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Publication Date

2013-06-27

8/15/80

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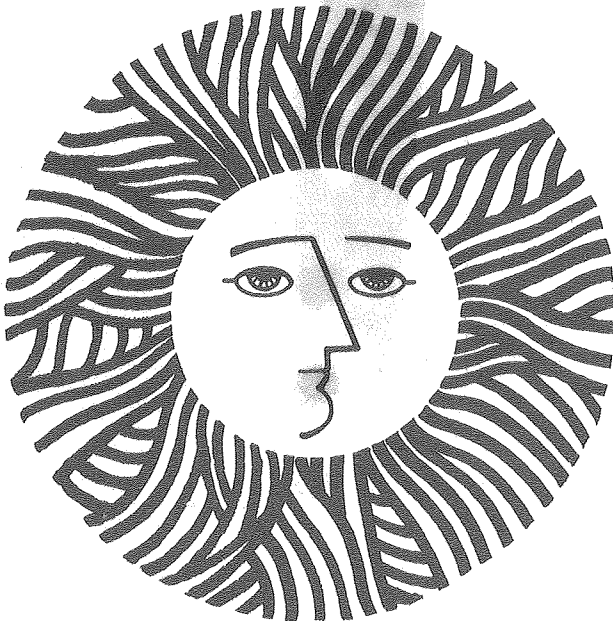
INTERNATIONAL RESIDENTIAL ENERGY USE AND CONSERVATION
ANALYSIS: STRUCTURAL AND ECONOMIC DATA BASE

Lee Schipper

May 1980

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INTERNATIONAL RESIDENTIAL ENERGY USE AND CONSERVATION ANALYSIS:

STRUCTURAL AND ECONOMIC DATA BASE

SUBMITTED TO EIA, FEB. 28, 1980

Revised on May 13, 1980

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With contributions from Amanda McCrae, William Coulbourne, R. Jourdain, and H. Hiyashi

INTRODUCTION

This compilation constitutes IBL's final version of Tasks 1 and 2 in the data compilation "International Residential Energy Conservation Analysis". We submit revised data sheets and revised and completed notes. Most of the items covered in this submission are familiar to all students of national accounts and demographic data. Standard economic texts (Samuelson, for example) give the relationship among GNP, national income, personal income, and personal consumption. Unemployment is measured as those desiring or seeking work unless measured as those receiving relief, usually a smaller group.

The reader will note that we have tried to define key terms in each set as they are defined by each country. This is because some important terms even as general as "household" are usually defined somewhat differently in each country. Typically these differences might mean changes in the sizes of quantities measured of the order one or two percent, probably unimportant for the analysis in Task 2. Similar variability is built into series, in general because of small differences in definitions or differences in accounting procedures. Where two versions of a series for, say, personal income were given for major sources from the same country, the differences were typically less than 5%. In one case (W. Germany) we actually give two series.

We have also tried to define the time period covered by instantaneous data. For example, population estimates usually relate to a certain time of the year—beginning, middle, or end, unless an average for the year is given. Housing data tend to run on a yearly basis, but as with censuses, these data may not start on January 1. Looking at this problem as a whole, we suggest that there may be uncertainties of half a year on all series (population, housing, housing starts and demolitions households, unemployment) where the quantity is not a yearly cumulative total found in all national accounts. The uncertainty thus introduced, however, becomes a fraction of the yearly growth rate, which may be close to zero. We suggest as a rule, therefore, that population and housing data may be uncertain by about 1% when the time period covered is not specified.

While we discuss some general uncertainties above, there are a few peculiarities that affect our relating of housing data to energy. First, most countries do not count people in institutions as members of households, and institutional energy use may not even be counted in residential. This leaves an uncertainty of 2%.

Second, house area appears to be understated in general because, as officials in nearly every country pointed out to us, demolitions are understated, additions or enlargements that are not recorded take place all the time, and people manage to make use of--and presumably heat--space for which the original purpose was not living area. Moreover, the data on house area is only relatively secure for Germany and Sweden; Japanese data go back to the early 60's but definitions of the type of house are uncertain; French data on the size of the stock only go back to 1970, while Italian, Canadian, and English data only give numbers of rooms, and then only for certain classes of dwellings. We hesitate from using this measure of size (see the discussion in the Notes on Sweden) except as a way of comparing within a country the relative increase in the size of a certain kind of dwelling. In any case we find that our information on dwelling size, which we consider to be the best currently available, conflict greatly with those given in the famous RFF study ("How Industrial Societies Use Energy"), data that were taken from the United Nations. We intend to pursue this matter further, particularly for the countries with poor data, since it is so crucial to measuring the energy intensity of heating.

Another generic uncertainty is the definition of dwelling type. Unless otherwise stated, SFD (single family dwellings) includes farms, ordinary free standing houses, duplexes, row and terraced houses, while multifamily dwellings include houses of more than two dwellings, particularly towers, maisonettes (an english term for a two storey group of several apartments), and, most important, other dwellings, such as rooms or studios in non-dwelling buildings. We are not sure that energy consumption for these other dwellings (or in every case farms) is counted as residential consumption, but we have been able to verify the general nature of each country's definitions and try to represent the best explanation. Since dwelling type has potentially great influence on energy use/square meter we will try to look carefully at this factor and its associated uncertainties when we apportion heating energy among dwelling types, which is possible for Canada, France, and Sweden with the data at hand and potentially possible for Germany.

Fortunately, most countries' housing stock can be balanced for additions and removals from census to census; as we note for Sweden and Germany, the census functions as a check on data on removals, which is often uncertain until a census confirms the actual number of removals over a five year period. We suggest at this time that data on additions and removal be regarded as suspicious except in three-to-five year groups, for which uncertainties can be worked out. We will only use two or three year construction data when we need to estimate possible changes in the building stock between censuses.

For this submission we enclose data sheets from each country followed by notes and references.

CANADA

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Canada

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	17.87	18.24	18.54	18.93	19.2	19.64	20.15	20.38	21.70
Male	10 ⁶		9.22					10.05		
Female	10 ⁶		9.02					9.96		
Personal Disp. Inc.	10 ⁹ \$CDN				31.12	33.05	36.26	39.90	43.12	46.82
CPI	1970 = 100	76.6	77.4	78.3	79.6	81.1	83.1	85.9	89.0	93.1
Expenditures:										
Food	10 ⁹ \$CDN	7.32	7.50	7.82	8.25	8.63	9.19	9.85	8.78	9.69
Clothing	"	2.36	2.42	2.51	2.64	2.80	2.97	3.14	3.16	3.34
Durables	"								2.95	3.07
Tspt. Comm.	"	2.81	2.87	3.10	3.43	3.73	4.12	4.26	4.81	5.22
Energy	"	3.62	3.81	4.00	4.32	4.60	4.91	5.32	6.90	7.58
Others	"									
TOTAL	"	23.54	24.45	25.74	27.49	29.67	32.06	34.85	39.00	42.36
Employment	10 ⁶	6.0	6.06	6.26	6.38	6.61	6.87	7.15	7.38	7.54
Unemployment	10 ³	446	466	390	374	324	280	267	315	382

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Canada (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ⁶	21.00	21.30	21.57	21.80	22.04	22.36	22.70	22.99	23.291		
Male	10 ⁶	10.56		10.80			11.22		11.45			
Female	10 ⁶	10.50		10.77			11.23		11.54			
Personal Disp. Inc.	10 ⁹ \$CDN	50.91	54.01	59.94	68.10	79.72	94.55	111.12	126.42	139.48		
CPI	1970=100	96.8	100.0	102.9	107.8	115.9	128.6	142.5	153.2	165.4		
Expenditures:												
Food	10 ⁹ \$CDN	10.47	11.24	12.02	13.47	15.77	17.86	20.76	22.88	24.95		
Clothing	"	3.91	4.03	4.38	4.87	5.68	5.94	6.78	7.72	8.20		
Durables	"	4.66	4.79	5.21	5.94	6.93	8.87	10.25	11.41	12.25		
Trsp., Comm.	"	6.86	7.73	7.78	8.74	10.08	12.17	14.20	16.44	18.15		
Energy	"	8.74	9.62	10.60	11.40	12.59	14.21	16.40	19.07	21.70		
Others	"											
TOTAL	"	47.49	50.09	54.47	60.58	69.37	83.44	97.02	110.54	121.96		
Employment	10 ⁶	7.78	7.88	8.11	8.36	8.80	9.19	9.36	9.57			
Unemployment	10 ³	382	495	536	555	519	519	697	736			

HOUSING STOCK DATA: PART TWO
Country: Canada

	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS	10 ⁶		4.55					5.18		
HOUSING STOCK TOT.	10 ⁶	4.67	4.79	4.91	5.03	5.17	5.31	5.47	5.62	5.80
Avg. Size Persons/DW			3.9					3.7		
Additions Size	10 ³	123.8	115.6	126.7	128.2	151.0	153.0	162.2	149.2	171.0
Retirements	10 ³	13.2	11.1	15.0	20.2	19.7	19.6	16.1	16.4	14.7
SINGLE FAM. DW. TOT.	10 ⁶	3.03	3.10	3.15	3.20	3.26	3.31	3.38	3.46	3.53
Avg. Size Persons/DW										
Additions Size	10 ³	78.1	76.1	75.6	71.6	76.2	75.1	73.9	73.6	74.6
Retirements	10 ³	8.3	7.4	8.6	11.8	12.9	10.7	8.2	8.2	8.1
MULTI FAM. DW. TOT.	10 ⁶	1.64	1.69	1.76	1.82	1.91	2.00	2.09	2.17	2.27
Avg. Size Persons/DW										
Additions Size	10 ³	45.6	39.4	51.1	56.6	74.7	77.9	88.3	75.6	96.4
Retirements		4.9	6.0	6.4	8.4	6.7	8.9	7.8	8.2	6.6
OTHER DWELLINGS Avg. Size			0.4%					0.5%		
Additions Retirements										
RESIDUAL TOTAL	10 ³	16.4	11.8	8.7	8.7	8.7	8.7	15.4	20.2	20.2
Single		2.1	-5.1	-10.4	-10.4	-10.4	-10.4	2.4	11.5	11.5
Multiple		14.3	17.0	19.1	19.1	19.1	19.1	13.0	8.7	8.7

*OTHER DW REFERS TO: MOBILE (Only occupied figures are given for census years).

HOUSING STOCK DATA: PART TWO
Country: Canada (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶			6.08					7.17			
HOUSING STOCK TOT. Avg. Size Persons/DW	10 ⁶	6.00	6.19	6.37	6.58	6.81	7.05	7.25	7.48	7.72	7.95	
				3.5					3.1			
Additions Size	10 ³	195.8	175.8	201.2	232.2	246.6	257.3	217.0	236.2	251.8	246.5	
Retirements	10 ³	14.4	11.8	14.4	15.3	16.0	14.6	11.7	11.8	13.0	13.5	
SINGLE FAM. DW. TOT. Avg. Size Persons/DW	10 ⁶	3.62	3.69	3.75	3.83	3.93	4.03	4.12	4.23	4.34	4.44	
Additions Size	10 ³	78.6	66.6	83.0	106.5	122.7	129.7	113.4	128.6	117.8	106.2	
Retirements	10 ³	8.5	6.4	7.7	8.0	9.0	8.3	7.3	8.2	9.7	10.0	
MULTI FAM. DW. TOT. Avg. Size Persons/DW	10 ⁶	2.39	2.50	2.62	2.75	2.88	3.02	3.18	3.24	3.38	3.52	
Additions Size	10 ³	117.2	109.2	118.2	125.7	123.9	127.5	103.6	107.6	134.0	140.3	
Retirements		5.9	5.4	10.0	7.3	7.0	6.4	4.3	3.7	3.2	3.5	
OTHER DWELLINGS* Avg. Size				1.1%					2.4%			
Additions												
Retirements												
RESIDUAL TOTAL	10 ³	20.2	20.2	5.5	5.1	5.1	5.1	5.1	NA	NA	NA	
Single		11.5	11.5	-5.3	-17.4	-17.4	-17.4	-17.4	NA	NA	NA	
Multiple		8.7	8.7	10.8	12.3	12.3	12.3	12.3	NA	NA	NA	

*OTHER DW REFERS TO: MOBILE (only occupied figures are given in census years).

1. CANADA - NOTES AND REFERENCES

1.1. TASK 1: DEMOGRAPHIC AND ECONOMIC DATA

Population: Data are based on the census surveys taken mid-year in 1956, 1961, 1966, 1971, and 1976, and were cited from the Canada Yearbook. All other years' population statistics are mid-year estimates as found in the Yearbook.

An evaluation of the population trends in Canada over recent years is given in the Canada Yearbook, 1975:

"After 1956 a steady decline in population growth occurred, reaching a rate of 1.5% per annum in 1966-71. This gradual fall in the growth rate in recent years--the lowest except the depression decade--has evoked special interest mainly because it occurred after the growth rate reached a peak of 3.3% in 1956-57 and at a time when the economic outlook was favorable for high growth rates. The current annual growth rate (1972-73) is estimated to be about 1.2%. In absolute numbers, between 1966 and 1971 the population increased by 1,553,000 or 310,000 a year, which was about 25% lower than the increase during 1951-56. The sharp reduction in population growth in recent years due to the marked decline in birth rates and lower immigration has caused speculation on the possibility of Canada's population growth approaching the zero level in the very near future."

Personal Disposable Income: The figures are from "National Income and Expenditure Accounts," as found in the Canada Yearbook. The Personal Disposable Income figures are the sum of "Personal expenditure on consumer goods and services" and "Personal saving." Annual coverage since 1962 is available in Statistics Canada's occasional publication "Income and expenditure accounts," 1926-1978, Catalogue No. 13-531.

Consumer Price Index: The Consumer Price Index measures the movement from month to month in retail prices of goods and services bought by a representative cross-section of the Canadian urban population. It is a base-weighted index, measuring the effect of changing prices on the cost of purchasing a fixed basket. The basket on which the index was based from 1961 to April 1973 relates to 1956 family spending patterns. Since April 1973, the index has been based on the 1967 expenditure pattern of families ranging in size from two to six persons with annual incomes of \$4,000 to \$12,000, living in urban centers with metropolitan populations exceeding 30,000 (Statistics Canada Catalogue No. 62-001) or "Prices and price indexes" (Statistics Canada Catalogue No. 62-002). For additional information on methodology and weighting patterns, see "The consumer price index for Canada, (Statistics Canada Catalogue No. 62-539).

Personal Expenditure on Consumer Goods and Services: The data in the Consumer expenditure category are also based on the Statistics Canada publication "Income and expenditure accounts," Catalogue No. 13-531. Unfortunately, statistics were not available for the total Private Final Consumption Expenditures. As listed in Japan and UK, these figures include purchases abroad, less purchases in the domestic market by non-resident households, less the value of gifts and purchases sent abroad). All data are taken directly from the Canada Yearbook 1964-1978.

Food: Includes food, tobacco, alcoholic and non-alcoholic beverages.

Clothing: Includes clothing, "personal furnishings," and footwear.

Durables: These data represent the statistics in the category for furniture, furnishing and household equipment and operation. Unfortunately, this category of expenditure is not included in the earlier editions of the Canada Yearbook. Therefore, no figures are given for the years 1960-1966.

Energy: Figures actually represent expenditure on gross rent, fuel and power. The Canada Yearbook lists the category of "gross rent, fuel and power" as "shelter" in the years 1960-1968, thus the figures are cited accordingly. The data appears to be consistently rising, indicating that the accounting procedure remained the same for the years 1960-1977.

Other: Other, in the case of Canada, is the remaining expenditures on all other goods and services made by consumers. Note, the other category does not include expenditures abroad, etc., or all the miscellaneous accounting that is needed to determine Private Final Consumption Expenditure (see above).

Employed and Unemployed: The employed include all persons, who, during the reference week, did any work for pay or profit; did any work which contributed to the running of a farm or business operated by a related member of the household; or had a job but were not at work because of bad weather, illness, industrial dispute or vacation, or because they were taking time off for other reasons. People who had jobs but did not work during the reference week and who also looked for work are included in the unemployed as people without work and seeking work.

The unemployed are all those who, through the reference week, were without work and seeking work, i.e., did not work during the reference week and were looking for work, or would have been looking for work except that they were temporarily ill, were on indefinite or prolonged lay-off, or believed no suitable work was available in the community; were temporarily laid off for the full week, i.e., were waiting to be called back to a job from which they had been laid off for less than 30 days.

Because they are based on a sample of households, estimates derived from the labor force survey are subject to sampling error. A statistical measure of the sampling error is given in the Statistics Canada publication "The Labor Force," (Catalogue No. 71-001). The source of the unemployed and employed statistics in the Census Characteristics Division, Census and Household Surveys of Statistics Canada.

1.2. TASK 2: HOUSING

Households: A household, as defined in the census, consists of a person or a group of persons occupying one dwelling, usually a family with or without lodgers or employees. However, it may consist of a group of unrelated persons, of two or more families sharing a dwelling, or of one person living alone. Only private households are included in the statistics presented, as cited in the Canada Yearbook or data from Canadian Mortgage and Housing Corp. (CMHC).

The household data shown are total household, that is, both family and non-family households. The percentage of family households dropped proportionately from 86.7% in 1961 to 84.5% in 1966 and to 81.7% in 1971. The proportion consisting of two or more families dropped from 3.7% in 1961 to 2.0% in 1971, indicating a decrease in overcrowding in households. Non-family households, on the other hand, increased in number and in proportion to the total number of households; this is mainly attributable to the increase in the proportion of one-family households from

9.3% in 1961 to 11.4% in 1966 and 13.4% in 1971. Thus, new family formation alone was not responsible for the overall increase in the number of households; some family persons and families who previously shared accomodation now maintained their own households.

Housing: Housing data are based on worksheets provided by Statistics Canada, "Housing Stock Worksheets" from J. P. Delisle at Statistics Canada. The data check with Statistics Canada figures as printed in the Canada Yearbook, with a discrepancy of no more than 5%. See also Canada Housing Statistics, CMHC, 1979.

Since 1941 decennial censuses of Canada have provided a comprehensive inventory of the nation's dwelling stock in a complete housing census taken in conjunction with the censuses of population and agriculture. Detailed information over the 1941-71 period may be found in the relevant census volumes and reports. Summary data from the 1971 Census are included in the recent editions of the Canada Yearbook, representing a selection of the housing characteristics for which data were collected. More detailed information, including cross-classifications of the data, may be obtained from the User Inquiry Service of Census Field, Statistics Canada. The data from Shell Canada agree to within $\pm 3\%$ of the figures for occupied households given in the census.

The 1971 Census recorded a total of 6 million occupied dwellings in Canada. (A dwelling, for census purposes, is a structurally separate set of living quarters with a private entrance either from the outside of the building or from a common hall or stairway inside.) This total represented a 32.5% increase in dwellings since the 1961 Census compared to an increase in population of 18.2%. It is apparent that despite slower population growth resulting from declining birth rates and lower immigration, the need for dwellings has continued to increase at a rate comparable to the record growth rates of the 1950s. This is attributable largely to the increased rate of family formation as children of the postwar "baby boom" reached working and marriageable age, and to the establishment of increasing numbers of one- and two-person households in both younger and older age groups.

Dwelling Types: Single detached homes continued to be the predominant type of housing accommodation in Canada in 1971, although their relative numbers have gradually declined in favor of multiple-type dwellings. Twenty years earlier, at the 1951 Census, two thirds of all dwellings were single detached but this ratio gradually dropped to 59.5% by 1971. In the 1961-71 period single detached homes increased by 20.6%, whereas multiple-type units—single attached (double and row houses), apartments, flats—grew at the significantly higher rate of 52.19%. In keeping with other countries' data we count detached, semi-detached and row houses as singles,* all others as multiples, and remove mobile homes for the years when data is so broken down (1961, 71 and 76). For other years we follow the aggregations in the Statistics Canada worksheets, counting singles only as detached homes. This leads to a deviation with the practice for other countries; in 1961 the non-detached singles amounted to 9% of the total stock and 16% as large as the detached, in 1971 11.3 and 16% respectively, in 1976 12% and 18% respectively. However, comparison of the aggregated totals supplied by Statistics Canada shows that their definitions are consistent with our major source of end use data, Shell Canada, for which energy use is separated into these types of multiples and singles.

*Under the heading "detached and non-detached".

Dwelling Sizes: No data on the square footage of dwellings are currently available. However, it may be possible to construct estimates of floor area by combining data on floor area from the 1974 Survey of Housing Units (CMHC) and the data on bedrooms per dwelling from the annual Household, Facilities and Equipment Survey (Statistics Canada). However, it is significant that the number of rooms per dwelling averaged over the whole stock only rose from 5.3 (1961) to 5.4 (1971).

New Stock and Retirements: Construction of dwellings, and demolitions, were included in the worksheets provided by Statistics Canada. Again a check revealed agreement with published figures in Statistics Canada or CMHC books. CMHC does provide some data on the area of homes financed by them, but this fraction was generally less than 60% of the total number of single family dwellings built (in contrast to the 90% for France or Sweden). It was considered therefore unreliable to use the Federally financed subset of all new construction as representative of all new dwellings. The Statistics Canada worksheets were exceptional in that they included an estimation of residuals for each year's balance, that is, the difference between last year's stock, additions, removals, and present stock. We included this residual in the data, and note that it is generally small. The worksheets count only detached homes as singles, however, but the CMHC yearbook gives a more disaggregated breakdown that allows us to group types consistent with other countries' data for each year. Unfortunately data on retirements are not so broken down; otherwise we could reconstruct the entire population for each year using a simple stock and flow model.

FRANCE

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: France

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	45.5	45.9	46.4	47.6	48.3	48.8	49.2	49.6	50.1
Male	10 ⁶	22.1	22.3	22.5	23.2	23.5	23.8	24.3	24.3	24.6
Female	10 ⁶	23.4	23.6	23.9	24.4	24.7	24.9	25.4	25.3	25.5
Personal Disp. Inc.	10 ⁹ FF	206.0	223.8	257.1	286.9	312.5	336.0	360.9	390.0	426.3
CPI	1970=100	67.7	69.3	72.9	74.8	78.9	81.0	83.2	85.4	89.3
Expenditures:										
Food	10 ⁹ FF	63.00	67.30	74.33	81.14	86.30	90.65	93.86	102.4	106.7
Clothing	"	22.31	24.26	26.82	30.64	32.15	31.12	33.87	35.43	37.88
Durables	"	7.06	7.67	8.71	9.96	10.57	10.44	12.27	13.02	14.75
Tspt., Comm	"	14.2	16.10	18.52	20.96	23.22	24.85	29.80	32.47	36.91
Energy	"	6.49	6.87	7.11	8.20	9.51	9.77	10.84	11.92	13.48
Rent & Household Operations	"	10.69	12.41	14.52	16.65	18.36	20.85	26.51	30.86	35.46
Other	"	59.15	64.09	71.59	80.85	88.69	96.52	103.95	110.5	126.32
TOTAL	"	182.9	198.7	221.6	248.4	268.8	284.2	311.1	336.6	371.5
Employment	10 ⁶			19.6		19.74	19.80	19.97	19.93	20.09
Unemployment	10 ³							31.4	36.2	53.6

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: France (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ⁶	50.3	50.8	51.0	51.5	52.1	52.5	52.7	52.8	53.0	53.2	
Male		24.7	24.7	24.9	25.2	25.4	25.7	25.8		26.0		
Female		25.9	25.9	26.1	26.3	26.5	26.8	26.9		27.0		
Personal Disp. Inc.	10 ⁹ FF	476.0	536.4	604.4	679.3	771.8	900.5	1,051.7	1,278.9	1,330.8		
CPI	1970 = 100	95.0	100	105.5	112	120.2	136.7	152.8	167.5	183.2		
Expenditures:												
Food	10 ⁹ FF	117.2	127.2	137.1	151.6	168.4	190.3	216.1	243.4	261.3		
Clothing	"	42.22	47.4	52.9	58.6	64.4	64.7	84.9	92.7	100.2		
Durables	"	16.93	17.57	21.45	24.83	29.10	36.01	40.60	47.3	49.5		
Tspt., Comm.	"	43.38	25.35	29.94	35.19	39.93	42.03	49.56	65.5	69.0		
Energy	"	15.21	16.95	19.68	22.02	25.50	33.96	38.53	46.10	52.7		
Rent & Household												
Operations	"	41.03	44.41	49.78	36.09	64.61	72.71	84.28	98.38	112.5		
Other	"	147.63	176.48	198.58	243.04	253.21	306.54	345	375.21	468.01		
TOTAL	"	423.6	467.2	525.5	589.6	665.9	773.3	889.1	1,003.5	1,155		
Employment	10 ⁶	20.60	21.08	21.20	21.44	21.65	21.75	21.87	22.04			
Unemployment	10 ³	749	510	569	595	576	614	889	990			

HOUSING STOCK DATA: PART TWO
Country: France

	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS	10 ⁶	14.3	14.45	14.57	14.8	15.0	15.3	15.4	15.6	15.76
HOUSING STOCK TOT.	10 ⁶			16.39					17.8	18.26
Avg. Size Persons/DW		3.16	3.16	3.20	3.23	3.26	3.19	3.19	3.17	3.17
Additions Size	10 ³ m ²	317 64	316 65	309 65	336 66.3	309 68.7	411 72.0	414 73.4	423 72.8	411 76.6
Retirements										
SINGLE FAM. DW. TOT. (*include TFD)	10 ⁶			9.1*					7.9	9.4*
Avg. Size Persons/DW	m ²									
Additions Size	10 ³ m ²	80.3	90.7	90.0	100.6	107.9	118.4	128.3	138.4	143.6
Retirements	10 ³									
MULTI FAM. DW. TOT. (*do not consider TFD)	10 ⁶			5.5*					7.7	6.4*
Avg. Size Persons/DW										
Additions Size	10 ³ m ²	241	245.9	294.1	373.1	409	243	231.6	221.7	262.4
Retirements	10 ³									
OTHER DWELLINGS** Avg. Size	10 ³		1,827						2,200	2,500
Additions Retirements										
Unoccupied Vacation	10 ³			854 973					1,080 1,120	1,233 1,267

**OTHER DW REFERS TO: unoccupied and vacation homes.

HOUSING STOCK DATA: PART TWO
Country: France (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶	16.2	16.2	16.3	16.5	16.9	17.3	17.75	17.8	18.0		
HOUSING STOCK TOT. Avg. Size Persons/DW	10 ⁶ m ²		18.9 68			20.10 72		21.07 72				
		3.10	3.08	3.14	3.15	3.08	3.07	2.97	2.97	2.95		
Additions Size	10 ³ m ²	427 76.3	450.3 76.5	475.7 77.1	546.3 77.6	500.5 79.3	500.4 79.5	514.3 83.1	449 89.3	451 87.8		
Retirements												
SINGLE FAM. DW. TOT. (* include TFD) Avg. Size Persons/DW	10 ⁶ m ²		8.2			8.4 83		10.3*				
Additions Size	10 ³	159.9 92.8	175.5 93.0	181.1 94.3	224.6 92.4	200.7 94.5	212.6 95.3	224.9 100.5	221.5 107.9			
Retirements	10 ³											
MULTI FAM. DW. TOT. (* do not consider TFD) Avg. Size Persons/DW	10 ⁶ m ²		8.0			8.5 61		7.4*				
Additions Size	10 ³ m ²	267.0 65.8	280.7 66.1	294.6 65.3	321.7 65.4	299.8 66.6	287.8 66.3	289.4 67.6	227.4 67.2			
Retirements	10 ³											
OTHER DWELLINGS** Avg. Size	10 ³		2,723			3,200		3,329				
Additions Retirements												
Unoccupied Vacation	10 ³ 10 ³		1,323 1,400		1,605 1,500	1,600	1,600	1,633 1,696	1,700	1,800		

**OTHER DW REFERS TO: unoccupied and vacations homes.

2. FRANCE - NOTES AND REFERENCES

2.1. TASK 1: DEMOGRAPHIC AND ECONOMIC DATA

Population: Major population surveys were conducted by the Institut National des Statistiques et des Etudes Economiques (INSEE) in 1962, 1968, and 1975, covering 100%, 20%, and 20% of the population respectively. Statistics for other years were estimated using birth and death statistics and an estimation of migration. The results are published in the Annuaire Statistique (AS).

Personal Disposable Income: We used information available from the Annuaire Statistique and from the U.N. Yearbook of National Accounts. Personal Disposable Income appears in the AS as "revenu disponible brut."

Consumer Price Index: The retail price index was composed by chaining several indices based upon 1954, 1962, and 1970 as given in the Annuaire Statistique. While the market basket base changed slightly, the years for which the two indices were available were remarkably consistent.

Expenditures: For personal consumption expenditures, Annuaire Statistique lists food and beverages (alimentation) and tobacco separately, which we combine; clothing (textiles et cuirs), household durables--furniture, appliances, and other home articles but not paper goods, etc., transportation including autos and gasoline. Food includes the imputed value of food consumed on farms, which is listed separately prior to 1970. We excluded this term, included in "other" instead.

Employment, Unemployment: Employment figures were compiled by INSEE in March 1962 and 1968, and February 1975. "Unemployed" is defined as those who are available to look for a job but are currently not working. For other years, estimations were made for December 31 by INSEE after studying annual evolutions in the labor force; these evolutions were determined from information provided from the Union Nationale pour l'Emploi dans l'Industrie et Commerce, and public enterprises.

2.2. TASK 2: HOUSING STOCK

The Institute National de la Statistique et des Etudes Economiques (INSEE) conducted major housing surveys in 1962, 1968, and 1975, covering 100%, 25% and 20% of the housing stock respectively. The results of these surveys are published in the Annuaire Statistique de la France, 1978. Data for 1967, 1970, and 1973 (non-census years) were also compiled by the INSEE, and published in "Les Conditions de Logement des Menages en 1970," J.-C. Dutailly et C. Burlan; "Les Conditions de Logement des Menages en 1973," O. Marchand et C. Felder, "Recensement General de la Population de 1975," Pierre Alain Audirac.

In these surveys, a principal residence is defined as a dwelling designed for habitation which is occupied by people almost all of the year (residence principale). A household (menage ordinaire) is a group of persons occupying a principal residence. Therefore, the number of households and principal residences is equal. Excluded from the principal residence category are: collective households (menages/collectifs) such as homes for the aged, religious communities; mobile homes (habitations mobiles) which include boats; and others (compte a part). Vacation homes

are defined as those dwellings occupied only a limited part of the year. Vacant dwellings are those dwellings which at the time of the survey were unoccupied and not used as a secondary home.

Households: INSEE estimated the number of households for two or three months of every year since 1958; the results are published in a 1978 study of the evolution of the saturation of household appliances (see ref. 4). The figures listed are mid-year estimates (June '60, '62, '63, '64, '65, '66, '67, '69, '70, '71, '72, and May '73, '74, '75, '76, '77) or end of the year ('61, '68).

Housing stock total is available only for the years of major surveys ('62, '67, '68, '70 data from ref. 2; '73 data from ref. 6; '75 data from ref. 4) and result from the addition of vacation homes and unoccupied dwellings to the principal homes.

The INSEE housing studies of 1970, '73, and '75 (ref. 6 and 7) calculated the average size of existing principal residences by estimating the number of single and multiple family dwellings classified according to number of rooms and date of construction, and their respective size. Details of these estimates are available only for 1973.

Persons per dwelling have been calculated dividing the population of France taken from Annuaire Statistique by the number of households. This is an overestimate of 2-5% (based on population breakdowns we have examined for 18 other countries) since people in collective households and mobile homes are excluded from the household count.

Additions and their average size are available from Annuaire Statistique from 1960 to 1977. Sizes apply to federally financed dwellings. A somewhat higher estimate from the "Ministere de l'Environnement et du Cadre de Vie" (ref. 8) has been used for the period '69-'76. This data includes all buildings, not just those federally financed.

Retirements are not available.

Single Family Dwellings/Multiple Family Dwellings: The INSEE definition of single family dwellings (maisons individuelles) includes only those dwellings in a separate building--farms (fermes), individual homes (maisons individuelles), and others (autres). All principal residences in a building with one or more other principal residences are defined as multiple family dwellings (maisons collectives).

The division between these two classes was available in terms of percentages for the years 1962, '67, '68, '70, '73, '75 (see ref. 1 and 2). However, for '62, '68, and '75 we have been estimating the disaggregation between single and double family dwellings including farms, on the one hand, and other multi-family dwellings on the other, using the data published by INSEE in ref. 1. This classification is consistent with those in our other sample countries. These data, noted with *, are substituting the previous disaggregation (1962: SFD=7.6, MFD=7.0; 1968: SFD=8.0, MFD=7.8; 1975: SFD=9.1, MFD=8.6). Average size of the stock of these two categories separately is available only for 1973 in ref. 6. People/dwelling is not available separately. Both the number and size (1968 and 1974) of the new constructions were available in the Annuaire Statistique, based on data from Credit Foncier--a national source of funds for home purchases. The average sizes available from this source for 1968 and 1976 (1968: SFD=90.9m², MFD=66.5m²; 1976: SFD=92m², MFD=63m²) probably underestimate the actual sizes because government funding is

limited to homes of a certain maximum size and cost, but they are good indicators of the trends in housing construction. The size estimates reported (1969-76) are from the Ministère de l'Environnement et du Cadre de Vie (ref. 8).

Retirements are not available.

Other dwellings refer to Unoccupied and Vacation homes. Totals and subdivisions of these dwellings were estimated by INSEE (see ref. 2 and 6). 1962 data are available in a recent study issued from the "Comite Francais d'Electrothermie" (ref. 4). Additions and retirements are not available.

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WEST GERMANY

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: W. Germany

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	55.43	56.17	56.83	57.39	58.29	59.04	59.68	59.87	60.17
Male	10 ⁶	26.97	26.41	26.79	27.16	27.6	28.03	28.37	28.41	28.56
Female	10 ⁶	29.46	29.76	30.04	30.29	30.67	30.98	30.77	31.46	31.63
Personal Disp. Inc.	10 ⁹ DM	202.8	215.3	232.3	236.1	276.2	307.9	325.6	331.0	359.8
CPI	1970 = 100	77.8	79.6	81.9	84.4	86.4	89.3	92.4	93.8	94.9
Expenditures:										
Food	10 ⁹ DM	64.5	69.3	73.5	77.1	81.0	86.9	91.5	92.4	94.7
Clothing	"	20.9	22.9	26.0	25.7	29.0	32.3	33.9	33.9	35.2
Durables	"	23.8	24.6	28.0	27.3	31.9	34.9	37.3	37.5	38.6
Tspt., Comm.	"	15.1	14.5	19.6	18.0	24.2	27.6	30.4	30.7	33.8
Energy	"	5.6	7.2	7.3	8.0	8.4	9.1	9.5	10.2	11.3
Rent & Household Operations	"	12.2	14.9	15.7	18.3	20.0	22.6	26.1	29.5	33.2
Others	"									
TOTAL	"	167.2	183.6	202.4	212.5	232.0	255.5	274.5	281.8	298.0
Employment	10 ⁶	26.25	26.59	26.69	26.74	26.75	27.15	26.80	26.29	25.97
Unemployment	10 ³	118.2	117.6	102.5	130.3	114.8	105.7	116.5	459.5	323.5
Misc. Variable 1*	10 ⁹ DM	171.8	188.3	201.8	216.8	233.5	257.6	275.1	282.1	300.8

*Private consumption according to another source. See notes.

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: W. Germany (Cont.)

	Unit	69	70	71	72	73	74	75	76	77**	78	Notes
POPULATION	10 ⁶	60.84	60.71	61.29	61.67	61.97	62.04	61.83	61.5	61.40		
Male	10 ⁶	28.97	28.87	29.25	29.47	29.65	29.67	29.50	29.32	29.24		
Female	10 ⁶	31.88	31.78	32.03	32.20	32.33	32.39	32.33	32.22	32.16		
Personal Disp. Inc.	10 ⁹ DM	390.8	447.7	491.6	526.6	568.2	612.2	667.3	714.3			
CPI	1970 = 100	96.7	100	105.3	111.1	118.8	127.1	134.7	140.2	145.3		
Expenditures:												
Food	10 ⁹ DM	101.2	109.1	118.1	128.5	140.0	148.2	156.1	168.5			
Clothing	"	38.2	41.6	46.95	51.7	54.5	58.0	57.4	59.6			
Durables	"	42.95	49.1	55.5	61.8	66.3	69.7	67.3	71.2			
Tspt., Comm.	"	38.8	45.3	50.4	54.4	60.3	63.5	78.9	90.3			
Energy	"	12.3	13.9	15.4	17.3	21.9	25.0	24.97	28.17			
Rent & Housing Operations	"	38.0	41.0	44.5	49.3	54.9	60.5	72.1	77.5			
Others	"											
TOTAL	"	328.6	363.8	404.5	444.9	489.1	525.7	574.6	621.9			
Employment	10 ⁶	26.36	26.67	26.73	26.66	26.71	26.23	25.35	25.09	25.02		
Unemployment	10 ³	178.6	148.8	185.1	246.4	273.5	582.5	1,074.2	1,030	1,091		
Misc. Variable 1*	10 ⁹ DM	330.8	367.6	407.8	447.8	491.7	527.6	576.5	624.7	658.6		

*Private Consumption according to another source--see notes.

**Provisional.

HOUSING STOCK DATA: PART TWO
Country: W. Germany

	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS	10 ⁶		19.46	20.18	20.27	20.72	20.26	21.36	21.67	21.97
HOUSING STOCK TOT.	10 ⁶	16.19	16.82	17.26	17.69	18.18	19.02	19.57	20.10	19.88
Occupied	10 ⁶		16.41				18.44			19.66
Avg. Size	m ²	67.6		68.1		68.8	69.4			71.1
Persons/DW		3.51		3.39			3.2			3.04
Additions	10 ³	523	515	520	514	564	535.6	548	514	481
Size	m ²	70.4	72.5	74.0	75.8	77.3	79.5	80.5	81.8	82.1
Retirements	10 ³	110	110	120	120	125	125	125	130	130
SINGLE FAM. DW. TOT.	10 ⁶		7.85				859			9.45
Avg. Size	m ²	72.5								
Persons/DW										
Additions	10 ³	236		245	247	266	261	259	240	214
Size	m ²	81.3					93.7	96.6	98.9	101.3
Retirements	10 ³									
MULTI FAM. DW. TOT.	10 ³		8.30				9.38			9.67
Avg. Size	m ²	53.5					56.8			
Persons/DW										
Additions	10 ⁶	287		274	268	299	274	289	274	268
Size	m ²	61.5				65.0	65.5	66.1	66.7	66.7
Retirements	10 ³									
OTHER DWELLINGS*	10 ⁶		0.26				0.47			0.54
Avg. Size	m ²									
Additions*	10 ³			30	33	34	33	33	35	38
Retirements	10 ³									

*OTHER DW REFERS TO: Non-Res. buildings, single rooms, vacation homes. Additions include non-residential buildings, additions to existing buildings, farm dwellings, 10⁶ units; 1961, 1.27; 1965, 1.2, 1968, 1.2, 1972, 0.7. These are counted as single family dwellings.

HOUSING STOCK DATA: PART TWO
Country: W. Germany (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶		21.90	21.85	23.00		23.65	23.72	23.94	24.17		
HOUSING STOCK TOT.	10 ⁶	20.36	20.81	21.33	21.96	22.64	23.21	23.62	23.99	24.37		
Occupied	10 ⁶											
Avg. Size	m ²		72.8	73.6	74.5	75.5	75.3	75.1				
Persons/DW			2.94		2.85			2.64				
Additions	10 ³	465	445	520	623	674	569	4.05	36.5	378		
Size	m ²	82.5	83.8	84.9	84.8	85.4	86.8	91.1	95.5	96.7		
Retirements	10 ³	135	140	150	160	165	160	160				
SINGLE FAM. DW. TOT.	10 ⁶				9.82							
Avg. Size	m ²		79.4		80			83.0				
Persons/DW												
Additions	10 ³	203	196	224	249	263	230	195	208	227		
Size	m ²	103.0	104.9	107.0	108.3	110.5	112.4	114.0	114.9	115.9		
Retirements	10 ³											
MULTI FAM. DW. TOT.	10 ³				10.7							
Avg. Size	m ²		58.3					60.5				
Persons/DW												
Additions	10 ³	262	249	296	375	411	339	210	154	152		
Size	m ²	66.6	67.2	68.2	69.0	69.4	69.5	69.8	69.3	68.5		
Retirements	10 ³											
OTHER DWELLINGS*	10 ⁶				0.778							
Avg. Size	m ²											
Additions	10 ³	34	33	34	36	40	35	31	27	31		
Retirements	10 ³											

*OTHER DW REFERS TO: Non-Res. buildings, single rooms, vacation homes. Additions include non-residential buildings, additions to existing buildings, farm dwellings, 10⁶ units; 1961, 1.27; 1965, 1.2, 1968, 1.2, 1972, 0.7. These are counted as single family dwellings.

3. WEST GERMANY - NOTES AND REFERENCES

3.1. TASK 1: ECONOMICS

Population: Population is taken from "Lange Reihe Zur Wirtschaftsentwicklung," (Long Time Series for Economic Development), Statistisches Bundesamt (Federal Bureau of Statistics), Wiesbaden, 1978, Table 2.1. Comparison with the 1975 and 1978 editions of Statistisches Jahrbuch (SJ), (Statistical Abstract), Federal Bureau of Statistics, showed good agreement. The data refer to averages for the year. SJ also published consistent year-end data. The male-female breakdown was also taken from "Long Time Series." According to our German contacts (Energiewirtschaftlichesinstitut, [EWI] Cologne), this series is the most dependable available.

Personal Disposable Income: This is taken from yearly issues of SJ and from "Long Time Series." We adopt those in "Long Time Series," for which Table 15:6 indicates that because of revisions in accounting, pre-1970 and post-1970 data are not strictly comparable. These data agree to within $\pm 5\%$ of the yearly data given in SJ. Disposable income (Verfugbares Einkommen) includes that of private non-profit organizations, as is the case of data from other countries in the survey. All data is in current Deutsche Marks.

Consumer Price Index: The consumer price index is given in every edition of SJ, "Preisindex fuer die Lebenshaltung." The 1972 edition gave values for 1960-71, based upon 1962=100, and gives (p. 458) the average income levels for which the series is defined. Note that in other countries the index is defined by weighted averages of prices over all consuming groups, by adjusting the weights to correspond to what people actually buy. Therefore individual country's indices are not directly comparable because of differing market baskets, and Germany's index is conceptually different. However, we feel that the German index is internally consistent, and therefore useful for deflating expenditures on energy and other goods.

Personal Consumption Expenditures (Privater Verbrauch): Data were available for many recent years in each edition of SJ, broken down in great detail by class of expenditures. The definitions of each class are found in "Gueterverzeichnis des Privaten Verbrauchs" (Index of Goods for Private Consumption), Fed. Bureau of Statistics, 1963. The breakdown given in yearly editions of SJ was consistent from year to year, and the classes of goods were easily and immediately comparable with those from other countries.

Food: Includes tobacco, clothing, and expenditures in restaurants.

Clothing: Includes shoes.

Durables: Includes household durables and household services such as repairs, and as such is not strictly comparable with expenditures in other countries.

Transport and Communications: Includes transportation goods, services, fuels, and communication services.

Rent: Includes the imputed value of owned dwellings.

Energy (Elektrizitaet, Gas, Brenstoff U.M.): Includes all household fuels. Since master metering of apartments is extremely uncommon in Germany there is little worry over confusion of heating costs and rent. Indeed the 1967 report on household energy use from the Energiewirtschaftlichesinstitut combined data on expenditures with average fuel prices to construct series of fuel consumption that agreed within 15% with other estimates based on deliveries or engineering calculations.

The totals for private consumption are taken from the Tables in various editions of SJ. However, "Long Time Series" contains a series of totals (Table 15.6) from 1960-77 that varies somewhat from the data presented in SJ. We therefore give (miscellaneous variable 1) this total as well. Lacking better information on which terms were revised we do not attempt to reconcile the individual expenditures as given with the revised total.

Employment and Unemployment: "Long Time Series" gives (Table 2.1) "Erwerbspersonen," "Arbeitslose," and "Erwerbstaetig," (Workforce, Unemployed, Employed) for every year except 1969. While unemployment data come from the Federal Bureau for Employment (Bundesanstalt fuer Arbeit) totals can be checked in the "Long Series" data because the entire permanent population ("Wohnbevoelkerung") is broken down into "work force" ("Erwerbspersonenen"), unemployed, employed, and part time workers. Some corrections were necessary for avoiding the fluctuation due to counting of foreign workers that can earn in the country and spend most of their salaries abroad. This of course tends to affect the unemployment figures severely. A small bias is introduced since national accounts we used (expenditures, income) are net of transfers abroad, some of the income generated by foreign workers is not registered herein, even though the hours they worked are.

3.2. TASK 2: HOUSING

Households ("Haushalte"): A random sample of several thousand households is held every year on the last day, supplementing the major censuses of housing taken in 1962, '65, '68, and '75. Included is the number of families and number of dwellings. The difference is crucial. In 1961 there were 16.8×10^6 dwellings in Germany (including farms) but over 19×10^6 families. Only in 1975 did these two numbers equate. Data were kept by single, double, multiple, and farm dwelling. The number of vacation homes seems small relative to other countries studied. Reents (1978) reviewed nearly all of the relevant data on housing and families.

Average size: The average size of single family (here we include doubles), multi-family, and farm dwellings (also included under singles) is published in Reents and in a paper by Geiger (1977). Additions and their size and type are published regularly in SJ; data so obtained agreed with data from Reents, HEA, and EWI taken from housing publications prepared by the Statistisches Bundesamt. Average size appears to apply to all dwellings, regardless of financing, in contrast to experience in other countries. Demolitions are not recorded anywhere, and Dittert (Battelle, Frankfurt, private communication) asserts that there are no reliable figures from any official source; that they must be derived from the yearly estimated increases in the overall building stock and the known increments due to new dwelling completions. Persons/dwelling is computed by Reents.

No indication of whether population not living in dwellings is included, an error on the order of 2-5% in other countries, for the stock as a whole. No breakdown between singles and multiples could be found. Further examination of the actual detailed censuses would probably yield the desired results. We do give the average size and persons per dwelling for the stock each year as estimated in Reents.

The German Housing data is quite remarkable, stemming from only a few sources, well defined, consistent from year to year. The only major derivation on our part was to calculate the size of single family dwellings, data on the share of total area in single and multiple dwellings (Reents), estimates of sizes for certain years (Geiger) and published data from Battelle Frankfurt and EWI were used to form estimates given. As Geiger points out, the result is a surprising increase in area per capita between 1960 and 1975, an increase that explains most of the increase in heating use.

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ITALY

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Italy

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	50.20	50.67	51.00	51.36	51.78	52.11	52.44	52.78	53.06
Male		24.60	24.81	24.96	25.13	25.33	25.48	25.64	25.79	25.93
Female		25.60	25.86	26.04	26.23	26.45	26.63	26.80	26.99	27.13
Personal Disp. Inc.	10 ¹² L		17.2	19.6	22.6	24.4	26.8	28.8	31.0	35.5
CPI 1970=100		67.8	69.3	72.6	78.0	82.6	86.3	88.3	91.6	92.8
Expenditures										
Food	10 ¹² L	6.71	7.26	8.03	9.55	9.75	10.54	11.34	12.09	13.36
Clothing	"	1.27	1.34	1.47	1.67	1.99	2.05	2.26	2.46	2.80
Durables	"	0.74	0.83	0.99	1.29	1.38	1.38	1.48	1.59	1.75
Tspt., Comm.	"	1.04	1.17	1.37	1.69	1.80	1.95	2.28	2.66	3.03
Energy	"	1.29	1.39	1.66	1.88	0.67	0.74	0.81	0.92	0.97
Rent & Household										
Operations	"					1.94	2.10	2.29	2.47	3.02
Other	"									
TOTAL	"	13.4	14.6	16.5	19.28	20.84	22.32	24.33	26.59	30.07
Employment -										
Labor Force	10 ⁶			20.63	20.14	20.03	19.71	19.40	19.53	19.48
No. Employed	10 ⁶			20.02	19.62	19.48	19.00	18.64	18.85	18.80

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Italy (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ⁶	53.40	53.71	54.18	54.65	55.18	55.65	56.01	56.32	56.60		
Male		26.09	26.24	26.40	26.62	26.91	27.22	27.39				
Female		27.31	27.46	27.78	28.03	28.27	28.43	28.62				
Personal Disp. Inc.	1012 L		39.5	44.4	49.5	55.0	65.6	78.8	95.5	116.2		
CPI 1970=100		95.3	100.0	104.8	110.8	122.8	146.3	171.1	199.8	234		
Expenditures:												
Food	1012 L	14.47	15.90	15.80	17.03	20.10	24.43	28.03	33.71	39.85		
Clothing	"	2.99	3.49	3.74	4.13	5.03	6.26	6.88	8.25	10.31		
Durables	"	1.92	2.23	2.34	2.57	3.28	4.23	4.84	5.99	7.34		
Tspt., Comm.	"	3.44	3.95	4.53	5.07	5.84	7.06	8.47	11.36	13.85		
Energy	"	1.05	1.16	1.28	1.36	1.51	2.14	2.36	2.85	3.46		
Rent & Household Operations	"	3.27	3.66	4.20	4.85	5.69	6.85	7.91	9.28	10.90		
Other	"											
TOTAL	"	32.84	37.28	39.98	44.06	52.50	65.28	75.59	92.00	109.77		
Employment -												
Labor Force	10 ⁶	19.26	19.30	19.25	19.03	19.17	19.46	19.65	19.86			
No. Employed	10 ⁶	18.61	18.70	18.65	18.33	18.50	18.90	19.00	19.13			

HOUSING STOCK DATA: PART TWO
Country: Italy (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶	15.5	15.7	16.0	16.2	16.4	16.6					
HOUSING STOCK TOT.	10 ⁶	16.8	17.1	17.5	17.7	17.9	18.1	18.3	18.5			
Additions	10 ³	293	375	357	257	194	178	217	182			
Retirements	10 ³	11.6	5.1	5.4	4.3	4.4	3.3	2.4	2.5			
Vacancy Ratio	%	13.0	13.7	12.2	12.5	12.8	12.5	12.1	12.1			
OCCUPIED DW. TOT.	10 ⁶	14.61	14.84	15.30	15.48	15.69	15.89	16.10	16.32			
Avg. Size	m ²			65				69				
Persons/DW OCC		3.65	3.62	3.54	3.53	3.52	3.50	3.48	3.45			
SINGLE FAM. OCC.												
DW TOT.												
(* include TFD)												
Avg. Size	10 ⁶	3.31*	1.82	1.87	3.45*	3.47*	5.00*	1.95	4.69*			
Persons/DW	m ²											
Additions	10 ³	58	68	70	49	40	36	43				
Retirements	10 ³	19	19	20	21	21	21	21				
MULTI FAM. OCC.												
DW. TOT.												
(* do not consider TFD)												
Avg. Size	10 ⁶	11.30*	13.02	13.43	12.03*	12.22*	10.72*	14.15	11.63*			
Persons/DW	m ²											
Additions	10 ³	169	215	207	159	124	121	144				
Retirements	10 ³		35		13							
OTHER DWELLINGS												
Avg. Size												
Additions												
Retirements												

4. ITALY - NOTES AND REFERENCES

4.1. TASK 1: ECONOMICS

Population: Two complete censuses were taken in the period considered: 1961 (Oct. 15) and 1971 (Oct. 24). The population estimates shown here refer to the end of the year and are made by the Istituto Centrale di Statistica (Central Institute of Statistics, ISTAT) using records of deaths, births, and net migration. The series are published in the Anuario Statistico (Statistical Yearbook, AS) of which have been consulted the editions from 1960 to 1977. Male-female and age breakdowns of the population are also published annually in AS. The data refer to resident population.

Personal Disposable Income: We used available information from the U.N. Yearbook of National Accounts, but personal disposable income was unavailable prior to 1970. Since manipulation of existing national accounts figures failed to synthesize personal disposable income for the year where a figure was given, we approximated this as simply personal consumption expenditures plus savings.

Consumer Price Index: The AS gives the consumer price index for Italy based upon the year 1970=100. The entire time series has been constructed on the previous AS issues where this index was based on 1966.

Personal Consumption Expenditures: The historical series of the personal consumption expenditures are taken from the annual issues of AS that give the different categories closely as disaggregated as in our tables. Until 1963 the energy expenditures (fuel and electricity) are included in the household expenditures for rent.

Food: Includes alcoholic beverages and tobacco.

Clothing: Includes textiles and shoes.

Durables: Includes furniture, appliances and other household goods, but not autos, electronic equipment, books, etc.

Transportation and Communication: Includes auto purchases and all operation (gasoline) and maintenance (repairs) expenditures for them, transportation services, postal and telegraph services.

Energy: Considered as an independent item only after 1964, includes household expenditures for liquid and solid fuels, and electricity.

Rent and Household Operations: Includes the cost of owning a home or paying rent--as declared to the taxation authorities, which is often a lower sum than the one really paid.

Employment: The AS lists separately "disoccupati" (unoccupied) and "in cerca di prima occupazione" (in search of first employment) for every year; although, the data are not always consistent with the reality because the persons enrolled in the unemployment lists are a limited minority.

There has been virtually no growth in the labor force in the last fifteen years, but it has to be considered that these estimates do not consider the over one million Italians working in other countries--whose incomes are, in part, reflected in expenditures of their families in Italy.

4.2. TASK 2: HOUSING STOCK

Official housing stock data is almost non-existent, there having been two censuses during the period observed (1961 and 1971). The Annuario Statistico give completions and demolitions, including some information on volumes, but little on the actual stock and on its subdivision per type. We use RPA data, validated through contact with their source Dr. Bernardini at Montedison.

For the more recent years, many different key energy references give detailed estimates broken down by type, size, year of construction and thermal characteristics. Checking their consistency, we have used different estimations and series of data from published and unpublished sources either from utility companies or from the academic groups of research mostly connected with the Consiglio Nazionale delle Ricerche - CNR (National Council of Research) (see Task 3). The estimates used for integration are from:

- Workshop on Alternative Energy Strategies (WAES Report) prepared by Montedison,, 1977, covering 1972
- Usi Finali dell'Energia (End Uses of Energy) by Ente Nazionale Idrocarburi - Eni, 1978, covering 1975
- A study from CRESME (Center for Economical, Sociological and Market Research for the Building Sector), 1974, covering 1962-73
- Two studies issued by the Gruppo Energia Solare (Solar Energy Group) of the Department of Sciences of the University of Naples (Prof. Silvestrini), 1976 and 1979, covering 1966, 1969 and from 1972 to 1976
- A very detailed analysis on 1976 that will soon be published in Energia e Materie Prime
- Other personal communications with W. Mebane (covering 1977) and O. Bernardini (1960-74) from Montedison.

Households: The number of households is defined on AS only for the years of census (1961 and 1971). The complete series of evaluations from 1960 to 1974 were taken from a study on appliances' penetration elaborated by Montedison (personal communication from Bernardini, draft paper). The number of households do not correspond to the number of houses nor to the number of occupied dwellings. In fact, although there are many unoccupied dwellings, still 4% of the "occupied" dwellings are occupied by more than one household (6% in 1960).

Housing stock total is taken from AS for the census years. The other years were interpolated in a linear fashion by taking the annual number of removals from stock and subtracting that from the number of additions. The approximation results were consistent with the data found in different energy-related studies (max \pm 5% deviation).

Additions and Retirements are published by AS. The authorization of "abitabilita e agibilita", but do not consider unauthorized dwellings. Retirements consider removals, destructions and reconversions.

The vacancy ratio is taken from AS for the census years and calculated with good approximation for the other years. The evaluation of this number in its historical series is important because it shows that this phenomenon is not only connected with vacation homes or second homes. In fact, already in 1960 8% of dwellings were unoccupied, most of them being unoccupied apartments in old houses, generally in the old 'palazzi' of the cities, abandoned because they were too expensive to restore (in the fifties and the sixties). Until 1970, the increase of vacancy ratio is due to the construction of vacation homes (connected with the rise in economic welfare), while the reverse tendency observable thereafter is due to the double effect of the decrease of second homes construction and the new policy of restoration of old buildings ("recupero dei centri storici"). Although it is difficult to calculate with the data in our possession, this shift in the occupation of the housing stock is energetically relevant (higher energy efficiency of the old houses, lower average size but also lower rate person/dwelling, indirect decrease in the energy consumption for transportation).

Occupied Dwelling Total: The number of occupied dwellings is taken from AS for the census years and from Montedison R&D Division for the other years (1960-75). Estimates for 1976 were provided by W. Mebane (also from Montedison) from a draft report still to be published (ref. 2).

The average size of the dwellings has been defined by ISTAT for the census years in terms of the number of rooms (a "stanza" must have its own air and light from outside), and consider kitchens when they are large enough to be eventually transformed into bedrooms. We had 3.3 rooms/dwelling in 1961 and 3.7 rooms/dwelling in 1971 that we evaluate in square-meters by the mean of an estimate of ENI (ref. 7) for 1975.

The rate of person per dwelling was partly found in the different publications examined and partly calculated dividing the total population by the number of occupied dwellings.

Dwelling Types: There are no official statistics on the repartition between dwelling types. From the census it is possible to find only a disaggregation of the whole housing stock following the climatic differences and distinguishing Northern, Central and Southern Italy. The "Annuario Statistico dell'Attivita Edilizia" (Building Construction Yearbook) by ISTAT gives the number of buildings (not dwellings) by type, but only for the new constructions, only for the main Italian cities, and only from 1968.

However, in 1975, the Gruppo Energia Solare (GES) of the Department of Sciences of the University of Naples developed a system of evaluations within the research program of Waes-Italy (organized by Montedison). Some estimates have been calculated for the Waes base-year 1972 and for 1966, 1969 and 1973. Those estimates (see ref. 1) were disaggregated per 5 types of buildings (single-family dwelling, two-family dwelling, buildings with 3 to 15 apartments, buildings with 16-30 apartments, buildings with more than 30 apartments) within the different climatic areas, all in percentages.

Other estimates (from Montedison) are presented in the RPA data (1960-75) but the disaggregation is only between SFD and MFD, where the Two-FD are included in the MFD.

More recently, a new disaggregation has been evaluated--always for studying the heating systems--by CRESME (reported in ref. 6) on 1974 data (the total number of dwellings in the CRESME evaluation is lower than the Montedison estimate, 15,718 vs. 15,890). The types of dwellings are six and related to the shape of the constructions: single-family dwelling, two-family dwelling, "palazzina," "blocco aperto," "blocco chiuso," "torre." For the two comparable types, SFD and TFD, the resulting estimates are highly inconsistent with the precedents evaluations by the GES of Naples and by Montedison.

Early this year other estimates considering six types of buildings have been developed while calculating the base-year 1976 of a forecasting model for the residential sector (draft paper to be published, coedited by GES and Montedison, see ref. 2). As shown in Table A, the series from CRESME for 1974 and those for 1976 are relatively different: a great part of this difference is due to the evaluation of the rate of dwelling per building in the different classes (the rates considered for 1976 data are: SFD: 1; TFD: 1.8; "palazzina": 4.6; "blocco aperto": 18; "blocco chiuso": 26; "torre": 26. The rates for the CRESME data on 1974 are unknown).

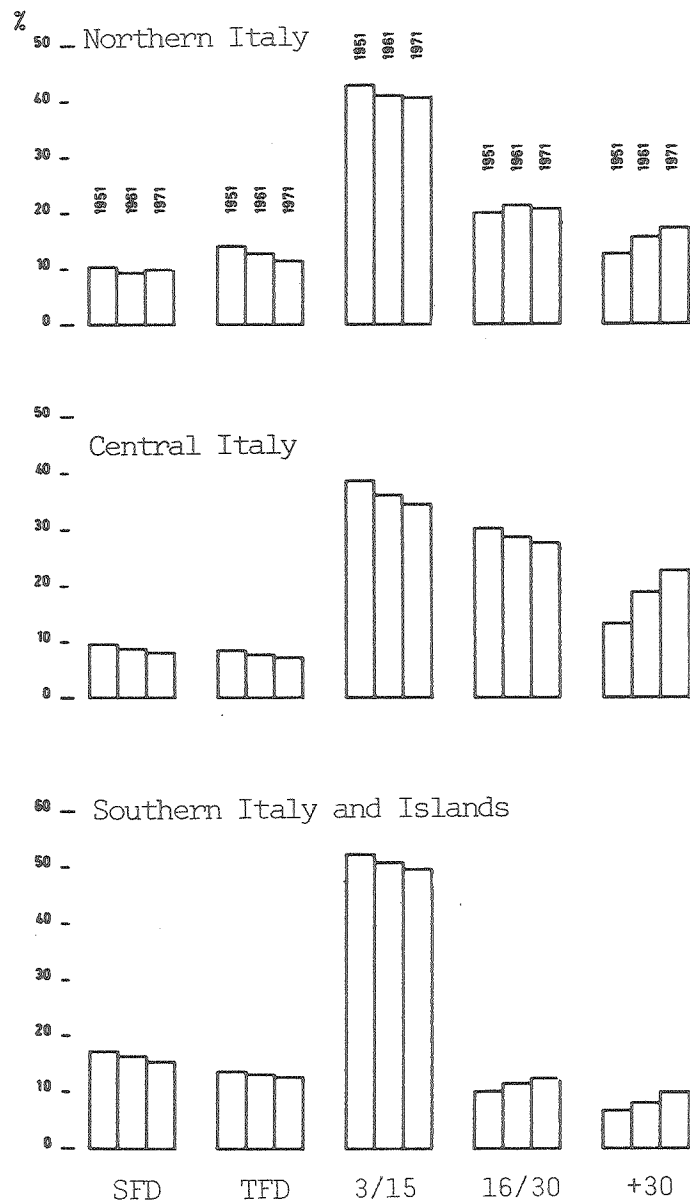
For the other years, 1960 to 65, 67, 68, 70, 71, and 75, we have used RPA data, so the disaggregation is between SFD and MFD (including TFD). For 1975 we had a disaggregation between SFD (+TFD) and MFD from ENI (see ref. 8), but in this report only the dwellings with central heating were considered and so it was not reliable enough.

In Figure A is a graphic representation of the variation of the housing stock in the three main climatic areas during the last three decades as estimated in the Waes report. Additions and Retirements for the two-dwelling types are RPA estimates based on the United Nations Yearbook of Construction Statistics, 1960-76.

Table A. Italian Housing Stock per Type (10³ dwellings)

YEAR TYPE	1966	1969	1972	1973	1974	1976	YEAR TYPE
Single-Family Dwelling	1600	1660	1752	1761	2827	2827	Single-Family Dwelling
Two-Family Dwelling	1612	1649	1697	1704	2177	1859	Two-Family Dwelling
3-15 Dw/Building	6001	6209	6528	6606	4117	4116	"Palazzina"
16-30. Dw/Building	2696	2831	3000	3045	4348	4348	"Blocco aperto"
> 30 Dw/Building	2063	2264	2503	2574	1761	2762	"Blocco chiuso"
					488	402	"Torre"
TOTAL	13972	14613	15480	15690	15718	16315	TOTAL

Figure A
 Distribution of Dwellings
 per Type of Building
 (source: Waes-Italy)



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JAPAN

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Japan

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	93.42	94.29	95.18	96.16	97.18	98.28	99.04	100.2	101.33
Male	10 ⁶	45.88	46.30	46.73	47.71	47.71	48.24	48.61	49.18	49.74
Female	10 ⁶	47.54	48.02	48.45	48.45	49.47	50.04	50.43	51.02	51.59
Private Income	10 ¹² ¥	12.0	14.3	16.5	19.3	22.1	22.2	28.8	33.4	38.2
CPI	1970=100	57.2					76.7	80.9	84.0	88.4
Expenditures:										
Food	10 ⁹ ¥	3,807	4,190	4,718	5,413	6,048	6,825	7,538	8,404	9,724
Clothing	"	1,208	1,381	1,617	1,823	2,026	2,183	2,419	2,715	2,941
Durables	"	556	708	774	986	1,291	1,329	1,553	1,903	2,347
Tspt., Comm.	"	1,924	2,458	3,046		3,479	4,478	4,799	6,985	7,669
Energy										
Fuel and Light	"	332	377	432	484	529	467	520	572	601
Rent	"	672	795	926	1,069	2,234	2,717	3,198	3,627	4,086
Other	"	175			267		403			669
TOTAL	"	8,674					18,402			28,037
Employment	10 ⁶	44.61	45.18	45.74	45.61	46.73	47.48	48.47	49.20	50.02
Unemployment	10 ³	500	440	400	400	370	390	440	630	590

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Japan (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ⁶	102.54	103.72	105.14	107.59	109.10	110.5	111.93				
Male	10 ⁶	50.33	50.92	51.62	52.82	53.60						
Female	10 ⁶	52.21	52.80	53.52	54.77	55.50		.				
Private Income	10 ¹² ¥	45.7	53.9	50.7	52.8	91.4	114.3	130.4				
CPI	1970=100	93.1	100.0	106.4	111.2	124.0	154.1	172.4	188.4	203.6		
Expenditures:												
Food	10 ⁹ ¥	10,978	12,450	13,884	15,562	18,379	23,212	27,251	30,282			
Clothing	"	3,265	3,700	4,246	4,829	6,054	7,274	8,216	9,199			
Durables	"	2,892	3,317	3,897	4,350	5,251	6,010	6,604	7,179			
Tspt., Comm.	"	8,956	10,577	11,942	14,099	16,988	21,527	26,420	30,446			
Energy												
Fuel & Light	"	732	767	854	913	1,074	1,463	1,710	2,039			
Rent	"	4,721	5,474	6,331	7,367	8,637	10,012	11,711	13,824			
Other	"	792	982	1,150	1,343	1,679	2,076	2,326	2,620			
TOTAL	"	32,336	37,267	42,304	48,463	58,062	71,574	84,238	95,589			
Employment	10 ⁶	50.40	50.94	51.14	51.09	52.33	50.94	52.23	52.71	53.42		
Unemployment	10 ³	570	590	640	730	670	590	1,000	1,080	1,100		

HOUSING STOCK DATA: PART TWO
Country: Japan

	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS	10 ⁶	20.67			21.50		24.66	25.52	26.40	27.11
HOUSING STOCK TOT.	10 ⁶				21.09					
Occupied	10 ⁶				20.37					24.20
Avg. Size	m ²				72.5		73.1	73.4	73.7	73.9
Persons/Household		4.5			4.2		4.05			
Additions	10 ³	501	606	653	761	825	921			1,291
Size	m ²	57.8	57.1	54.8	54.5	56.9	58.3			64.8
Retirements	10 ³	40	49	47	51	55	67			108
Size	m ²	72.7	72.8	72.3	71.2	73.3	75.4			83.2
SINGLE FAM. DW. TOT.	10 ⁶	14.09	14.26	14.43	14.60	14.76	14.92	15.29	15.66	16.19
Avg. Size	m ²									
Persons/DW										
Additions	10 ³	285	526	526	526	526	526	752	752	918
Size	m ²									
Retirements	10 ³		352	357	361	365	369	373	382	392
MULTI FAM. DW. TOT.	10 ⁶	5.75	5.82	5.71	5.70					8.10
Avg. Size	m ²									
Persons/DW	10 ⁶									
Additions	10 ³		271	60	161					285
Size	m ²									
Retirements	10 ³		192	194	190					194
OTHER DWELLINGS*	10 ³				86.2					79
Avg. Size	m ²									
Additions										
Retirements										

*OTHER DW REFERS TO: see notes.

HOUSING STOCK DATA: PART TWO
Country: Japan (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶	28.21	29.14	30.03	30.85	31.66	32.37	32.37	33.64			
HOUSING STOCK TOT. Occupied	10 ⁶					31.06						
Avg. Size Persons/Household	10 ⁶ m ²	74.6	75.3	76.0	76.6	28.73	78.0	78.7	79.4	32.03	80.0	
			3.69			-		3.44				
Additions Size	10 ³ m ²	1,428	1,566	1,559	1,920	2,030	1,472	1,539				
Retirements Size	10 ³ m ²	65.8	66.9	67.9	69.8	75.1	77.5	78.2				
		121	132	144	184	210	188	207	237			
		86.9	85.8	81.7	82.2	84.6	82.9	83.5	83.8			
SINGLE FAM. DW. TOT. Avg. Size Persons/DW	10 ⁶ m ²	16.64	17.16	17.66	18.13	18.62	19.09	19.56	20.17			
Additions Size	10 ³ m ²	852	937	932	926	936	940	944	1,096			
Retirements	10 ³	405	416	429	442	453	466	477	489			
MULTI FAM. DW. TOT. Avg. Size Persons/DW	10 ⁶ m ²	8.32	8.59	8.84	9.43	10.11	10.31	10.56	10.03			
Additions Size	10 ³ m ²	495	548	532	889	1,094	532	595	829			
Retirements	10 ³	270	277	286	295	314	337	344	352			
OTHER DWELLINGS* Avg. Size	10 ³ m ²					126.9						
Additions												
Retirements												

*OTHER DW REFERS TO: see notes.

5. JAPAN - NOTES AND REFERENCES

5.1. TASK 1: ECONOMICS

Population: The population figures from JSY* are the results of the Population Census taken as of October 1 of the year stated or estimates based on the results. The estimates are obtained by extrapolating the base population enumerated in the Population Censuses or Surveys, adding or subtracting the natural change and net migration of the year stated (from Oct. of previous year to the end of Sept. of the year stated) and by interpolating the difference between figures thus estimated and the figures obtained from the next base population (in years '60, '65, '70, and '75). Source is the Bureau of Statistics, Office of Prime Minister.

Personal Disposable Income: PDI does not appear in the JSY but it was decided to use "Private Income" from the table National Income per Capita as a surrogate statistic. It appears that this figure could be high by roughly 10%, due to the inclusion of personal taxes and non-tax payments. The per capita private income statistics were multiplied by the population to attain the aggregate private income for the total population of Japan. The source, as cited in the JSY, is from the National Income Division, Economic Research Institute, Economic Planning Agency.

Consumer Price Index: Data are based on the Retail Price Survey and the Family Income and Expenditure Survey. The retail price survey covers 169 cities, towns and villages and retail stores or establishments whose sales amount is the largest in the survey area. Prices surveyed are normal retail prices actually sold in the stores and excluded special prices due to bargain sales.

Total Private Final Expenditures: The primary source of personal consumption expenditures was the Yearbook of National Accounts Statistics, 1967-77, published by the United Nations. The Japan Statistical Yearbook was used for estimates of expenditure on energy and rent because the national accounts statistics did not disaggregate this amount. Because the two sources were in general agreement, they were combined to yield as comprehensive a list of personal expenditures as possible.

The most recent year of the Japan Statistical Yearbook (1979) was used for the estimates of "energy" expenditures ("fuel and light" in the JSY); expenditures on "rent" are cited from the "Housing" category, subtotal "rent" in the 1979 JSY private final consumption expenditures table. The energy and rent statistics for the years 1965-1977, given in the New System of National Accounts by the United Nations, (New SNA), are the most up-to-date expenditure data available for these categories. Unfortunately, similar statistics for 1960-64 are former SNA statistics (1968 JSY) and therefore create a discrepancy in the magnitude of expenditures on energy and rent pre- and post-1965.

Another discrepancy exists in the earlier years of consumption expenditure figures (except the "energy" and "rent" figures already reviewed above). For the years 1961, '62, '64, '66, '67, no estimates of consumption expenditures were available from the most recent UN Yearbook of National Accounts (1978), but instead were cited from the 1970 Yearbook; thus they are former SNA statistics and not directly comparable to all other new SNA statistics. It appears that each year the last 9-10 years' data and certain benchmark years' statistics are revised to be

*Japan Statistical Yearbook

internally consistent for comparison from year to year. Thus, the statistics for the years 1960, '63, '65, '68-'76, for all expenditure categories other than rent and energy, are the latest revised estimates available. (For notes comparing the former SNA to the new SNA, see the UN Yearbook of National Accounts, 1978.)

Food: Food, alcoholic and non-alcoholic beverages, tobacco.

Clothing: Clothing, footwear and miscellaneous personal belongings.

Durables: Furniture, furnishings, household equipment (operation), personal transport equipment (automobiles, bicycles, etc.), and household operations.

Transportation, Communication: Includes medical care and health expenses, "recreation, entertainment, education and cultural services," "education," and "miscellaneous goods and services." The transportation and communication includes personal transport equipment.

Energy: Fuel and light as listed in the Japan Statistical Yearbook.

Rent: Rent only, as listed in the Japan Statistical Yearbook. Other housing expenditures are not listed because they have been included in the durables as listed in the UN Yearbook of National Accounts.

Other: Includes direct purchases abroad by resident households, less direct purchases in the domestic market by non-resident households, less value of gifts in kind sent abroad, net.

Employment and Unemployment: Data are based on the Labor Force Survey as cited in the JSY. The survey covers 76,000 selected persons 15 years old and over who are regularly residing in a sample of 33,000 households for employment status during a week ending on the last day of each month. Data on employment status for the whole country are estimated from the results. Persons in labor force refer to the employed and totally unemployed persons 15 years and over. The employed refer to the employed at work and the employed not at work. The unemployed refer to the totally unemployed or persons other than the employed, i.e., those who are able to work and actually looking for work. The contents of the Labour Force Survey are revised periodically and therefore the figures in every JSY from year to year will vary for a single years' estimated. As a result of the inconsistency due to revisions, the most recent estimates are used.

5.2. TASK 2: HOUSING

Housing: Data are based on the Population Census taken as of October 1 of the year stated. Figures for 1975 are estimated by one-percent sample tabulation. "Ordinary households" refer to a group of persons living together and sharing living expenses or one person who occupies a dwelling unit and lives alone. For our purposes, total households are cited, including the "quasi-households" in the figures. Quasi-households are defined as a group of single persons or a single person living in boarding and/or lodging houses. Household figures for non-Census years can be interpolated from the Census data cited.

Housing: Data are based on the Housing Survey taken as of October 1 of the year stated, and have been recorded from the JSY. Surveyed are all dwellings, occupied structures and household with some exclusions. The following living-quarters have been excluded: (1) Dwellings managed by foreign governments and international organizations, (2) Dwellings used by the Imperial Household, (3) Prisons, juvenile reformatories, women's guidance homes and immigration centers, (4) Institutions of the Self-Defense Forces, (5) Institutions of U.S. Military Forces stationed in Japan. The figures for "two family dwellings" are not available, so that "single family dwellings" correspond to "Detached Houses" consisting of a dwelling unit. Tenement and Apartment houses are listed as "multi-family dwellings." A tenement house is a building which consists of two or more dwelling units that are connected to each other by walls but have independent doors to a street. A building which consists of two or more units whose passages and steps are used in common is reported as "apartment." The category of "other" dwellings are all dwellings other than those above mentioned. A part of a factory, or an office, which is used as a dwelling is included here.

In recent years, the number of buildings is listed separately from the number of dwellings per building, therefore, to obtain the total number of multiple family dwellings, the number of dwellings per building is multiplied by the number of buildings.

Additions and Retirements: Additions data are based on the Survey of Construction Work Started. The survey is carried out for the new construction (including Additions and Alterations) of buildings with a floor area of 10 square meters or more, which is reported to the prefectural governors by the owners-to-be. Retirements data are based on Survey of Building Destruction. The survey, similarly, covers the destruction of buildings with a floor area of 10 square meters or more, which is reported to the prefectural governors by the constructor.

Size of Dwellings (as cited from JSY): These data are "floor space per dwelling" and refer to the total space of every floor including the space of entrance, kitchen, passage, toilet, bathroom as well as dwelling rooms. The room or space which is used as a store, office and workshop and is constructed in the same building as dwelling rooms are also included in this category. However, a warehouse for goods, workshop, garage, etc. which are constructed separately from the main part of the dwelling are excluded from floor space of house. In case of apartment houses, the passage, kitchen, toilet, etc., which are used jointly are also excluded. Additional information on the structure of the stock of dwellings was obtained from energy studies supplied by the Japan Energy Economics Institute and the Japan Institute of Economic Research. Translation was carried out by Mr. Robert Jourdain, then an LBL graduate student, and Mr. Hideyaki Hiyashi, architect at LBL. Two reports by Hidetoshi Nakagami, Institute of Residential Environment Design, Ltd., Tokyo, were also used to corroborate data on household size. Careful comparison, however, showed that the data in the English Language publications already surveyed were similar to those in these more recent energy studies.

S W E D E N

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Sweden

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ³	7,498	7,542	7,581	7,618	7,695	7,773	7,843	7,893	7,935
Male	10 ³	3,740	3,763	3,782	3,806	3,841	3,882	3,919	3,942	3,961
Female	10 ³	3,758	3,779	3,799	3,822	3,854	3,890	3,924	3,951	3,974
Personal Disp. Inc. (Current)	10 ⁹ KR	46.8	50.3	54.0	57.8	63.2	68.2	73.7	77.7	81.5
CPI	100 = 1970	67.4	69.1	72.0	74.2	76.7	80.5	85.6	89.4	92.1
Expenditures:										
Food	10 ⁹ KR	14.3	15.2	16.7	16.9	17.9	19.4	21.1	22.5	23.4
Clothing	"	4.43	4.79	5.05	5.39	5.62	6.02	6.40	6.59	6.57
Durables	"	3.10	3.53	3.70	3.84	4.22	4.57	4.81	5.15	5.45
Tspt., Comm.	"	4.62	5.12	5.67	6.48	7.26	8.40	8.70	9.15	10.3
Energy	"	1.42	1.44	1.63	1.76	1.77	1.90	2.10	2.11	2.38
Rent & Household Operations	"	8.27	8.74	8.84	9.08	9.79	10.83	12.16	12.95	13.60
Others	"									
TOTAL	"	43.3	46.0	50.1	54.1	58.3	64.1	69.3	74.7	79.2
Employment	10 ³	3,616	3,645	3,667	3,783	3,736	3,762	3,767	3,727	3,765
Unemployment	%			1.5	1.7	1.6	1.2	1.6	2.1	2.2

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: Sweden (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ³	8,004	8,081	8,115	8,129	8,144	8,176	8,208	8,236	8,279		
Male		3,997	4,036	4,049	4,051	4,054	4,067	4,081	4,092	4,105		
Female		4,007	4,045	4,066	4,078	4,090	4,109	4,127	4,144	4,163		
Personal Disp. Inc.	10 ⁹ KR	88.0	95.9	104.1	110.6	121.6	142.5	164.6	185.6	210.8		
CPI	100 = 1970	93.6	100	107.6	119.0	121.6	133.9	147.0	161.9	180.5	198.7	
Expenditures:												
Food	10 ⁹ KR	24.4	26.2	28.3	30.5	32.8	36.2	41.0	46.6	51.7		
Clothing	"	6.95	7.1	7.2	7.5	8.1	9.5	10.8	12.5	13.6		
Durables	"	5.38	6.23	6.20	6.76	7.33	8.73	9.96	11.2	12.1		
Tspt., Comm.	"	11.3	12.2	13.0	14.4	15.9	18.8	22.0	26.0	27.2		
Energy	"	2.48	2.80	3.18	3.34	4.17	5.29	5.82	7.40	8.13		
Rent & Household Operations	"	15.2	16.70	17.56	18.29	19.42	21.59	24.30	27.00	30.77		
Others	"											
TOTAL	"	85.3	92.2	98.0	105.9	114.7	131.3	149.6	171.8	189.1		
Employment	10 ³	3,837	3,913	3,906	3,905	3,915	3,979	4,062	4,088	4,099		
Unemployment	%	1.9		1.5	2.5	2.7	2.5	2.0	1.6	1.8		

HOUSING STOCK DATA: PART TWO
Country: Sweden

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	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS	10 ⁶	2.58			2.66		2.78			
HOUSING STOCK TOT.	10 ⁶	2.68	2.71	2.75	2.79	2.84	2.88	2.83	2.93	3.01
Occupied	10 ⁶									
Avg. Size	m ²	71.2					77.4			
Persons/DW		2.84					2.74			
Additions	10 ³	68.3	73.8	75.1	81.4	87.2	98.8	89.3	110.2	106.2
Size**	m ²	73.2					77	78.6		
Retirements	10 ³	6.89	7.1	8.0	8.8	10.7	10.1	9.3	10.2	10.9
Demolition	10 ³									
5 yr Total				187.7						176
SINGLE FAM. DW. TOT.	10 ⁶	1.260					1.293			
Occupied	10 ⁶						1.263			
Avg. Size	m ²	86-92					93.0			
Persons/DW		3.29					3.07			
Additions	10 ³	17.3	20.4	21.6	23.2	26.8	27.6	27.1	28.3	28.7
Size**	m ²			107			102.9		116	
Retirements	10 ³	?	?	?	?	?	?	?	?	19.8
Demo.	10 ³									
5 yr Total				86.28					106	
MULTI FAM. DW. TOT.	10 ³	1.42					1.582			
Occupied	10 ³	1.340					1.515			
Avg. Size	m ²	56.3					64.7			
Persons/DW		2.58					2.47			
Additions	10 ³	51.0		54.67				56.6	63.9	70.5
Size**	m ²	62		69				72		
Retirements	10 ³						20.2	7.7	8.5	9.3
Demo.	10 ³									
5 Yr Total				86.8					51	
OTHER DWELLINGS*	10 ³	75.5					60.0			
Avg. Size	m ³	?				4.3	4.9	5.6	7.0	7.9
Additions	10 ³	?	4.3							
Retirements	10 ³	?	18.58							

*Also counted in multi family totals.

**1960-65, 65-70 figures are averages. 1970-77 figures are for actual publicly financed completions: Stock averages are given in the notes.

HOUSING STOCK DATA: PART TWO
Country: Sweden (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS	10 ⁶		3.05					3.33		3.48		
HOUSING STOCK TOT.	10 ⁶	3.08	3.18	3.27	3.35	3.43	3.49	3.53	(3.57)	3.60		
Occupied	10 ⁶		3.05									
Avg. Size	m ²		81.4					81.8				
Persons/DW			2.65					2.41				
Additions	10 ³	109.1	109.8	107.2	104.0	97.5	85.3	74.5	55.8	54.9		
Size	m ²											
Retirements	10 ³	10.5	10.4	10.0	8.4	8.7	6.4	5.5	4.5	5.0		
Demo.												
5 yr Total						119			?	?		
SINGLE FAM. DW. TOT.	10 ⁶		1.338		1.370			1.468				
Occupied	10 ⁶		1.310					1.449				
Avg. Size*	m ²		101					107				
Persons/DW			2.99					2.90				
Additions	10 ³	31.7	34.6	31.9	37.1	43.6	46.5	47.1	30.1	40.8	40.2	
Size**	m ²			113	.5	115.8	119.5	122.2	127.1	127.2	126.0	
Retirements	10 ³	1.8	1.8	1.9	1.6	1.5	1.2	1.2	1.0	0.9	0.8	
Demo.												
5 yr total					75				?	?	?	
MULTI FAM. DW. TOT.	10 ⁶		1.844		1.980			2.061				
Occupied	10 ⁶		1.741					1.878				
Avg. Size	m ²		67					63.8				
Persons/DW			2.30					2.03				
Additions	10 ³	69.5	68.9	69.8	62.7	52.5	37.8	26.9	15.0	13.8	13.4	
Size**	m ²			66.0	65.6	64.5	64.4	69.8	69	73.3	76.0	
Retirements	10 ³	8.6	8.6	8.2	6.8	7.2	5.1	4.5	3.5	4.1	3.4	
Demo												
5 yr total					44					?	?	
OTHER DWELLINGS*	10 ³		74		?			77				
Avg. Size	m ²		?		?			?				
Additions	10 ³	7.8	6.3	5.2	4.2	1.2	1.0	0.5	0.6	0.2	0.1	
Retirements	10 ³	?	?	?	?	?	?	?	?	?	?	

*Also counted in multi family totals.

**1960-65, 65-70 figures are averages. 1970-77 figures are for actual publicly financed completions: Stock averages are given in the notes.

6. SWEDEN - NOTES AND REFERENCES

6.1. TASK 1: ECONOMIC AND DEMOGRAPHIC

Population: Complete censuses were taken in 1960, 65, 70 and 75 ("Folk och Bostadsräkning," FOB) establishing population on Nov. 1 of each respective year. The population estimates for all years shown here refer to end of year estimates made by the Statistiska Centralbyråen (SCB), the Central Bureau of Statistics. The series used was published in the 1978 Statistiska Årsbok (Statistical Yearbook (SA)). SA also gives male-female and age breakdowns of the population. (The latter were overlooked but will appear in future editions). Estimates between censuses appear to be made using the well kept records of deaths, births, and net migration.

Personal Disposable Income: Personal disposable income appears in some, but not all editions of SA. The values are inconsistent, particularly around 1970 when the UN System of National Accounts was changed. However, we used a recent publication of SCB, "Nationalräkenskaper" ("National Accounts"), Series N 1978:8.4, that give a series for personal disposable income (including income of nonprofit institutions) from 1963 to 1977. Mrs. Gunilla Karlström of SCB's Information Division provided the 1960-63 data from an earlier publication of the same nature that we were not able to obtain directly. The values given in these publications agree very well with those found in the National Accounts publications of the United Nations.

Consumer Price Index: The SA gives the Consumer price index for Sweden based upon the year 1949=100. While the market basket has changed over time, the weights are given in various issues of SA and the index itself has been carefully constructed to give a continuous time series since 1949. Using the 1970 value (236) we have normalized to this year for consistency with other countries. We note that other important publications related to economic activity, such as those issued by Sveriges Allmännyttiga Bostads Organization (Swedish Public Housing Organization (SABO), Swedish Esso, Swedish Steam Fitters Organization, etc., give values of the CPI for various years; these values always agree with those given in SA. Thus the CPI given in SA may be taken as official and that used consistently in Sweden.

Personal Consumption Expenditures: Values for personal consumption expenditures given in each year's SA rarely agree because of the revisions, and important definitions of expenditures on housing vs. fuels changed in the late 1960s. Consequently we inquired at the SCB and were given a recently revised estimate dating back to 1963 (N 1978: 8.4 App. 1) and a continuation from 1950-63 based upon an earlier classification. We used, where necessary, the disaggregated forms (for example, those that differentiate among each type of fuel) in order to assure that 1) the contents of each type of expenditure were consistent throughout the study period and 2) the contents represented quantities that made economic sense, i.e., fuel and rent were not mixed. For 1963 the two series agreed fairly well, to within 3% in major classifications.

Food: Includes alcoholic beverages and tobacco, but not restaurant services, which are mixed with hotels.

Durables: Includes household goods for kitchen and ordinary rooms but not autos or electronic equipment. Comparison with France showed good correspondence.

Clothing: Included textiles, shoes, etc., and their repair.

Transportation and Communication: Included transportation services, gasoline, auto purchases and repairs, postal and telegraph services. However, since 1972 an increasing number of well-paid workers have received compensation in the form of automobiles registered to companies or even state agencies. According to several sources (Hushaallens Energikonsumtion, Konsumentverket, 1976; Sol eller Uran?, Secretariat for Future Studies, 1978; Sveriges Energifoersorjningen 1977-1983, Statens Industriverk 1979) these cars amounted to as many as 50% of new car registrations in the 1975-1977 period, until tax laws made such "private" consumption much more difficult. However, it is clear that this consumption was not recorded as private consumption in the national accounts, so that estimates of expenditures for automobile transportation might be low by as much as 5%, the rough share of the total auto population purchased in the 1972-77 period under the name of companies.

Energy: Includes household expenditures for fuel, electricity, gas and coke when applicable, other solid fuels that were important in the 1960s. However, it is not clear how expenditures for district heat or collective oil deliveries are defined when such are hidden in the rent for apartments. Prior to 1963 a small amount of district heat was not counted under fuel.

Rent: Includes the cost of owning a home. In addition to the uncertainty posed by the accounting of collective heat costs, rent expenditures are also affected by rent controls, subsidies, and much activity that could be termed black market purchases of the right to own an apartment. While we cannot document the latter, we can report that virtually every one of our Swedish contacts and acquaintances has at one time paid some kind of under-the-table fee to the occupant of an apartment for the right to take over that apartment!

Employment: The number of people employed is given both in each year's SA and in a SCB time series (Employment 1960-74; S. Med. Nr. N 1975:98, App. 5) published recently by SA. (Data for 1975-77 are from the 1978 SA.) But employment is not defined consistently by issues of SA; alternatively SA published the percentage of the workforce in search of employment, or the absolute numbers. We have used the most recent series for numbers of employed people, and have taken percentages of unemployed from SA, avoiding those data from early years clearly labeled as unemployed people on relief. The percentage of unemployed refers to the labor force in total.

To summarize, the Swedish economic data were taken from time series published in recent years that covered the period 1960-1977. Earlier series were joined to include the earliest years 1960-63. Data on personal income, consumption, and population agreed well with United Nations rendering of similar information; in all cases the values adopted come directly from Swedish sources. Footnotes in SA and in most SCB publications list references to which investigators can turn to find the exact definitions of each quantity, as well as information on uncertainty and sampling methods.

6.2. TASK 2: HOUSING DATA

We were supplied with a wealth of housing statistics from the Housing Division of the SCB (in Stockholm and Örebro); in addition we considered housing data unearthed by several energy related investigations: Energi Prognos Utredningen (EPU), Industridept., 1974; Energibesparingen i Befintliga Bebyggelse (Energy Conservation in Existing Buildings), Statensplanverk, 1977; Energikommissionens Betaenkandet: Appendices from the "Group on Buildings," Industridept., 1977, 78.

Households: The numbers of households are defined for years covered by the FOB, Folk och Bostads Räkningen (Census); Other years' values can be interpolated by noting the slowly varying number of people per household and the population for the year in question. Note that the FOB is defined as the number on Nov. 1, while population estimates are year end. FOB distinguishes between households, houses, and we assume that the number of households equals the number of occupied dwellings. Because of the harshness of the Swedish winter, however, most unoccupied houses are heated to some degree, and unoccupied apartments are heated fully, since heat from occupied units is known to pass easily to unoccupied units. Household population is 2% less than total population (according to FOB 1970, vol. M) because of transients, movers, hospitals, foreigners. Data for persons/dwelling is given in each FOB; as noted above this data covers permanent dwellings and their occupants. Omitted, according to FOB 1970, are people who are in certain institutions, people with no permanent residence place, some foreigners, but they are counted in the overall population statistics. People/dwelling gives an accurate representation of the population that uses energy classified as "residential" so we give these data directly. The overall discrepancy with total population is of the order 2%. Note that FOB gives the breakdown between single family dwellings and "other" dwellings, but does not break "other" into apartments, student dwellings, or dwellings in non-residential buildings.

Housing Stock is taken from FOB for the census years; other years are interpolated in a linear fashion by taking the average number of removals from stock and subtracting that from the average number of additions. Available to us are yearly additions but only 5 year averages of removals, of which demolitions ("rivningar") form only a small subset.* We give demolitions and total net removals. The purpose of approximating data on actual number of houses is to relate fuel consumption for those years in which it is available directly to number of dwellings.

Average size of Swedish dwellings is traditionally defined in terms of number of rooms including or excluding kitchens. Recent surveys that examine the area of dwellings (Energibesparingen i befintliga bebyggelse) find that the area per room is roughly constant and actually give that value for dwellings of three types (detached urban, detached rural, all apartments) for dwellings built in various years. Knowing the average size of a room in a dwelling built before 1960 that survived until 1975, and knowing the average number of rooms/dwelling both in this sample and in the entire stock as it existed in 1960 (this value given in FOB 1960 and in Energibesparingen), we approximated the size of each type of dwelling for 1960 and 1965. Estimates of size for 1970 and 1975 (i.e., for the stock in that year) agreed well with the calculations performed in Group on Buildings...., which had access to unpublished FOB data on dwellings by rooms, area, and age.

*Correct data arrived October 26 giving 5 year averages for net and gross removals for 1960-65 and 1965-70. We derived 1970-75 from FOB 1975, Energibesparingen and FOB 1970.

However, it is likely that those dwellings that did not survive beyond a given FOB to the next were the most dilapidated; it is known that demolitions in a given year are smaller than new additions; we presume that the smallest dwellings, and probably those with the smallest rooms, were among those removed from stock;** hence our estimates of the average size of the building stock for 1960 and 1965 probably represent upper limits—roughly 20% of the pre-1966 stock did not survive through 1975 because of conversions, modernization, or demolition; had these been present in the 1975 survey they would have caused the average size to be somewhat lower.

Thus for 1960 we give 92 m² as the upper limit average area of single family dwellings based upon the average area of those that survived to 1975, and 86 m² as the area based upon the known number of rooms per dwelling for all 1960 dwellings of this type times the average area per room. The first calculation is based upon the data in Table 5.04, 5 of Group on Buildings, the second on data in Tables B1:1,4.5.6.11,53 of Energibesparing...

Additions are defined as new construction only. We do not consider conversions or modernization, though data exist. During the 1970s many smaller dwellings in apartments were combined to make larger units available.

Size of additions is published by SCB (BO 1979: 9.2 and BO 1979: 5.2) and by Sveriges Almaennyttiga Bostads Organization (SABO) but their data apply only to dwellings financed directly or indirectly with some government support. SCB indicates that this comprises about 90% of the entire production. For single family dwellings, however, private financing might account for as much as 30% of the production in some years. Since public financing stipulates a maximum value (and also size) per dwelling, our estimate must be seen as a lower limit to the size of single family dwellings. Privately financed additions are probably a great deal larger. On the other hand, it should be noted that the 1975 FOB data on size of the stock are based indirectly on the taxation of dwellings and therefore on the actual size of all dwellings. This sample shows average area 5% greater than the publicly financed sample, and is complete. SCB (BO 1979: 5.2) gives areas of new dwellings according to whether they were built by owners or third parties; we have combined these data by averaging the two groups.

Retirements ("Avgangenen") are comprised of a hodge-podge of changes in the status of buildings; true demolitions ("rivningar" and "planerad rivningar"), conversions to business property, combination of two or more dwellings into one (for which only the net loss is counted), and other retirements. While SCB and other sources list actual demolitions for each dwelling type from 1965, only the given year net (and gross) retirements are given for totals. Therefore we give the totals as five year sums, and the individual data where available. Demolitions are given in SCB BO 1979: 5.2, while total retirements are given in the 1968 and 1974 reports "Avgangenen" as well as in "Energibesparing." For the 1970-75 dwelling stock by type. The difference between net and gross removals includes adjustments in data made after the five year statistics are available; gross data (available for the 1960-70 period only) includes reported changes in each category with an expected 15% error. We expect that the FOB is far more accurate than the collection of yearly reports, which may, for example, contain double counting in a given year or over two years. In our judgement retirements should not be considered a prime statistical quantity that is indicative of economic activity in the

**In Avgangenen av Bostadslagenheter 1961-65 (SCB, Nr. BO 1968:33) and, 1965-70 (SCB, Nr. BO 1974:49), a breakdown of the different reasons for retirement are shown. For retirements, less than 2 rooms/dwelling disappear from the stock. For demolitions the number is about 33% less than the number of rooms/dwelling in net construction. The data reflect net conversion, that is, if two dwellings are converted to one, only one "disappears".

building sector, but rather one derived from better known construction rates and five year changes in stock. The five year data run from November 1 of the census year (1960, etc.) through that of the next census year. Other retirement data runs annually.

Dwelling Type: The various SCB series distinguish between detached housing (single, double, row and terraced houses), apartments, and "other dwellings," which refer mainly to student or other temporary housing and dwellings in non-residential buildings. Farm dwellings are included in singles but not broken out by SCB or FOB, as far as we could tell. SA lists yearly additions by detached and "other", which includes both apartments and SCB "other." We have used SCB data* to split our non-apartment dwellings from apartments. However, we consider this split somewhat unreliable, and note that most "other" dwellings are found in large buildings anyway. Summer homes are not mixed in which these figures, though we have obtained elsewhere data on this stock in connection with key energy consumption figures. Thus, data include "other" dwellings in the stock. For 1960-70 separate addition and retirement data for "other" dwellings is available from the sources named above. After 1970 the additions are given (and are separated from additions listed elsewhere) but the retirements are buried in the MFD data.

Degree Days: The present submission of data does not contain the data on degree days, as we consider it instead with Task 3. However, we can report that we have obtained monthly degree day data for the whole of Sweden from 1967 to 1977, and are expecting data back to 1960. Some indexes are given in yearly reports of Swedish Esso, but for consistency we use the official series calculated every year by Swedish ASHRAE (VVS) for the Oeverstyrelsen foer Ekonomiska Foersvar, or Economic Civil Defense Council, a kind of emergency preparedness government body. In Sweden degree days are defined as the difference between the monthly average temperature and 17.0 degrees C. However, days on which the average outdoor temperature rises above somewhat lower thresholds (10°C in the summer, 12°C in April and September, and 13°C in October) are omitted as heating days. This leads to a considerably lower estimate of degree days than would an hourly calculation. Moreover, the use of a monthly average allows periods during which the actual temperature rises above 17°C to offset other periods, contrary to practice in the U.S. where only periods of less than the base temperature (actually 18.6°C) are counted. Finally, the choice of a base temperature in Sweden is uncertain in our view because indoor temperatures are the highest of any nation we surveyed (typically 22°C) which increases the real number of degree days, while houses are the tightest of all considered, which lowers the real number of degree days. (See T. Schraeder, Two Parameter Model of Space Heating Consumption, Princeton University, Center for Environmental Studies, 1977). Moreover, the definition of heating season length, which also enters into some calculations, is to us unreasonable as the share of ever-ready electric and district heating increases. An internal working paper from the National Board of Industry considers this problem but makes no choice as to the correct system. We note, however, that data from Munther (Energifoerbruken i Smaahus), Statens Raad foer Byggeforskningen, 1974), a study of over 3000 electrically heated homes, actual degree hour data was obtained and was related directly to indoor temperature assumed to remain at 21°C. These values were close to 5000 DD (C) for Stockholm, in contrast to the average value of near 3800 cited in the references mentioned earlier. This difference of interpretation is important; preliminary data from German Esso, for example, give more degree days to the area around Munich, Germany, than the Swedish official values for Stockholm, which has a greater intrinsic heating demand.

* Bostadsbyggandet 1972 (Construction 1972), Part 1. SCB, 1973 Bostadsbyggaadet Aren 1961-73 (Construction 1967-73), Housing Authority, Series 1974:28, 1974. Bostadsbyggandet 1978. SCB, Series BO 1979: 5.2. FOB 1970, Part 14: Comparison of 1960-65-70 Results. SCB, 1975.

Publications of the Statistiska Centralbyrån
(Central Bureau of Statistics)

1. Folk och Bostadsräkning (Family and Housing Census): 1965 (Vol. 8); 1970 (Vols. 9 and 14); 1975 (Vols. 4 and 5). (Summarized in Bostaeder och Boende (Homes and Occupants), 1970 and 1975 editions; Bostadsstyrelsen (Housing Authority), 1975 and 1979, respectively).

Volume 9 of the 1970 Census summarizes the 1960 and 1965 censuses.

2. Statistiska Årsbok (Statistical Yearbook): 1978, Table 5, Population by year; 1974-6, 72, 70, 68, 66, 64, Tables on consumer expenditures, consumer prices, consumer price index, employment ("sysselsättning")

Nationalräkenskaper (National Accounts) 1963-77. Series N 1978: 8.4, 1978.

Konsumtion (Final Consumption Expenditures), 1963-77. Series N 1978: 8.4, appendix 1 (this was completed with an earlier series, 1950-63).

Sysselsättning och Lönesumma 1963-77 (Employment and Compensation. Series N 1978: 8.4 Appendix 5, Table 43 (Total employment and self-employment); 1963-77 (and M: 1975:98, Appendix 5, 1975 (Covering 1960-74)

Laaneobjektsstatistik (Data on Mortgage Properties); Vols. BO 1979: 9.1-9.4

Bostadsbyggandet (Housing Construction) 1972 Part 2; 1978, Part 2 (Series BO 1979: 5.2)

Avgången av Bostadslägenheter (Decreases in the Building Stock): 1 Nov. 1960 - 1 Nov. 1965 (Series BO 1968:33); 1 Nov. 1965 - 1 Nov. 1970 (Series BO 1973:49)

Other Important Sources of numerical data

Energibesparing i Befintliga Bebyggelse (Energy Conservation in Existing Buildings). Stockholm: Statensplanverk, 1977 (referred to as "Energibesparing").

Swedish Housing 1968, 75, 78, 79. Pocket Statistical Tables from Sveriges Allmännyttiga Bostads Organization, Stockholm.

Energikommissionens Betaenkandet (Report of the Energy Commission). Appendix 13 (Industridepartement 1977 Ds 1 1977:13). Stockholm, Dept. of Industry (referred to as "Group on Buildings").

Bostadsbyggandet 1961-73 (Housing Construction 1961-73). Report Nr. 1974:28, Stockholm, Bostadsstyrelse, 1974.

Energi Prognos Utredningen: Energi 1985-2000. (Energy Forecast Commission). Statens Officiella Utredningar SOU 1974:64-5. Stockholm: Liberfoerlag.

UNITED KINGDOM

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: United Kingdom

	Unit	1960	61	62	63	64	65	66	67	68
POPULATION	10 ⁶	52.37	52.81	53.27	53.55	53.89	54.22	54.50	54.80	55.05
Male	10 ⁶	25.27	25.53	25.81	25.95	26.13	26.30	26.42	26.57	26.70
Female	10 ⁶	27.10	27.28	27.47	27.60	27.75	27.92	28.08	28.24	28.35
Personal Disp. Inc.	10 ⁶ L	18,245	19,556	20,456	21,757	23,385	24,998	26,470	27,815	29,752
CPI	1970=100	68.3	70.6	72.4	73.9	76.3	79.9	83.1	85.1	89.1
Expenditures:										
Food	10 ⁶ L	6,322	6,656	6,947	7,194	7,601	7,951	8,391	8,736	9,144
Clothing	"	1,647	1,729	1,771	1,873	1,971	2,099	2,154	2,219	2,375
Durables	"	852	851	881	948	1,022	1,078	1,077	1,120	1,242
Trsp., Comm.	"	1,734	1,777	1,942	2,147	2,403	2,588	2,788	3,068	3,427
Energy - Fuel, Light	"	751	796	911	1,010	1,000	1,087	1,161	1,208	1,341
Rent, Water	"	1,367	1,455	1,602	1,770	1,931	2,129	2,338	2,536	2,738
Others	"	4,186	4,571	4,869	5,188	5,588	5,959	4,962	6,614	7,145
TOTAL	"	16,909	17,835	18,923	20,130	21,516	22,891	24,247	25,491	27,412
Employment	10 ⁶	24.26	24.59	24.77	24.80	25.08	25.33	25.48	25.07	24.84
Unemployment	10 ³	326	287	406	497	349	299	281	503	542

DEMOGRAPHIC AND ECONOMIC DATA: PART ONE
Country: United Kingdom (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
POPULATION	10 ⁶	55.26	55.42	55.61	55.78	55.91	55.92	55.90	55.89	55.85		
Male	10 ⁶	26.80	26.88	27.00	27.10	27.17	27.19	27.20	27.20	27.28		
Female	10 ⁶	28.46	28.54	28.61	28.69	28.74	28.73	28.71	28.69	28.67		
Personal Disp. Inc.	10 ⁶ L	31,731	34,738	38,723	44,504	51,303	60,614	74,361	86,155	94,312		
CPI	1970 = 100	94.0	100	109.3	117.1	127.9	148.4	184.4	214.9	249.0		
Expenditures:												
Food	10 ⁶ L	9,755	10,410	11,309	12,162	13,857	15,970	19,663	23,029	26,439		
Clothing	"	2,505	2,753	2,990	3,383	3,891	4,553	5,296	5,938	6,838		
Durables	"	1,254	1,392	1,636	2,029	2,339	2,536	2,968	3,376	3,694		
Tspt., Comm.	"	3,633	4,050	4,843	5,665	6,225	6,786	8,692	10,480	11,646		
Energy - Fuel,Light	"	1,430	1,495	1,619	1,797	1,897	2,268	2,916	3,600	4,261		
Rent,Water	"	3,000	3,330	3,771	4,320	5,044	6,059	7,384	8,926	10,211		
Others	"	7,577	8,225	9,202	10,500	11,934	13,721	16,273	18,189	20,441		
TOTAL	"	29,154	31,660	35,370	39,856	45,187	51,863	63,192	73,538	83,530		
Employment	10 ⁶	24.85	24.75	24.40	24.39	24.97	25.06	24.93	24.76	24.88		
Unemployment	10 ³	518	555	724	804	575	542	866	1,332	1,450		

HOUSING STOCK DATA: PART TWO
Country: United Kingdom

	Unit	1960	61	62	63	64	65	66	67	68
HOUSEHOLDS GB only	10 ⁶		16.19				17.05	16.94		17.64
UK	10 ⁶		16.83	17.07	17.28	17.50	17.69	17.88	18.08	18.29
Persons/HH, GB			3.01					2.99		
HOUSING STOCK TOT. GB	10 ⁶		16.30	16.63	16.83	17.11	17.39	17.66	17.94	18.23
UK	10 ⁶		16.70					18.0	18.37	18.67
Avg. Size Persons/DW	m ²									
Additions UK	10 ³		304	313.6	307.4	382.3	389.2	392.1	408.7	418.7
Size	m ²									
Retirements	10 ³		99.7	102.9	102.0	109.2	109.5	119.9	127.8	125.1
SINGLE FAM. DW. TOT.										
Avg. Size										
Persons/DW										
Additions										
Size										
Retirements										
MULTI FAM. DW. TOT.										
Avg. Size										
Persons/DW										
Additions										
Size										
Retirements										
OTHER DWELLINGS*										
Avg. Size										
Additions										
Retirements										

*OTHER DW REFERS TO:

HOUSING STOCK DATA: PART TWO
Country: United Kingdom (Cont.)

	Unit	69	70	71	72	73	74	75	76	77	78	Notes
HOUSEHOLDS GB only	106		18.0		18.19			18.92				
Persons/HH UK	106	18.56	18.77	19.00	19.19	19.36	19.53	19.68	19.86	20.04		
Persons/HH GB				2.88					2.76			
HOUSING STOCK TOT. GB	106	18.49	18.73	19.00	19.21	19.42	19.63	19.87	20.12	20.38		
UK	106	18.93	19.18	19.46	19.68	19.89	20.10	20.61	20.87	21.11		
Avg. Size Persons/DW	m ²						80					
							-					
Additions Size	10 ³	372.6	355.2	358.2	329.6	306.3	280.4	323.4	323.0	310.0		
Retirements	10 ³	118.8	113.1	122.4	115.8	103.7	69.1	80.6	70.7	60.0		
SINGLE FAM. DW. TOT. (UK)	106				9.4			10.0		10.32		
Avg. Size Persons/DW												
Additions Size												
Retirements												
MULTI FAM. DW. TOT. (UK)	106				10.3			10.6		10.8		
Avg. Size Persons/DW												
Additions Size												
Retirements												
OTHER DWELLINGS* Avg. Size	106											
Additions												
Retirements												

*OTHER DW REFERS TO:

7. UNITED KINGDOM - NOTES AND REFERENCES

7.1. TASK 1: ECONOMICS

Population: Data shown relate either to the population enumerated at successive censuses or to the annual mid-year estimates. Mid-year estimates are constructed from the latest full Census, with allowance for births, deaths, migration into and out of the area, and variation in the disposition of armed forces since the Census was taken. The estimates are given on two bases, Home and Total Population. For our purposes, the Home population figures were selected, representing mid-year population, that is, persons actually present in the area. The data are representative of the United Kingdom and thus the sources are: Office of Population Censuses and Surveys, General Register Office (Scotland); General Register Office (Northern Ireland). The data have been recorded directly from the Central Statistical Office (CSO) Annual Abstract of Statistics, (1960-1979 Editions).

Personal Disposable Income: The data are listed at current market prices of the year indicated, as found in the CSO Annual Abstract of Statistics (AAS). Personal disposable income equals total personal income less payments of United Kingdom taxes on income, national insurance, etc., contributions, transfers abroad (net) and taxes paid abroad. Personal disposable income less personal savings is equal to consumption expenditures (as listed in the category of economic statistics: "Personal consumption expenditures").

Consumer Price Index: The statistics cited are from the "Index of Retail Prices" as found in the AAS. The weights have been revised each January on the basis of ascertained consumption in the three years ended in the previous June, valued at prices obtained at the date of revision. This new procedure was begun in January 1962, and the index figures preceding this period have been revised so as to be comparable to the current statistics. The source of the CPI is the Department of Employment, United Kingdom.

Consumption Expenditures: The data are taken from the table in the AAS titled "Consumer Expenditure." The source given is the Central Statistical Office. The figures are consistent categorically and in total from year to year, and are in general agreement with estimates from the U.N. Yearbook of National Accounts (within 10% agreement).

Food: Includes alcoholic beverages and non-alcoholic beverages and tobacco.

Clothing: Includes footwear and other clothing.

Durables: "Durable goods" as listed in the table at current prices includes furniture and floor coverings, radio, electrical and other durable goods.

Transportation and Communication: Includes new and second hand motor cars and motorcycles, total running costs of motor vehicles, and communication services.

Energy: This category is broken down into "fuel and light," (including coal and coke, electricity, gas and other fuel), and "rent, water" (including rent, rates and water charges).

Other: All expenditures not explicitly listed above have been lumped into the miscellaneous category or "other." In addition, the "other" category includes Income in Kind, not included elsewhere, less Expenditure by foreign tourists in the United Kingdom, and Consumer's Expenditure Abroad.

Employment and Unemployment: Employment statistics are the total employed labor force, and the unemployed are total unemployed labor force, as found in the AAS. Both sets of data were obtained by the method specified, on p. 203, in the Ministry of Labor Gazette, March 1965, for the years 1960-71. Data for the later years are based on the Census of Employment. The bureau source as listed in the AAS is the Department of Employment, and Department of Manpower Services (Northern Ireland).

7.2. TASK 2: HOUSING

Households: The definition of a private household is "any person living alone who is responsible for providing his or her own meals or a group of persons living together, partaking of meals prepared together and benefiting from a common housekeeping."

The data are from the Great Britain Census, Office of Population Censuses and Surveys (1961, '66, '71). Other years as noted below.

Data on UK housing and construction is very hard to find. For one thing, many tables are divided up into regions of the UK and not published together, particularly information on Northern Ireland, whose counties represent about 5% of the population of the UK. Nevertheless we found the following information.

Data for Great Britain is published in the Annual Abstract; data for UK is published (from 1966) by Nationwide Building Society (NBS) a large savings and construction institution (like a Savings and Loan in the U.S.). Their publication is titled "Housing Trends" and we were supplied with the issue from Second Quarter, 1979. They compile data for the entire UK from the Department of the Environment, Census, and Housing and Construction Statistics. Included in their report were numbers of households, year and numbers of dwellings, yearly additions, net removals. Thus for households and for dwelling stock we give both the UK figure and the Great Britain figure, in the event that later data on energy use is restricted to Great Britain. Data for 1961 is from the big census as reported in the Annual Abstract, 1970 edition, and refer to mid-year estimates. Figures for "persons/dwelling" are derived by us as "population/occupied dwelling."

New Construction: We present Great Britain only data on total new construction and net removals, as obtained from the Annual Abstracts. Comparison with NBS data for all of UK showed good agreement; at most (1968) 7,000 dwellings per year were constructed in Northern Ireland.

Housing Type: Little information is available on dwelling type or size. However, tabulations provided by the Department of the Environment, and the UK Office of Population and Censuses do give (from a sample of the order of 15,000) yearly estimates of the breakdown of stock by type. This is the "annual housing survey." We have used these estimates for 1972, '75, and '77, applying the percentages given to the UK

housing totals (though the survey strictly speaking only applies to Great Britain, the error is small). We classify "completely detached" and "semi-detached" as single family dwellings, "terraced houses," "purposed built flat," "converted flat," and "with business and other," as multi-family dwellings. This breakdown is consistent with other estimates of the UK Housing Stock (Leach and Romig, the Common Market).