.42	0.43	0.45	0.46	0.53	0.60	0.67					
COOKING	0.84	0.89	0.90	0.92	0.94	0.96	0.99	1.01	1.03	1.04	1.06	1.07	1.15	1.24	1.32					
AIR COND	0.33	0.45	0.47	0.48	0.49	0.50	0.50	0.51	0.51	0.52	0.52	0.54	0.63	0.72	0.81					
LIGHTING	1.03	1.04	1.02	1.05	1.09	1.16	1.23	1.31	1.36	1.41	1.45	1.49	1.68	1.88	2.06					
OTHER	1.25	1.44	1.45	1.49	1.54	1.60	1.67	1.73	1.79	1.84	1.89	1.95	2.19	2.44	2.66					
FUEL USE BY HOUSING TYPE QT (QBTU)																				
SNGL	10.07	9.44	9.33	9.19	9.14	9.14	9.13	9.10	9.10	9.10	9.06	9.04	9.18	9.67	10.33	10.94				
MULT	6.72	7.07	7.07	7.10	7.16	7.16	7.16	7.18	7.20	7.24	7.24	7.24	7.37	7.64	7.98	8.48				
MOBL	0.19	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.31	0.32	0.38	0.43	0.47				
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																				
ELEC	1.85	2.18	2.20	2.31	2.38	2.44	2.46	25.90	26.95	28.11	29.05	30.37	36.16	42.40	48.58					
GAS	11.31	13.94	14.50	14.99	15.62	16.21	16.76	17.51	18.16	18.87	19.56	20.44	23.79	26.33	29.16					
OIL	12.31	16.09	15.79	15.47	15.17	15.02	14.78	14.63	14.51	14.38	14.28	14.47	14.85	14.53	14.40					
OTHR	0.98	1.07	1.03	1.00	0.96	0.93	0.90	0.88	0.86	0.84	0.82	0.80	0.70	0.60	0.51					
TOTAL	39.44	53.77	53.90	54.49	55.24	56.20	57.03	58.91	60.48	62.20	63.71	66.08	75.51	83.66	92.65					
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																				
TOTAL	0.0	13.78	15.42	17.05	18.08	19.29	20.43	20.29	21.02	20.58	21.15	21.49	22.52	24.77	26.43					
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																				
TOTAL	0.0	0.70	0.69	3.57	3.99	4.02	4.57	4.47	4.54	4.41	4.45	1.07	0.99	1.10	1.12					
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																				
ELEC	TOTAL FUEL USE (QBTU)						212.09	TOTAL EXPENDITURES						350.28						
GAS	TOTAL FUEL USE (QBTU)						147.50	TOTAL EXPENDITURES						227.37						
OIL	TOTAL FUEL USE (QBTU)						102.13	TOTAL EXPENDITURES						167.69						
OTHR	TOTAL FUEL USE (QBTU)						4.75	TOTAL EXPENDITURES						9.18						
TOTALS																				
			456.48						756.51			EQUIPT EXPEN 216.61			TI EXPEN 27.57			TOTAL1000.66		

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), JAK RIDGE NATIONAL LABORATORY																					
PEA REGION 3 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																					
	SUMMARY OF PROGRAM OUTPUTS																				
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000						
HOUSING STOCK (MILLIONS)																					
SNGL	52.48	56.80	57.70	58.93	60.24	61.56	62.89	64.00	65.25	66.27	67.34	68.39	73.49	78.41	83.14						
MULT	18.61	22.15	22.92	23.74	24.63	25.57	26.55	27.44	28.26	29.03	29.85	30.68	34.38	37.43	40.47						
MOBL	1.82	2.49	2.64	2.79	2.95	3.13	3.31	3.48	3.65	3.82	3.99	4.17	5.03	5.81	6.57						
TOTAL	72.91	81.44	83.26	85.47	87.82	90.26	92.75	94.92	97.17	99.14	101.18	103.24	112.89	121.64	130.17						
NEW HOUSING UNITS STOCK (MILLIONS)																					
SNGL	0.0	0.95	1.35	1.70	1.77	1.81	1.82	1.61	1.76	1.54	1.67	1.59	1.53	1.61	1.63						
MULT	0.0	0.76	0.95	1.00	1.08	1.14	1.18	1.09	1.05	1.02	1.04	1.06	0.93	0.89	0.91						
MOBL	0.0	0.22	0.25	0.26	0.28	0.29	0.31	0.31	0.31	0.31	0.32	0.33	0.36	0.38	0.41						
TOTAL	0.0	1.92	2.55	2.96	3.13	3.24	3.31	3.02	3.12	2.87	2.96	2.99	2.82	2.88	2.95						
FUEL USE BY FUEL TYPE CF, OFT (OBTU)																					
ELEC	5.55	6.94	7.19	7.52	7.90	8.32	8.73	9.10	9.44	9.73	10.01	10.35	11.93	13.37	14.67						
GAS	5.59	5.88	5.93	5.88	5.83	5.78	5.70	5.63	5.59	5.54	5.50	5.55	5.79	6.13	6.52						
OIL	3.64	2.97	2.67	2.47	2.26	2.05	1.84	1.63	1.43	1.24	1.06	0.90	1.86	1.75	1.65						
OTHR	1.01	0.79	0.75	0.72	0.68	0.65	0.62	0.59	0.56	0.54	0.51	0.45	0.39	0.30	0.24						
TOTAL	15.78	16.58	16.71	16.78	16.94	17.15	17.35	17.53	17.73	17.87	18.02	18.38	19.97	21.55	23.08						
FUEL USE BY END-USE FUNCTION CU (CETU)																					
SPACE HEATING	0.61	0.48	0.47	0.32	0.23	0.18	0.10	0.04	0.01	7.97	7.93	8.09	8.63	9.16	9.67						
WATER HEATING	2.33	2.45	2.66	2.52	2.42	2.32	2.22	2.12	2.02	1.92	1.82	1.72	2.45	2.42	2.38						
REFRIG	0.95	1.07	1.09	1.12	1.14	1.16	1.18	1.19	1.21	1.22	1.23	1.24	1.31	1.38	1.45						
FREEZERS	0.30	0.41	0.43	0.45	0.47	0.50	0.52	0.54	0.56	0.58	0.60	0.62	0.70	0.79	0.87						
COOKING	0.83	0.99	0.91	0.93	0.96	0.98	1.01	1.04	1.06	1.08	1.10	1.12	1.20	1.28	1.36						
AIR COND	0.93	0.64	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90	1.02	1.18	1.33						
LIGHTING	0.95	1.02	1.01	1.04	1.08	1.14	1.19	1.25	1.29	1.32	1.35	1.38	1.51	1.68	1.84						
OTHR	1.38	1.60	1.64	1.69	1.75	1.82	1.88	1.94	1.99	2.04	2.08	2.13	2.35	2.57	2.78						
FUEL USE BY HOUSING TYPE QT (CBTU)																					
SNGL	12.72	13.00	13.03	12.99	13.04	13.13	13.19	13.24	13.32	13.35	13.39	13.63	14.63	15.69	16.71						
MULT	2.72	3.14	3.21	3.30	3.39	3.48	3.59	3.69	3.79	3.87	3.96	4.05	4.50	4.91	5.31						
MOBL	0.34	0.45	0.47	0.49	0.51	0.54	0.57	0.60	0.63	0.65	0.68	0.70	0.83	0.95	1.06						
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																					
ELEC	1.84	22.62	22.12	23.93	24.93	25.79	26.60	28.21	29.79	31.22	32.64	34.32	41.78	48.26	54.51						
GAS	9.50	11.30	12.10	12.69	13.78	13.95	14.43	14.85	15.30	15.74	16.18	16.99	19.31	21.17	23.16						
OIL	6.43	8.25	8.14	7.88	7.74	7.59	7.46	7.28	7.13	7.00	6.89	6.97	7.06	6.79	6.58						
OTHR	2.10	2.11	2.05	1.98	1.93	1.86	1.80	1.75	1.71	1.67	1.63	1.59	1.14	1.00	0.80						
TOTAL	32.88	44.49	45.54	46.48	47.87	49.20	50.29	52.09	53.94	55.63	57.35	59.86	69.50	77.31	85.14						
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																					
TOTAL	0.0	15.56	17.36	19.08	20.36	21.68	22.94	22.56	23.35	22.51	23.55	23.94	25.23	27.09	28.79						
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																					
TOTAL	0.0	0.62	0.66	0.75	0.81	0.85	0.75	0.64	0.65	0.58	0.62	1.07	1.09	1.03	1.06						
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																					
ELEC	TOTAL FUEL USE (OBTU)					272.47	TOTAL EXPENDITURES					390.34									
GAS	TOTAL FUEL USE (OBTU)					141.27	TOTAL EXPENDITURES					109.00									
OIL	TOTAL FUEL USE (OBTU)					47.27	TOTAL EXPENDITURES					81.89									
OTHR	TOTAL FUEL USE (OBTU)					10.48	TOTAL EXPENDITURES					17.95									
TOTALS																					
												471.49			680.06	EQUIPT EXPEN	241.16	TI EXPEN	28.24	TOTAL	949.45

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 4 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS																ELECTRICITY IN TERMS OF PRIMARY ENERGY				
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000					
SUMMARY OF PROGRAM OUTPUTS																				
HOUSING STOCK (MILLIONS)																				
SNGL	77.64	86.28	88.11	90.45	92.91	95.43	97.98	100.17	102.57	104.63	106.79	108.94	119.51	128.74	137.87					
MULT	116.52	20.11	21.87	22.87	23.77	24.83	25.77	26.66	27.53	28.41	29.32	33.55	36.88	40.27						
MOBL	5.38	7.53	8.02	8.53	9.07	9.66	10.27	10.86	11.44	12.01	12.67	13.21	16.28	18.98	21.69					
TOTAL	99.54	114.31	117.14	120.84	124.78	128.88	133.68	136.80	140.67	144.17	147.80	151.47	169.33	184.60	199.83					
NEW HOUSING UNITS STOCK (MILLIONS)																				
SNGL	0.0	1.80	2.43	2.95	3.13	3.17	3.22	2.88	3.10	2.78	2.89	2.90	2.84	2.75	2.83					
MULT	0.0	0.77	0.99	1.01	1.08	1.15	1.20	1.12	1.07	1.05	1.08	1.11	1.01	0.91	0.94					
MOBL	0.0	0.69	0.79	0.83	0.90	0.90	1.00	1.00	1.01	1.03	1.17	1.11	1.22	1.28	1.38					
TOTAL	0.0	3.26	4.17	4.79	5.26	5.27	5.42	5.00	5.19	4.86	5.04	5.12	5.07	4.94	5.16					
FUEL USE BY FUEL TYPE CF, QFT (QBTU)																				
ELEC	12.10	15.85	16.32	16.73	17.24	17.79	18.26	18.71	19.20	19.64	20.09	20.78	24.17	27.06	29.62					
GAS	4.82	4.67	4.79	4.79	4.79	4.78	4.74	4.72	4.70	4.68	4.67	4.72	4.89	5.20	5.63					
OIL	2.84	1.77	1.60	1.48	1.38	1.28	1.20	1.14	1.07	1.02	0.99	0.94	0.84	0.72	0.62					
OTHR	1.81	1.51	1.45	1.39	1.34	1.28	1.23	1.17	1.12	1.07	1.02	0.98	0.77	0.61	0.48					
TOTAL	21.17	23.93	24.33	24.52	24.85	25.23	25.51	25.81	26.16	26.47	26.80	27.47	33.68	33.59	36.35					
FUEL USE BY END-USE FUNCTION CU (QBTU)																				
SPACE HEAT	9.03	9.35	9.42	9.23	9.24	9.24	9.21	9.20	9.27	9.23	9.25	9.61	10.46	11.29	12.03					
WATER HEAT	3.10	3.11	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13					
REFRIG	1.29	1.43	1.47	1.51	1.54	1.58	1.60	1.62	1.65	1.67	1.69	1.71	1.84	1.97	2.10					
FREEZERS	0.52	0.69	0.73	0.76	0.80	0.84	0.87	0.91	0.94	0.97	1.00	1.03	1.19	1.33	1.47					
COOLING	1.25	1.36	1.39	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.55	1.57	1.70	1.84	2.02					
AIR COND	2.11	3.31	3.50	3.59	3.70	3.79	3.84	3.89	3.95	4.00	4.06	4.23	4.70	5.14	5.60					
LIGHTING	1.29	1.41	1.38	1.39	1.42	1.46	1.51	1.55	1.59	1.63	1.67	1.71	1.97	2.23	2.49					
OTHR	1.76	2.06	2.11	2.18	2.25	2.31	2.38	2.44	2.50	2.56	2.61	2.66	2.93	3.22	3.54					
FUEL USE BY HOUSING TYPE QT (QBTU)																				
SNGL	17.78	19.60	19.85	19.89	20.05	20.26	20.37	20.49	20.68	20.83	21.00	21.49	23.76	25.85	27.79					
MULT	2.45	3.22	3.18	3.18	3.26	3.34	3.43	3.51	3.59	3.67	3.75	3.84	4.31	4.70	5.09					
MOBL	0.94	1.12	1.16	1.16	1.14	1.13	1.11	1.10	1.08	1.06	1.05	1.14	1.26	1.30	1.34					
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																				
ELEC	2.22	38.55	40.44	42.35	44.33	46.44	48.43	50.34	52.42	54.40	56.45	59.22	70.33	80.96	91.49					
GAS	6.35	6.97	7.69	8.25	8.80	9.33	9.87	10.29	10.73	11.23	11.66	12.32	14.81	16.27	18.19					
OIL	4.95	5.31	5.12	4.82	4.58	4.40	4.24	4.04	3.87	3.71	3.57	3.54	3.26	2.85	2.52					
OTHR	3.31	3.41	3.37	3.34	3.28	3.22	3.16	3.08	3.00	2.93	2.85	2.77	2.28	1.84	1.50					
TOTAL	38.72	54.23	56.52	58.76	60.98	63.39	65.66	67.75	70.02	72.26	74.53	77.86	90.69	101.87	113.70					
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																				
TOTAL	0.0	25.40	28.04	30.90	32.88	35.02	37.66	36.43	37.84	37.35	38.54	39.35	42.36	44.77	48.04					
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																				
TOTAL	0.0	0.85	0.94	5.28	5.55	5.60	6.47	6.34	6.40	6.29	6.34	1.35	1.32	1.20	1.34					
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																				
TOTAL FUEL USE (QBTU)				515.33			474.81													
TOTAL FUEL USE (QBTU)				119.30			137.87													
TOTAL FUEL USE (QBTU)				22.81			42.54													
TOTAL FUEL USE (QBTU)				29.85			30.93													
TOTALS			718.29				884.95		EQUIP EXPEN	394.37	TI EXPEN	39.55	TOTAL	1317.88						

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 5 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																
SUMMARY OF PROGRAM OUTPUTS																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
HOUSING STOCK (MILLIONS)																
SNGL	96.44	103.72	105.22	107.35	109.59	111.86	114.13	116.05	118.23	119.68	121.83	123.65	132.39	140.87	148.96	
MULT	37.70	44.58	46.38	47.67	49.39	51.22	53.11	54.83	56.44	57.97	59.53	61.12	68.25	74.11	79.90	
MOBL	3.44	4.66	4.93	5.21	5.51	5.83	6.16	6.48	6.79	7.10	7.41	7.73	9.29	10.70	12.07	
TOTAL	137.58	152.96	156.23	160.23	164.49	168.91	173.40	177.36	181.47	185.65	188.77	192.50	209.94	225.68	240.93	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGL	0.0	1.39	2.13	2.76	2.88	2.93	2.94	2.61	2.88	2.46	2.57	2.54	2.40	2.53	2.55	
MULT	0.0	1.38	1.76	1.87	2.01	2.13	2.20	2.04	1.94	1.87	1.91	1.95	1.67	1.58	1.60	
MOBL	0.0	0.40	0.45	0.48	0.51	0.54	0.57	0.57	0.57	0.58	0.60	0.62	0.66	0.70	0.74	
TOTAL	0.0	3.18	4.35	5.10	5.40	5.59	5.71	5.21	5.39	4.51	5.07	5.11	4.73	4.81	4.89	
FUEL USE BY FUEL TYPE OF, QFT (QBTU)																
ELEC	10.46	13.54	14.21	14.94	15.40	16.51	17.29	18.00	18.64	19.18	19.71	20.33	23.56	26.58	29.11	
GAS	18.20	19.37	19.39	19.12	18.84	18.59	18.28	18.05	17.86	17.66	17.50	17.44	17.33	17.71	18.46	
OIL	5.77	4.71	4.42	4.07	3.79	3.57	3.36	3.16	2.98	2.82	2.66	2.59	2.18	1.89	1.64	
OTHR	1.74	1.43	1.37	1.32	1.26	1.21	1.16	1.11	1.06	1.01	0.97	0.92	0.73	0.58	0.46	
TOTAL	36.17	39.05	39.39	39.45	39.60	39.88	40.09	40.31	40.54	40.66	40.84	41.49	43.78	46.75	49.67	
FUEL USE BY END-USE FUNCTION CU (CETU)																
SPACE HEATING	20.16	20.66	20.59	20.14	19.74	19.46	19.11	18.84	18.60	18.35	18.15	18.40	18.64	19.46	20.32	
WATER HEATING	4.40	4.71	4.75	4.84	4.93	5.03	5.14	5.27	5.38	5.48	5.59	5.68	6.27	6.80	7.30	
REFRIG	1.79	2.01	2.06	2.11	2.16	2.20	2.22	2.25	2.27	2.29	2.31	2.33	2.44	2.56	2.68	
FREEZERS	0.68	0.92	0.97	1.02	1.08	1.13	1.17	1.22	1.26	1.29	1.33	1.37	1.54	1.71	1.87	
COOKING	1.57	1.73	1.76	1.80	1.85	1.91	1.96	2.01	2.06	2.09	2.13	2.17	2.34	2.52	2.68	
AIR COND	0.57	1.20	1.08	1.12	1.15	1.18	1.20	1.21	1.23	1.24	1.25	1.31	1.56	1.79	2.01	
LIGHTING	1.79	2.05	2.06	2.13	2.21	2.31	2.41	2.51	2.58	2.63	2.68	2.72	3.00	3.31	3.61	
OTHER	5.29	5.96	6.11	6.28	6.48	6.66	6.85	7.01	7.16	7.28	7.40	7.52	8.05	8.60	9.19	
FUEL USE BY HOUSING TYPE QT (QBTU)																
SNGL	28.72	30.02	30.10	29.90	29.81	29.81	29.74	29.68	29.66	29.56	29.51	29.90	31.02	32.80	34.56	
MULT	6.65	7.94	8.17	8.39	8.58	8.80	9.03	9.25	9.44	9.61	9.76	10.01	10.93	11.88	12.81	
MOBL	0.79	1.28	1.12	1.16	1.21	1.27	1.33	1.38	1.44	1.48	1.53	1.58	1.82	2.07	2.30	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	29.33	39.09	40.61	42.71	44.47	46.74	48.46	51.45	54.85	57.52	60.23	63.83	76.59	89.39	101.19	
GAS	24.72	29.72	31.86	33.50	35.04	36.60	37.99	38.97	40.25	41.48	42.54	44.56	55.00	58.20	62.67	
OIL	9.80	12.48	11.93	11.13	10.57	10.06	9.64	9.30	8.97	8.66	8.33	8.28	7.60	6.70	5.95	
OTHR	3.22	3.09	3.05	3.02	2.97	2.92	2.86	2.82	2.79	2.74	2.69	2.65	2.37	1.94	1.59	
TOTAL	67.07	84.38	87.46	90.37	93.06	96.33	98.95	102.53	106.87	110.40	113.79	119.34	141.56	156.23	171.40	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	28.77	31.98	35.42	37.85	40.24	42.56	41.99	43.44	42.53	43.69	44.41	46.72	50.11	53.09	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	1.12	1.16	6.77	7.66	7.70	9.25	8.97	9.16	8.69	8.98	2.41	2.23	2.31	2.36	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			
GAS	TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			
OIL	TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			
OTHR	TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			TOTAL EXPENDITURES			TOTAL FUEL USE (QBTU)			
TOTALS	1047.71			1355.90			EQUIP EXPEN 447.20			TI EXPEN 55.10			TOTAL 1858.20			

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 6 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																	
SUMMARY OF PROGRAM OUTPUTS																	
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000		
HOUSING STOCK (MILLIONS)																	
SNGL	51.42	55.54	56.42	57.56	58.79	60.04	61.30	62.46	63.72	64.77	65.88	66.96	72.15	76.69	81.01		
MULT	10.08	11.97	12.39	12.82	13.29	13.72	14.31	14.80	15.24	15.70	16.15	16.60	18.66	20.24	21.80		
MOBL	1.90	2.59	2.74	2.90	3.07	3.25	3.43	3.62	3.80	3.97	4.15	4.34	5.25	6.04	6.81		
TOTAL	63.40	70.11	71.53	73.28	75.14	77.06	79.04	80.87	82.78	84.44	86.17	87.91	96.06	102.97	109.62		
NEW HOUSING UNITS STOCK (MILLIONS)																	
SNGL	0.0	0.79	1.19	1.50	1.57	1.61	1.62	1.53	1.64	1.43	1.49	1.48	1.38	1.36	1.36		
MULT	0.0	0.38	0.48	0.51	0.55	0.58	0.60	0.58	0.55	0.53	0.54	0.56	0.48	0.43	0.43		
MOBL	0.0	0.23	0.25	0.27	0.28	0.30	0.32	0.32	0.32	0.33	0.34	0.35	0.38	0.39	0.42		
TOTAL	0.0	1.40	1.93	2.27	2.40	2.49	2.54	2.43	2.51	2.29	2.37	2.39	2.24	2.18	2.21		
FUEL USE BY FUEL TYPE OF, QFT (QBTU)																	
ELEC	5.90	8.27	8.69	8.92	9.07	9.16	9.18	9.25	9.35	9.53	9.70	9.99	11.35	12.66	13.84		
GAS	5.78	5.65	5.60	5.52	5.46	5.44	5.40	5.38	5.38	5.37	5.37	5.43	5.39	5.51	5.73		
OIL	0.74	0.51	0.47	0.43	0.40	0.37	0.34	0.32	0.30	0.28	0.26	0.25	0.19	0.15	0.11		
OTHR	1.37	1.20	1.15	1.11	1.06	1.02	0.97	0.93	0.89	0.85	0.81	0.78	0.62	0.48	0.38		
TOTAL	13.79	15.62	15.91	15.97	15.99	15.99	15.90	15.89	15.96	16.03	16.14	16.45	17.54	18.80	20.07		
FUEL USE BY END-USE FUNCTION CU (CETU)																	
SPACE HEATING	5.07	5.02	5.00	4.89	4.79	4.70	4.59	4.52	4.47	4.42	4.38	4.44	4.49	4.66	4.85		
WATER HEATING	1.92	1.99	1.99	2.00	1.99	1.99	1.97	1.98	1.99	2.01	2.03	2.06	2.18	2.41	2.63		
REFRIG	0.82	0.97	0.99	1.01	1.03	1.04	1.04	1.05	1.06	1.07	1.08	1.09	1.14	1.19	1.25		
FREEZERS	0.34	0.49	0.52	0.54	0.56	0.58	0.60	0.61	0.63	0.65	0.67	0.69	0.78	0.85	0.92		
COOKING	0.78	0.83	0.84	0.85	0.85	0.86	0.87	0.87	0.88	0.89	0.90	0.91	0.94	0.98	1.02		
AIR COND	1.93	2.83	2.49	3.04	3.07	3.09	3.07	3.07	3.08	3.08	3.09	3.19	3.58	3.92	4.22		
LIGHTING	0.82	1.03	1.05	1.06	1.05	1.04	1.02	1.01	1.02	1.03	1.06	1.09	1.21	1.34	1.47		
OTHR	2.10	2.46	2.52	2.59	2.64	2.69	2.73	2.78	2.84	2.89	2.94	3.00	3.22	3.45	3.71		
FUEL USE BY HOUSING TYPE GT (CBTU)																	
SNGL	11.72	13.04	13.23	13.22	13.20	13.15	13.02	12.96	12.97	12.98	13.02	13.25	14.01	14.94	15.88		
MULT	1.55	1.75	1.78	1.82	1.84	1.86	1.89	1.92	1.94	1.96	1.98	2.01	2.24	2.45	2.65		
MOBL	0.52	0.63	0.65	0.66	0.68	0.69	0.71	0.72	0.74	0.76	0.78	0.81	0.92	1.03	1.14		
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																	
ELEC	15.11	19.40	22.39	25.05	27.57	29.99	32.19	32.43	33.14	33.64	34.49	35.77	42.70	48.94	55.28		
GAS	6.69	7.59	7.92	8.12	8.42	8.69	9.01	9.23	9.54	9.84	10.14	10.58	13.18	13.92	14.95		
OIL	1.27	1.39	1.31	1.23	1.15	1.09	1.04	0.98	0.93	0.89	0.85	0.82	0.68	0.54	0.43		
OTHR	2.56	2.35	2.47	2.56	2.64	2.71	2.76	2.66	2.58	2.49	2.41	2.34	2.06	1.68	1.37		
TOTAL	25.74	30.73	34.08	36.95	39.79	42.48	44.99	45.30	46.20	46.86	47.90	49.51	58.62	65.07	72.03		
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																	
TOTAL	0.0	15.04	17.46	19.02	19.99	20.95	21.49	21.78	22.49	22.03	22.60	22.96	23.88	24.99	26.25		
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																	
TOTAL	0.0	0.58	0.61	3.87	4.01	4.05	4.57	4.53	4.56	4.49	4.51	6.72	0.67	0.65	0.66		
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																	
ELEC	TOTAL FUEL USE (QBTU)						131.34	TOTAL EXPENDITURES						122.17			
GAS	TOTAL FUEL USE (QBTU)						131.34	TOTAL EXPENDITURES						122.17			
OIL	TOTAL FUEL USE (QBTU)						5.46	TOTAL EXPENDITURES						9.87			
OTHR	TOTAL FUEL USE (QBTU)						16.59	TOTAL EXPENDITURES						26.36			
TOTALS	419.22						573.33	EQUIPT EXPEN 231.14						TI EXPEN 26.86	TOTAL 831.33		

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 7 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
SUMMARY OF PROGRAM OUTPUTS																
HOUSING STOCK (MILLIONS)																
SNGH	27.17	28.75	29.07	29.55	30.05	30.56	31.07	31.55	32.09	32.51	32.96	33.39	35.40	37.04	38.50	
MULT	6.65	7.74	7.97	8.22	8.48	8.77	9.06	9.34	9.60	9.84	10.09	10.34	11.43	12.21	12.94	
MOBL	1.05	1.39	1.47	1.55	1.63	1.72	1.81	1.90	1.99	2.07	2.16	2.25	2.68	3.03	3.37	
TOTAL	34.87	37.89	38.52	39.31	40.17	41.05	41.94	42.79	43.67	44.43	45.21	45.98	49.51	52.29	54.81	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGH	0.0	0.29	0.49	0.65	0.68	0.69	0.69	0.67	0.73	0.61	0.64	0.63	0.57	0.54	0.52	
MULT	0.0	0.21	0.28	0.29	0.31	0.33	0.34	0.33	0.31	0.30	0.31	0.31	0.26	0.22	0.21	
MOBL	0.0	0.12	0.13	0.14	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	
TOTAL	0.0	0.62	0.90	1.08	1.14	1.18	1.19	1.17	1.20	1.08	1.12	1.12	1.01	0.95	0.93	
FUEL USE BY FUEL TYPE OF, QFT (QBTU)																
ELEC	2.91	3.88	4.09	4.25	4.40	4.54	4.66	4.78	4.91	5.02	5.13	5.30	6.21	7.02	7.61	
GAS	4.77	4.83	4.86	4.81	4.77	4.74	4.70	4.67	4.66	4.64	4.63	4.70	4.50	4.52	4.64	
OIL	0.69	0.53	0.50	0.45	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.22	0.18	0.15	
OTHR	1.94	0.85	0.81	0.78	0.74	0.71	0.67	0.64	0.61	0.58	0.56	0.53	0.42	0.33	0.26	
TOTAL	9.43	10.09	10.26	10.29	10.34	10.39	10.40	10.44	10.50	10.54	10.60	10.80	11.34	12.04	12.65	
FUEL USE BY END-USE FUNCTION CU (QBTU)																
SPACE HEATING	4.88	4.93	4.97	4.89	4.82	4.77	4.70	4.64	4.60	4.56	4.52	4.61	4.62	4.81	5.00	
WATER HEATING	1.00	1.11	1.12	1.14	1.15	1.17	1.18	1.20	1.22	1.24	1.26	1.28	1.39	1.54	1.65	
REFRIG	0.45	0.49	0.50	0.51	0.52	0.52	0.53	0.53	0.53	0.54	0.54	0.54	0.57	0.58	0.60	
FREEZERS	0.21	0.27	0.28	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.43	0.47	0.50	
COOKING	0.41	0.44	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.50	0.51	0.52	0.56	0.59	0.62	
AIR COND	0.43	0.65	0.69	0.70	0.72	0.72	0.72	0.72	0.73	0.73	0.73	0.75	0.84	0.91	0.97	
LIGHTING	0.45	0.52	0.53	0.54	0.55	0.56	0.58	0.59	0.60	0.62	0.63	0.64	0.73	0.80	0.86	
OTHR	1.54	1.68	1.72	1.76	1.81	1.85	1.89	1.93	1.97	2.00	2.04	2.08	2.21	2.32	2.44	
FUEL USE BY HOUSING TYPE CT (QBTU)																
SNGH	1.20	1.41	1.46	1.51	1.54	1.57	1.61	1.64	1.68	1.71	1.75	1.79	1.95	2.11	2.25	
MULT	0.23	0.31	0.33	0.34	0.36	0.37	0.39	0.41	0.42	0.44	0.45	0.47	0.54	0.61	0.67	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	8.55	10.30	11.09	11.91	12.58	13.25	13.86	14.36	14.88	15.37	15.87	16.53	18.63	21.90	24.63	
GAS	5.66	6.23	6.51	6.72	6.90	7.14	7.30	7.48	7.68	7.87	8.06	8.41	11.14	11.56	12.25	
OIL	1.18	1.43	1.34	1.23	1.15	1.08	1.02	0.98	0.94	0.89	0.86	0.85	0.74	0.62	0.52	
OTHR	1.90	1.65	1.63	1.62	1.59	1.57	1.54	1.49	1.45	1.41	1.37	1.33	1.17	0.95	0.78	
TOTAL	17.29	19.61	20.57	21.40	22.23	23.04	23.71	24.31	24.95	25.54	26.16	27.11	31.89	35.03	38.18	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	7.91	8.83	9.65	10.12	10.59	11.04	11.09	11.40	11.11	11.35	11.48	11.76	12.09	12.47	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.29	0.30	1.86	1.99	2.00	2.29	2.28	2.30	2.24	2.25	0.43	0.38	0.36	0.36	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
GAS	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OIL	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
OTHR	TOTAL FUEL USE (QBTU)				TOTAL EXPENDITURES											
TOTALS	270.83				312.25				EQUIP EXPEN 115.64 TI EXPEN 13.50 TOTAL 441.39							

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 8 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000	
SUMMARY OF PROGRAM OUTPUTS																
HOUSING STOCK (MILLIONS)																
SNGH	13.15	13.96	14.12	14.37	14.63	14.89	15.15	15.37	15.61	15.81	16.01	16.21	17.12	17.88	18.55	
MULT	3.75	4.38	4.61	4.65	4.81	4.97	5.14	5.30	5.44	5.57	5.71	5.84	6.44	6.86	7.26	
MOBL	0.85	1.14	1.20	1.27	1.34	1.41	1.49	1.56	1.63	1.70	1.77	1.84	2.18	2.47	2.73	
TOTAL	17.75	19.47	19.94	20.29	20.77	21.27	21.78	22.22	22.68	23.08	23.49	23.89	25.75	27.21	28.55	
NEW HOUSING UNITS STOCK (MILLIONS)																
SNGH	0.0	0.21	0.30	0.39	0.40	0.41	0.41	0.37	0.40	0.35	0.36	0.36	0.33	0.33	0.32	
MULT	0.0	0.14	0.18	0.19	0.20	0.21	0.22	0.21	0.19	0.19	0.19	0.19	0.17	0.15	0.15	
MOBL	0.0	0.10	0.11	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	
TOTAL	0.0	0.44	0.59	0.69	0.72	0.75	0.76	0.71	0.73	0.67	0.69	0.69	0.65	0.63	0.63	
FUEL USE BY FUEL TYPE OF, QFT (QBTU)																
ELEC	1.20	1.68	1.78	1.88	1.99	2.10	2.21	2.31	2.41	2.49	2.57	2.66	3.05	3.39	3.65	
GAS	2.26	2.47	2.47	2.41	2.33	2.26	2.19	2.14	2.11	2.07	2.05	2.07	1.95	1.96	2.01	
OIL	0.45	0.33	0.31	0.28	0.26	0.25	0.23	0.22	0.21	0.20	0.19	0.18	0.15	0.13	0.12	
OTHR	0.38	0.34	0.33	0.32	0.31	0.30	0.30	0.29	0.28	0.27	0.26	0.25	0.21	0.17	0.14	
TOTAL	4.29	4.83	4.89	4.90	4.89	4.91	4.93	4.96	5.00	5.03	5.06	5.16	5.37	5.66	5.91	
FUEL USE BY END-USE FUNCTION CU (QBTU)																
SPACE HEATING	2.74	2.88	2.88	2.82	2.75	2.70	2.64	2.61	2.58	2.56	2.53	2.57	2.55	2.63	2.71	
WATER HEATING	0.56	0.66	0.68	0.70	0.72	0.74	0.77	0.81	0.84	0.86	0.89	0.91	1.00	1.08	1.13	
REFRIG	0.23	0.29	0.30	0.30	0.31	0.31	0.32	0.32	0.32	0.32	0.33	0.33	0.34	0.35	0.36	
FREEZERS	0.12	0.17	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.26	0.28	0.29	
COOKING	0.22	0.27	0.28	0.29	0.30	0.31	0.32	0.32	0.33	0.34	0.35	0.35	0.38	0.40	0.42	
AIR COND	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.06	0.07	
LIGHTING	0.23	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.42	0.43	0.47	0.51	0.55	
OTHER	0.17	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.29	0.32	0.35	0.37	
FUEL USE BY HOUSING TYPE CT (QBTU)																
SNGH	3.56	3.87	3.90	3.86	3.83	3.82	3.80	3.79	3.80	3.79	3.79	3.85	3.92	4.08	4.22	
MULT	0.57	0.73	0.75	0.77	0.79	0.81	0.82	0.84	0.86	0.88	0.90	0.92	0.99	1.06	1.13	
MOBL	0.16	0.23	0.25	0.26	0.27	0.29	0.30	0.32	0.34	0.35	0.37	0.38	0.45	0.51	0.57	
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																
ELEC	3.48	4.08	4.27	4.52	4.71	4.92	5.17	5.41	5.71	5.98	6.17	6.46	7.95	9.13	10.12	
GAS	2.45	2.91	3.11	3.21	3.31	3.38	3.46	3.46	3.49	3.53	3.57	3.70	4.72	4.88	5.18	
OIL	0.82	0.92	0.87	0.81	0.76	0.72	0.69	0.67	0.64	0.62	0.59	0.59	0.54	0.48	0.43	
OTHR	0.65	0.60	0.60	0.60	0.60	0.60	0.59	0.58	0.58	0.57	0.56	0.55	0.53	0.45	0.38	
TOTAL	7.40	8.51	8.85	9.14	9.39	9.62	9.92	10.12	10.42	10.69	10.89	11.30	13.74	14.94	16.12	
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	3.27	3.65	4.05	4.32	4.60	4.87	4.82	5.00	4.91	5.05	5.14	5.42	5.73	6.03	
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																
TOTAL	0.0	0.11	0.12	0.09	0.88	0.88	1.10	1.06	1.09	1.04	1.66	0.39	3.37	0.36	0.36	
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																
ELEC	TOTAL FUEL USE (QBTU)	69.20														
GAS	TOTAL FUEL USE (QBTU)	49.34														
OIL	TOTAL FUEL USE (QBTU)	4.15														
OTHR	TOTAL FUEL USE (QBTU)	3.34														
	TOTAL EXPENDITURES	6.24														
TOTALS			129.07				131.92		EQUIP'T EXPEN	51.37		TI EXPEN	6.68		TOTAL	189.96

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 9 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																		
SUMMARY OF PROGRAM OUTPUTS																		
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000			
HOUSING STOCK (MILLIONS)																		
SNGL	48.14	52.71	53.67	54.96	56.31	57.69	59.07	60.26	61.60	62.72	63.90	65.07	70.88	76.10	81.21			
MULT	21.06	25.36	26.30	27.31	28.40	29.56	30.77	31.87	32.92	33.92	34.95	36.00	40.90	44.81	48.76			
MOBL	2.44	3.36	3.57	3.79	4.02	4.27	4.52	4.77	5.02	5.26	5.51	5.77	7.05	8.20	9.34			
TOTAL	71.64	81.44	83.55	86.06	88.74	91.52	94.36	96.90	99.54	101.50	104.36	106.84	118.83	129.11	139.31			
NEW HOUSING UNITS STOCK (MILLIONS)																		
SNGL	0.0	1.10	1.49	1.83	1.90	1.94	1.96	1.78	1.95	1.74	1.81	1.81	1.81	1.80	1.86			
MULT	0.0	0.97	1.20	1.27	1.36	1.44	1.50	1.41	1.37	1.33	1.37	1.40	1.30	1.21	1.26			
MOBL	0.0	0.30	0.34	0.36	0.38	0.41	0.43	0.43	0.44	0.44	0.46	0.48	0.52	0.55	0.59			
TOTAL	0.0	2.38	3.02	3.46	3.65	3.79	3.89	3.62	3.75	3.51	3.64	3.69	3.63	3.57	3.70			
FUEL USE BY FUEL TYPE OF, QFT (OBTU)																		
ELEC	5.00	6.64	6.88	7.11	7.33	7.55	7.75	7.96	8.25	8.56	8.92	9.39	11.57	13.09	14.47			
GAS	6.63	7.09	7.64	7.48	7.32	7.18	7.03	6.85	6.66	6.45	6.24	6.09	6.30	6.69	7.06			
OIL	0.14	0.11	0.10	0.09	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.05	0.04	0.03	0.02			
OTHR	0.41	0.35	0.34	0.33	0.32	0.31	0.30	0.28	0.27	0.26	0.25	0.24	0.20	0.16	0.13			
TOTAL	12.18	14.79	14.96	15.01	15.05	15.12	15.16	15.17	15.25	15.33	15.46	15.78	18.12	19.97	21.68			
FUEL USE BY END-USE FUNCTION, CU (CETU)																		
SPACE HEATING	4.85	5.69	5.72	5.61	5.51	5.43	5.34	5.24	5.18	5.12	5.10	5.21	6.04	6.52	6.91			
WATER HEATING	2.10	2.47	2.48	2.49	2.49	2.49	2.50	2.50	2.51	2.54	2.59	2.67	3.26	3.64	3.96			
REFRIG	0.93	1.14	1.17	1.20	1.23	1.25	1.27	1.28	1.30	1.31	1.33	1.35	1.44	1.53	1.62			
FREEZERS	0.24	0.33	0.35	0.36	0.37	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.53	0.59	0.65			
COOKING	0.81	0.98	1.00	1.01	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16	1.30	1.40	1.49			
AIR COND	0.33	0.51	0.53	0.53	0.54	0.54	0.54	0.55	0.55	0.56	0.57	0.61	0.79	0.96	1.14			
LIGHTING	0.93	1.10	1.10	1.12	1.13	1.15	1.18	1.20	1.23	1.26	1.30	1.34	1.55	1.73	1.90			
OTHER	1.99	2.56	2.62	2.69	2.75	2.81	2.87	2.91	2.95	2.97	2.98	2.98	3.20	3.60	4.00			
FUEL USE BY HOUSING TYPE, QT (OBTU)																		
SNGL	9.05	10.62	10.68	10.62	10.58	10.55	10.49	10.42	10.41	10.39	10.42	10.60	12.05	13.20	14.23			
MULT	2.78	3.62	3.72	3.80	3.86	3.93	4.00	4.06	4.12	4.19	4.27	4.37	5.06	5.59	6.10			
MOBL	0.36	0.54	0.57	0.59	0.62	0.64	0.67	0.69	0.72	0.74	0.77	0.80	1.01	1.18	1.35			
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																		
ELEC	12.78	19.36	20.78	22.37	23.81	25.30	26.78	27.70	28.68	29.77	31.25	32.92	41.16	47.88	54.77			
GAS	8.94	11.81	12.86	13.70	14.50	15.28	15.92	16.99	17.95	18.77	19.48	20.34	20.55	22.35	24.55			
OIL	0.29	0.32	0.30	0.27	0.25	0.24	0.22	0.21	0.20	0.19	0.18	0.18	0.15	0.12	0.09			
OTHR	0.77	0.77	0.80	0.82	0.84	0.85	0.86	0.86	0.86	0.85	0.85	0.84	0.66	0.55	0.45			
TOTAL	22.78	32.26	34.73	37.17	39.40	41.67	43.77	45.76	47.70	49.57	51.77	54.27	60.65	69.09	77.66			
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																		
TOTAL	0.0	14.78	16.47	18.09	19.35	20.66	22.02	21.73	22.57	22.26	22.91	23.36	25.88	27.79	30.04			
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																		
TOTAL	0.0	0.41	0.47	0.54	0.62	0.71	0.81	0.91	1.01	1.11	1.21	1.31	1.41	1.51	1.61			
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																		
ELEC	TOTAL FUEL USE (OBTU)				TOTAL EXPENDITURES													
GAS	TOTAL FUEL USE (OBTU)				TOTAL EXPENDITURES													
OIL	TOTAL FUEL USE (OBTU)				TOTAL EXPENDITURES													
OTHR	TOTAL FUEL USE (OBTU)				TOTAL EXPENDITURES													
TOTALS	424.45				595.94				EQUIPT EXPEN 236.39				TI EXPEN 21.63				TOTAL 853.97	

RESIDENTIAL ENERGY USE SIMULATIONS, 1970-2000, VERSION 4 (JANUARY 1977), OAK RIDGE NATIONAL LABORATORY FEA REGION 10 COMBINED PROGRAM -- RETROFIT, APPLIANCE & CONSTRUCTION STANDARDS ELECTRICITY IN TERMS OF PRIMARY ENERGY																			
SUMMARY OF PROGRAM OUTPUTS																			
	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1990	1995	2000				
HOUSING STOCK (MILLIONS)																			
SNGL	15.32	16.32	16.53	16.83	17.14	17.46	17.78	18.05	18.35	18.59	18.84	19.09	20.23	21.54	22.81				
MULT	3.99	4.68	4.82	4.98	5.15	5.33	5.52	5.68	5.84	5.99	6.14	6.29	6.95	7.56	8.16				
MOBL	0.97	1.31	1.38	1.45	1.53	1.62	1.71	1.79	1.88	1.96	2.04	2.12	2.53	2.91	3.29				
TOTAL	20.29	22.31	22.73	23.26	23.83	24.41	25.00	25.53	26.07	26.53	27.02	27.50	29.71	32.01	34.26				
NEW HOUSING UNITS STOCK (MILLIONS)																			
SNGL	0.0	0.22	0.34	0.43	0.45	0.46	0.46	0.41	0.45	0.38	0.40	0.40	0.36	0.43	0.44				
MULT	0.0	0.15	0.18	0.19	0.21	0.22	0.23	0.21	0.20	0.19	0.20	0.20	0.17	0.18	0.18				
MOBL	0.0	0.11	0.12	0.13	0.14	0.15	0.16	0.15	0.15	0.16	0.16	0.17	0.17	0.19	0.20				
TOTAL	0.0	0.48	0.65	0.76	0.80	0.82	0.84	0.78	0.80	0.73	0.76	0.76	0.71	0.80	0.82				
FUEL USE BY FUEL TYPE OF, QFT (OBTU)																			
ELEC	5.40	6.58	6.77	6.88	6.97	7.04	7.07	7.13	7.22	7.30	7.38	7.53	8.96	10.34	11.69				
GAS	0.79	0.93	0.92	0.90	0.87	0.85	0.83	0.82	0.82	0.82	0.82	0.84	0.99	1.15	1.29				
OIL	0.77	0.56	0.52	0.47	0.44	0.41	0.38	0.36	0.34	0.32	0.30	0.29	0.23	0.18	0.14				
OTHR	0.23	0.20	0.20	0.19	0.18	0.18	0.17	0.16	0.16	0.15	0.14	0.14	0.11	0.09	0.07				
TOTAL	5.19	6.27	6.41	6.44	6.46	6.48	6.45	6.47	6.53	6.59	6.65	6.80	7.29	7.76	8.20				
FUEL USE BY END-USE FUNCTION, CU (CETU)																			
SPACE HEATING	2.58	3.13	3.20	3.18	3.17	3.16	3.12	3.11	3.12	3.13	3.14	3.23	3.50	3.71	3.90				
WATER HEATING	0.95	1.12	1.13	1.13	1.12	1.11	1.10	1.10	1.11	1.12	1.13	1.15	1.19	1.24	1.29				
REFRIG	0.26	0.30	0.31	0.31	0.32	0.32	0.33	0.33	0.33	0.33	0.33	0.34	0.35	0.37	0.38				
FREEZERS	0.15	0.18	0.19	0.20	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.25	0.28	0.30				
COOKING	0.28	0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.38	0.41	0.43				
AIR COND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01				
LIGHTING	0.26	0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.38	0.42	0.46				
OTHER	0.70	0.90	0.93	0.96	0.98	1.01	1.03	1.04	1.07	1.09	1.11	1.13	1.24	1.33	1.43				
FUEL USE BY HOUSING TYPE QT (CBTU)																			
SNGL	4.24	4.98	5.06	5.05	5.05	5.04	4.99	4.98	5.00	5.02	5.04	5.15	5.46	5.78	6.07				
MULT	0.74	0.97	1.01	1.04	1.04	1.05	1.07	1.08	1.10	1.12	1.14	1.17	1.26	1.34	1.42				
MOBL	0.21	0.32	0.34	0.36	0.37	0.39	0.40	0.42	0.43	0.45	0.47	0.48	0.57	0.64	0.71				
ANNUAL FUEL COSTS BY FUEL TYPE (BILLIONS OF 1975 DOLLARS)																			
ELEC	4.72	5.78	6.42	7.04	7.57	8.10	8.65	8.82	9.04	9.25	9.48	9.81	11.48	12.57	13.73				
GAS	1.53	1.95	2.12	2.23	2.36	2.47	2.56	2.53	2.53	2.53	2.54	2.61	2.64	3.16	3.65				
OIL	1.56	1.62	1.52	1.40	1.31	1.23	1.16	1.11	1.06	1.01	0.96	0.94	0.81	0.65	0.53				
OTHR	0.36	0.31	0.32	0.32	0.33	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.23	0.19	0.16				
TOTAL	8.16	9.66	10.37	10.99	11.56	12.13	12.70	12.78	12.94	13.09	13.27	13.64	15.16	16.58	18.07				
ANNUAL EXPENDITURES FOR NEW EQUIPMENT (BILLIONS OF 1975 DOLLARS)																			
TOTAL	0.0	3.48	3.91	4.31	4.57	4.85	5.12	5.08	5.29	5.21	5.39	5.52	5.94	6.76	7.30				
ANNUAL EXPENDITURES FOR TI IMPROVEMENTS (BILLIONS OF 1975 DOLLARS)																			
TOTAL	0.0	0.13	0.11	0.67	0.72	0.73	0.89	0.87	0.88	0.85	0.86	0.22	0.20	0.23	0.24				
TOTAL FUEL USE AND EXPENDITURES, 1977-2000, REAL INTEREST RATE = 8.00 PERCENT																			
ELEC	TOTAL FUEL USE (OBTU)			139.33	TOTAL EXPENDITURES			111.45											
GAS	TOTAL FUEL USE (OBTU)			23.81	TOTAL EXPENDITURES			30.03											
OIL	TOTAL FUEL USE (OBTU)			6.32	TOTAL EXPENDITURES			11.33											
OTHR	TOTAL FUEL USE (OBTU)			2.98	TOTAL EXPENDITURES			3.15											
TOTALS				172.43			155.96	EQUIPT EXPEN		55.57	TI EXPEN		5.28	TOTAL		216.81			

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