THE HIDDEN WORLD TRADE IN ENERGY

by

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ABSTRACT

The energy embodied in internationally traded commodities is estimated for the year 1967 by employing United States input-output energy coefficients expressed in physical units. In this year and under the assumption of USA technology and industrial structure, this "hidden" world trade in energy probably exceeded 40 per cent of the directly observed world trade in energy. As a ratio to aggregate energy consumption, the importance of embodied energy flows is smaller, but net embodied energy imports are positively correlated with per capita GDP, and their inclusion in aggregate energy consumption would increase measured income (per capita GDP) elasticities. A country's imports of embodied energy are approximately proportional to the imports of all commodities. Exports of embodied energy, on the other hand, especially those associated with more energy-intensive materials (which are largely products of what is commonly called heavy industry and which account for most of the country <u>net</u> imports of embodied energy) have a much higher elasticity than do imports with respect to per capita GDP. These energy-intensive exports are also significantly affected by a country's relative production of primary energy, total agricultural crops, and other natural resources.

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Primary and secondary energy is consumed in direct forms to help produce goods and services. The resulting goods and services can then be said to "contain" or embody the energy expended in their own manufacture and in the manufacture or processing of non-energy inputs used directly and indirectly for their manufacture. Countries can import and export energy both in direct forms and indirectly through the energy embodied in non-energy commodities. These international flows of embodied energy constitute, in fact, a hidden and largely unrecognized world trade in energy. If this trade is sizable, it is conceivable that these indirect imports and exports could seriously affect our conventional measures, based on the production, direct exports and direct imports of fuel and power, of a country's aggregate energy consumption.

Almost nothing is known about the quantative significance of embodied energy flows in international trade. The present author applied U.S. input-output coefficients to a selection of "energy intensive materials" for a few countries and determined that the energy used directly and indirectly for producing these materials might constitute one fourth or more of all energy use. (Strout, 1976). Other studies have measured the energy embodied in the United States exports and imports using similar techniques. 1/ (Strout, 1967;

1/ For measurements using input-output tables or coefficients, it is essential that energy flows in the input-output table be measured in terms of energy content rather than of money value. Otherwise the great range in prices paid by different consumers can cause large errors. (See Reardon, 1976, Preface.) The magnitude of these errors, as large "as a factor of two" (Bullard and Herendeen, 1975), largely invalidates the estimates such as those of Fieleke (1975) based upon conventional input-output tables. Of course measuring gross energy flows in physical units does not solve the problem of measuring "effective" or net energy use, a problem left unaddressed in the present paper.

Bullard and Hillman, 1975; Reardon, 1976.) But no effort has yet been successful in measuring the energy content of traded goods and services for a relatively large group of countries, including those from the so-called developing parts of the world.

What questions might be answered by such a study? There are at least four. First, are the magnitudes of embodied energy moving in world trade large or small with respect both to direct forms of energy and to total energy consumption? Second, would the inclusion of net imports of embodied energy in a country's aggregate energy total have a significant effect on conventional notions of aggregate demand elasticities such as those derived from the usual energy-gross domestic product (GDP) analysis? (Strout, 1983). Thirdly, can the pattern of embodied energy exports and imports among countries tell us anything about the reasons why some energy is traded in direct forms and some in indirect forms and thus perhaps shed light on matters of international comparative advantage? And finally, are the foreign trade patterns for all embodied energy similar to or different from trade in that part of the total represented by more "energy-intensive" commodities?

While the present paper provides at least preliminary evidence on each of these four questions, it can be no more than a first-approximation study. The reasons are, first, that input-output coefficients from a single country only, the United States, are used to estimate the energy embodied in all countries' foreign trade. Thus all countries are implicitly assumed to have had not only the same technology but also the same industrial structure (in input-output terms) as the U.S.A. in one particular year. That the possible bias in this assumption is not insignificant is shown by the case of

Japan discussed in Strout (1976). Second, calculations have been made only for 1967, the most recent year for which are available U.S. input-output coefficients based on physical measures of energy. Third, the sample of 39 countries was based more on ease of data collection than upon criteria designed to produce a representative sample of all countries, or even of all "non-centrally-planned" countries.

The results of the various calculations, although certainly subject to improvement, are nevertheless striking. Embodied energy does appear to be of great potential importance for a complete understanding of the ultimate destination of energy flows and of the aggregate patterns of energy consumption in the world.

The paper has five parts. The first describes the country sample and touches upon the methodological issues in deriving a system of indirect energy coefficients for foreign trade. Overall magnitudes of embodied energy trade are derived in the second. Part III deals with cross-country pattern of aggregate energy consumption when embodied energy is included in the totals, and part IV looks at cross-country patterns of energy trade when embodied energy is introduced into the picture. Conclusions are summarized in part V.

I. Some Methodological Details

The general strategy of this study has been to estimate embodied energy in traded goods by applying coefficients of direct-plus-indirect energy use to a country's 1967 exports and imports. The resulting measures of embodied energy use can then be compared with direct energy trade and consumption.

Before carrying out this procedure, it was first necessary to prepare energy coefficients for the classification system used for international trade (not directly or easily compatible with the U.S. input-output classification scheme). In the interest of reducing the magnitude of the subsequent computational task, it was also advisable to aggregate as many commodities as possible into more or less homogeneous groups with respect to energy use. Along the way, of course, innumerable decisions and assumptions had to be made. These preliminary steps, discouragingly enough consumed the better part of the budget allocated for the current study, chiefly because it proved impossible to discover an existing bridge between the U.S. input-output classification (U.S. Department of Commerce, 1974 and the Standard Industrial Trade Classification (SITC; United Nations, 1961). The more pertinent details of the classification and related work are preserved for posterity in Annex A. The outcome was the reduced classification scheme and weighted average energy coefficients shown in Table 1.

In short, after assigning all coefficients of direct-plus-indirect primary energy use from a 357-sector U.S. input-output table (Herendeen and Bullard, 1974) to the appropriate 2-digit (57-sectors) SITC class, it was possible to construct 34 relatively homogeneous commodity categories. Each group corresponds to an SITC class at either the one-, two-, three- or in one

Table 1

Classification Scheme for Embodied Energy Estimates, by SITC Categories Showing 1967 Energy Coefficients ("Energy-intensive" commodity groups are underlined)

SITC Category Level: 1	2	3,4	Items (Level 1 Titles are shown in Capitals)	Embodied Energy Coefficient a/
0			FOOD AND LIVE ANIMALS	56319
1			BEVERAGES AND TOBACCO	48213
		2311	Natural Rubber, Gums	65553
	23x		Other Rubber	214399
	25		Pulp and Paper	178868
	27		Crude Fertilizers & Crude Minerals	140599
		282	Iron and Steel Scrap	15.43
		284	Non-ferrous Metal Scrap	70.78
		28x	Other Metalliferous Ores & Metal Scrap	116233
	2x		Other INEDIBLE CRUDE MATERIALS EX. FUELS	63851
	32		Coal, Coke & Briquettes	188.9
		331	Petroleum, Crude & Partly Refined	2319
		332	Petroleum Products	509011
		33x	Petroleum and Petroleum Prod., n.e.s.	---
	34		Gas, Natural and Manufactured	---
	3x		MINERAL FUELS, LUBES, AND RELATED, n.e.s.	---
	43		Animal & Vegetable Oils & Fats, waxes	104001
	4x		Other ANIMAL & VEGETABLE OILS & FATS	73955
	54		Medicinal & Pharaceutical Products	51098
	5x		Other CHEMICALS	200939
	61		Leather & Leather Mfrs, Dressed Skins	64501
	62		Rubber Manufacturers, n.e.s.	85391
	63		Wood & Cork Manufacturers	49469
	64		Paper, Paperboard & Manufactures	174605
	65		Textile Yarns, Fabrics, Made-Up Articles	97979
	66		Non-Metallic Minerals Mfrs., n.e.s.	110941
	67		Iron & Steel	198596
	68		Non-Ferrous Metals	172652 b/
	69		Manufactures of Metals, n.e.s.	131869
	6x		MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL, n.e.s.	114584
7			MACHINERY & TRANSPORT EQUIPMENT	54633
	81		Sanitary, Plumbing, Heating and Lighting Fixtures and Fittings	89508
	8x		Other MISC. MANUFACTURED ARTICLES	50071
9			COMMODITIES AND TRANSACTIONS NOT CLASSIFIED ACCORDING TO KIND	61783

Source: See Annex A. "x" in a number signifies a residual category. "n.e.s." = not elsewhere specified.

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a/ Coefficients are in Btu/US dollar except for 282 and 284 (Btu/metric ton) and 32, 331, and 34 (Btu/thousand MT).

b/ Further disaggregation advisable if trade dominated by copper (122 mil. Btu/MT), aluminum (203 mil. Btu/MT) or tin (38.8 mil. Btu/MT).

case four-digit level thus making it relatively simple to convert a country's 1967 exports and imports to their embodied energy content. (The coefficients could also be applied to other years once suitable price corrections had been made but, as already noted, this has not been done in the current study.)

Note in Table 1, that where energy commodities are shown their coefficients include only that energy used directly and indirectly in their production and not the direct energy content of the commodity itself. Note, too that while the energy coefficients for most commodities are in BTU/US dollar (in purchasers' values as opposed to the producers' values used for the original input-output table energy coefficients), physical measures are preferred for those traded goods where price variations can be expected to be large (scrap metal) or where trade is customarily reported in both physical and value units (coal, coke and briquettes; crude and partly refined petroleum; and natural and manufactured gas). Note finally, that categories indentified as especially energy-intensive, representing about one-fourth of all 2-digit classes (and one-fifth by value of all imported or exported commodities for the country sample of this paper), have been underlined in Table 1. Trade in these more energy-intensive commodities will be analyzed separately later in the paper.

For a preliminary look at the implications of the calculated energy coefficients, 1967 export and import data were collected for 39 countries. Country selection was determined by (a) data availability for (several propective countries such as Peru and Indonesia trade was not reported at that time in the Standard Industrial Trade Classification), (b) a desire for a rough balance between developed and developing countries, and (c) a desire to include both poorer and richer countries within the developing country group. No OPEC countries other than Nigeria were included, nor were any centrally planned economies, either more developed or less developed. The sample underrepresents smaller countries and poorer countries, especially those in Africa. No Caribbean, Central American or Middle Eastern oil exporting countries are included. Middle income countries are well represented and all higher income countries are included except for Iceland, Kuwait, and New Zealand. Table 2 lists the country sample and compares the distribution of sample per capita GDP with that of all non-Centrally Planned Economies.

Foreign trade data classified by the Standard Industrial Trade Classification are available for 82 countries in 1967 (UN, 1971). Thus the sample used for this study represents a little under one-half of the countries for which data are available. For some purposes the sample was further reduced by omitting Taiwan because Taiwan's total energy consumption, using the same UN source as for other countries, was only available as a residual item. 1/ The 39-country sample including Taiwan represented the following percentages of total world energy consumption and foreign trade, according to United Nations estimates and country classifications:

1/ Data for Taiwan were not separately published in United Nations (1976 but were apparently included in the "Far East, Developing" totals such as those shown on pages 78-79 of the UN source. Estimated data for Taiwan can be obtained, therefore, by subtracting published figures for the other Far Eastern countries from the regional total. Since it is possible that Taiwan, while certainly the largest, is not the only country included in the resulting residual, it was felt best not to use the Taiwan estimates in the multiple regression calculations performed later in this paper.

Table 2

Sample Countries Distributed by 1967 Per Capita GDP Compared with Distribution of All Non-Centrally Planned Countries

Per Capita GDP Range, 1967 in 1970 US dollars	Countries Included in Sample	Total Countries in GDP range	Sample as % of Total
$51 - 125	Ethiopia, India, Malawi Nigeria, Pakistan (incl. Bangladesh)	29	17%
126 - 309	Colombia, Egypt, Ghana, Ivory Coast, Rep. Korea, Philippines, Sri Lanka, Tunisia	26	31
310 - 762	Brazil, Malaysia, Mexico, Portugal, Taiwan, Turkey Yugoslavia	26	27
763 - 1878	Argentina, Chile, Finland Greece, Italy, Japan, Spain	16	44
1879 - 4628	Australia, Belgium-Luxemburg Canada, Denmark, France, Fed. Rep. Germany, Netherlands Norway, Sweden, Switzerland, United Kingdom, United States	15	80
Total	39	112	35

Note: Country totals include all countries in World Bank (1980), Series I, for which it was possible to compute 1967 per capita GDP in 1970 prices. GDPs were converted to US$ using the foreign exchange rates for 1970 from the same source. The range between the lowest per capita GDP country (Rwanda, $51) and the highest (Kuwait, $4628) was divided into five equal parts using a logarithmic scale to give the per capita GDP ranges shown in the first column.

Source: World Bank, World Tables (1980).

Table 3

39-Country Energy Subtotals as Per Cent of World Totals

Country Classification	Aggregate Consumption	Imports	Exports +Bunkers
Developed Countries	97%	97%	97%
Developing Countries	66	30	4
Centrally Planned Countries	0	0	0
All Countries	67	80	22

Source: United Nations (1976), Table 2.

II. Estimates of Embodied Energy in Foreign Trade

Estimating the embodied energy content of a country's exports and imports for 1967 is a straightforward matter of collecting the physical or value measures of trade, according to the classification shown in Table 1, multiplying each trade figure by the appropriate energy coefficient (also from Table 1), and aggregating. Detailed commodity data for the 39 country sample may be found in Annex B. Country totals for various classes of energy use are summarized in Annex C, and weighted subgroup means from several Annex C tables are summarized in Table 4 along with ratios showing the relative importance of embodied energy. (The subgroups are the same as those shown above in Table 2 except that the highest income subgroup has been further subdivided.) The subgroup per capita means from Table 4 are also shown in Figure 1.

The last column of Table 4 reveals that for the sample as a whole, the embodied energy content of imports was equivalent (under the assumptions of U.S. input-output technology, etc.) to about 40 percent of direct energy imports (line 8). For exports, average embodied energy exceeded direct energy exports (line 9; but recall that no major oil-exporting countries are included

Table 4

Various Measures of Energy Use, Weighted Subgroup Means,
by Income-Ranked Country Subgroups, 1967 a/

Line	Subgroup:	A	B	C	D	E	F	Sample Total
	Per Capita GDP (1970 US$)							
	Range:	$51-125	$126-309	$310-762	$763-1878	$1879-2948	$2949-4628	$51-4628
----	Weighted Mean:	$90	$212	$442	$1285	$2378	$4499	$1160
	Number countries:	5	8	7	7	9	3	39
	I. Energy Per Capita, in Kilograms Coal Equivalent/person							
1	Aggregate Consumption	119	369	674	2156	4351	9959	2267
	Direct Energy							
2	Imports	30	17	249	1770	2862	1383	819
3	Exports + Bunkers	38	125	82	346	750	656	258
	Energy Embodied in Foreign Trade b/							
4	Imports	23	108	138	415	1223	653	324
5	Exports	11	60	91	392	1222	662	307
	II. Ratios (Dimensionless except where indicated)							
	Embodied Energy Coefficients, Btu/US$							
6	Imports	98012	91240	100955	90358	94777	98218	95108
7	Exports	74273	72744	83859	100954	100078	90067	95553
	Embodied Energy/Direct Energy							
8	Imports	.763	.633	.555	.235	.427	.472	.395
9	Exports	.300	.482	1.099	1.133	1.630	1.009	1.195
	Embodied Energy/Total Consumption							
10	Imports	.192	.292	.205	.193	.281	.066	.143
11	Exports	.096	.163	.134	.182	.281	.067	.136
	Energy Embodied in Energy-Intensive Materials/Total Embodied Energy							
12	Imports	.533	.491	.554	.496	514	.519	.514
13	Exports	.127	.156	.305	.512	.525	.457	.484
	Energy Embodied in Non-Petroleum Energy-Intensive Materials/Total Embodied Energy							
14	Imports	.443	.380	.432	.383	.373	.339	.371
15	Exports	.084	.063	.209	.384	.419	.416	.394

Source: Annex C.

a/ The per capita GDP range for all countries in 1967 (in logarithms, 1970 US$) was divided into quintiles and the highest quintile group was subdivided into deciles to give the subgroup ranges. "Weighted subgroup means" equal the sum of total subgroup value divided by total subgroup population.

b/ Energy directly and indirectly consumed in the production of traded commodities, assuming 1967 United States technology and industrial structure. Excludes direct energy content of directly traded fuel or power but includes energy used to produce this fuel and power.

in the sample). The sample of countries in 1967 imported and exported embodied energy in amounts equal to about one-seventh of their total aggregate commercial energy consumption (lines 10 and 11). The commodity groups identified as energy-intensive accounted for about one-half of the embodied energy total (lines 12, 13).

Judging by the six sub-group means, there was a pronounced increase with higher per capita GDP of total energy consumption. This was also true for both direct and indirect imports <u>and</u> exports of energy. (Table 2, lines 1-5, and Figure 1.) The relationship with per capita GDP is strongly log-linear for per capita total energy use. Per capita energy imports in turn become strongly log linear (except for the influence of the United States on subgroup F) when embodied energy imports are added to direct energy imports, as can be seen from Figure 2. Thus when direct imports are relatively low, as is the case with subgroup B, embodied imports are high. Subgroup D is an example of the opposite tendency.

The estimated <u>average</u> energy content of imports, measured in Btu/US$ (1967 prices), shows no particular relationship to per capita GDP, judging by the subgroup means in Table 4 (line 6). Commodity imports by all country groups, in other words, contain roughly similar amounts of energy per unit of value. This is also true for that proportion of total embodied energy imports represented by the more energy-intensive commodity groups including petroleum processing (line 12). For exports, in contrast, there is a pronounced tendency for both the energy content and the proportion of energy-intensive commodities to increase as per capita GDP rises and then to level off and perhaps drop among the higher-income countries of the sample (lines 7, 13).

Figure 1

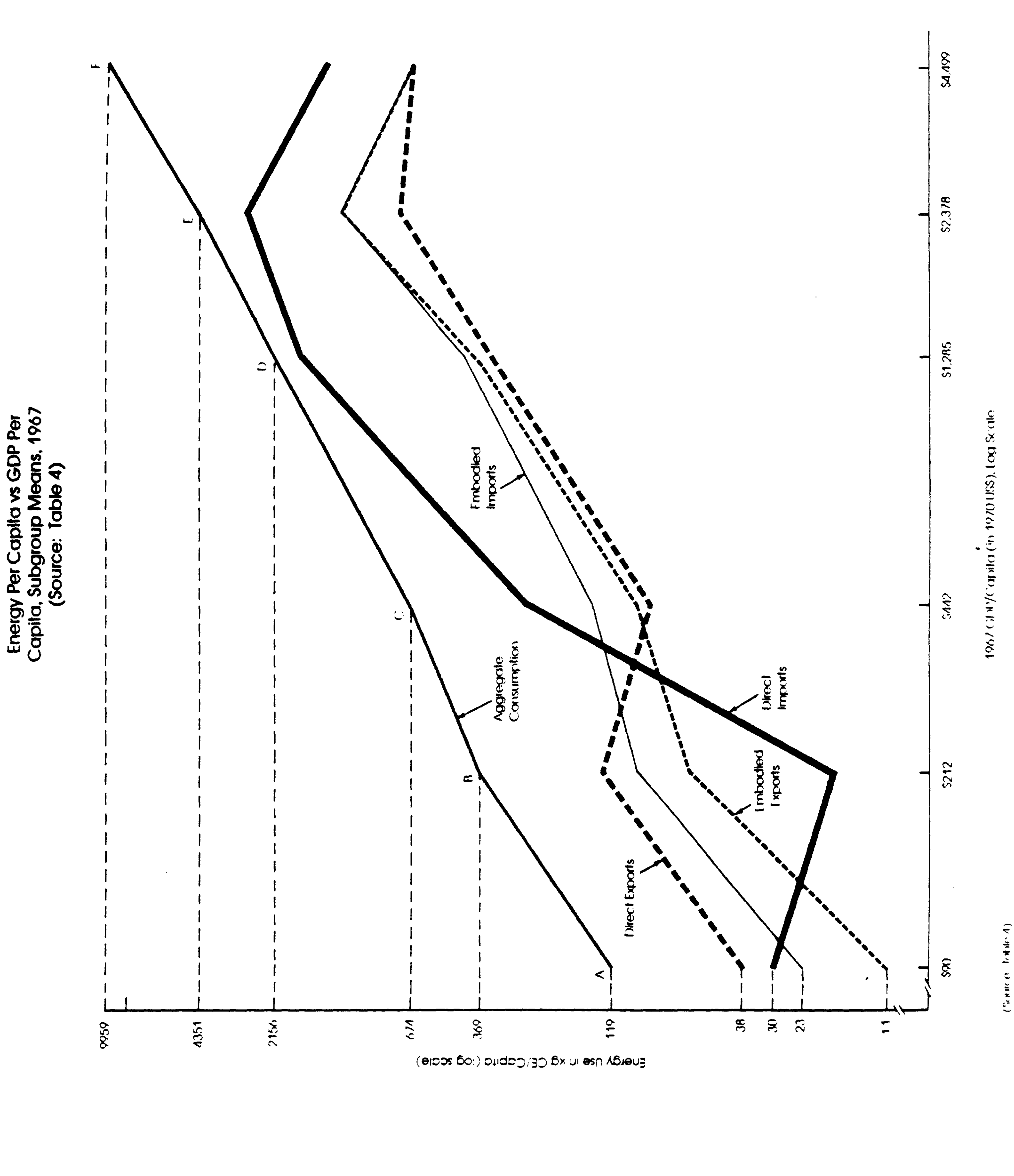
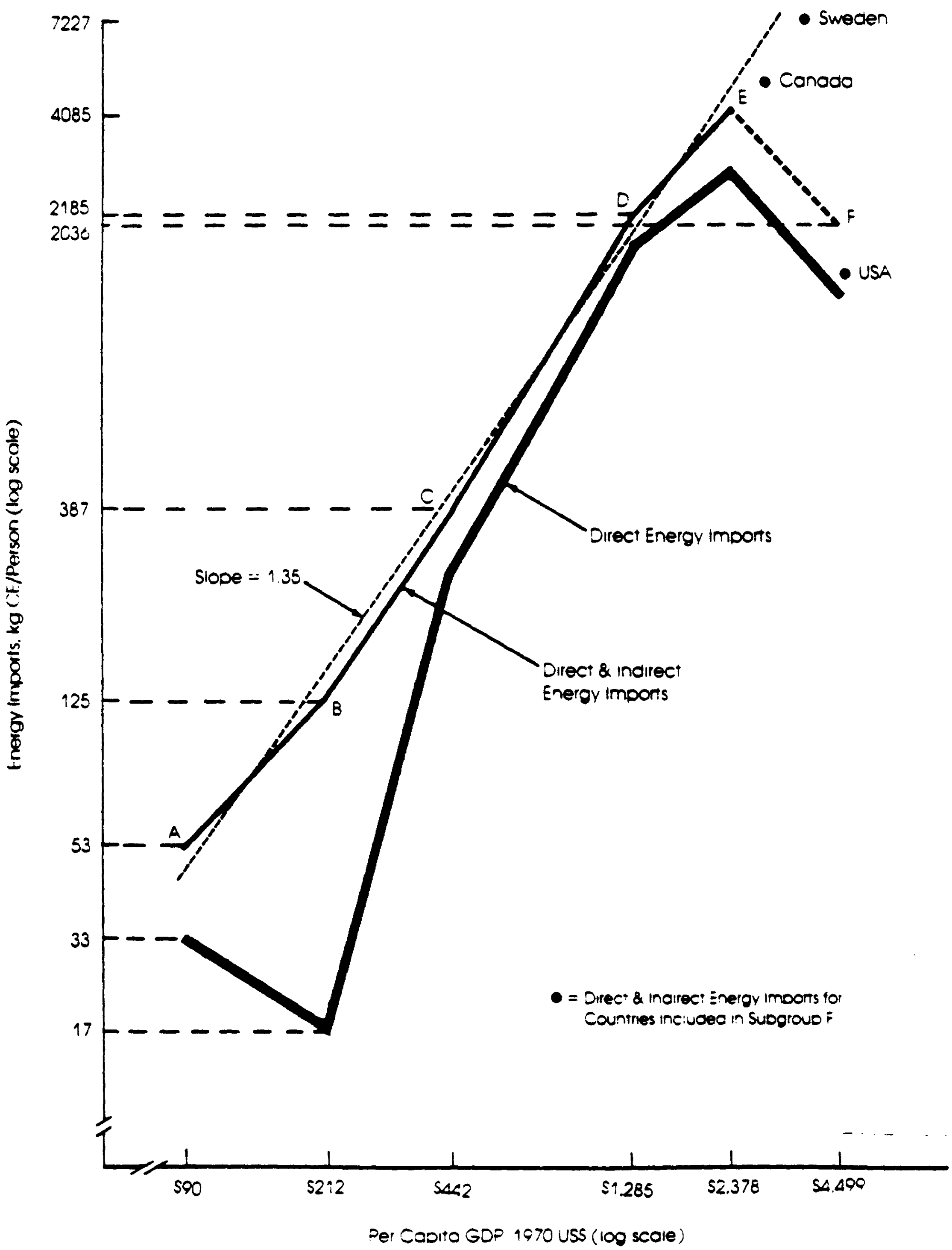

Energy Per Capita vs GDP Per Capita, Subgroup Means, 1967
(Source: Table 4)
Aggregate Consumption
Direct Imports
Direct Exports
Embodied Imports
Embodied Exports
A
B
C
D
E
F
9959
4351
2156
674
369
119
38
30
23
11
Energy Use in kg CE/Capita (log scale)
$90
$212
$442
$1,285
$2,378
$4,499

Figure 2

Total Direct and Direct and Indirect Energy Imports Per Capita vs GDP Per Capita, Subgroup Means, 1967 (Source: Table 4, Annex Tables C-2 and C-3)



(Source Table 4 Annex Tables C-2 and C-3)

This continues to be true when petroleum products are excluded from the exports of energy-intensive materials (line 15).

Finally, it may be noted that for the developing countries of the sample, as defined for Table 3, above, embodied energy imports were estimated as equal to about 61 percent of direct energy imports. The comparable percentage for the more developed countries was 38 percent. When the sample's underrepresentation of developing countries is taken into account, it would appear that the 1967 "hidden world trade" in energy may have been as much as 42 percent of the direct world trade in fuel and power.

III. Patterns of Direct and Direct-plus-Indirect Energy Use

The estimates of embodied energy magnitudes suggest that the totals are indeed large and that there often appears to be a rough correlation with gross domestic product--at least when subgroups of sample countries are examined. What is the implication of these findings for our general notions of how aggregate energy use varies among countries at different levels of development? Clearly, if a country chooses to import energy indirectly in the form of non-energy goods and services, and if exports needed to pay for imports are less energy-intensive, then there will be net imports of embodied energy. That country's aggregate energy consumption, when based on directly measured energy imports and exports, will be understated. The relative magnitude of this understatement has already been suggested in Figure 1 by the gap between the lines representing embodied imports and exports.

The relationship between energy consumption and a country's GDP and other structural factors may be investigated in a more precise fashion using cross-country multiple regression analysis and an estimating equation or model of the following general form:

$$LENA = a + b1\ LGDP + bi\ Xi + u \qquad (1)$$

where: L- as a suffix denotes natural logarithm

ENA = Commercial energy consumption <u>per capita</u>, from UN (1976), with primary electricity adjusted to its thermal plant equivalent

GDP = Gross domestic product per capita in 1970 US dollars, from World Bank (1980) and World Bank computer dates of early 1982

Xi = other structural and climatic variables, including:

LGDPSQ = LGDP x LGDP

POP = country population, in millions (World Bank 1980)

TMPI = winter temperature index with upper (arbitrary) limit of 1.0; equals mean of three coldest months (long-term averages) for cities, weighted where possible by provincial population, and divided by 60-degree Fahrenheit (author's estimates)

u = residual error, normally distributed, mean zero

A series of standard cross-country estimating equations are shown in Table 5 for the year 1967 and for the present sample (from which Taiwan has been excluded because of uncertainty about the accuracy of its estimated energy, as noted above). The respresentativeness of the 1967 equations for ENA may be judged by comparing equations 5.1-5.3 with similar equations for a larger and more representative sample of 59 countries shown at the bottom of the table. Table 5 also includes estimates based upon an alternative measure of per capita GDP, measured in constant international price rather than each country's own prices. The significance of the results based upon these so-called Kravis-dollar GDP estimates will be discussed below.

The principal conclusions drawn from Table 5 may be summarized as follows:

- The overall statistical fit of all equations is quite good.

- The additional variables LGDPSQ, LPOP, and LTMPI generally improve the explanatory power of the equations.

- The 1967, 38-country results closely parallel those for the two later periods employing 59-country sample.

- When net embodied energy (= EMBM - EMBX, where -M, and -X denotes imports and exports, respectively, as shown in Table 4, lines 4 and 5) is added to total commercial energy (ENA) to give the new variable, END, the chief differences with the ENA equations are:

i. a slight improvement in statistical fit

ii. a slight decrease in the significance of LGDPSQ and LPOP

iii. a reduction in the coefficient of LGDP, the income elasticity of demand

The magnitude and sign of the GDP effect has already been suggested by Table 4 and Figure 1 where it can be seen that net embodied energy imports are largest for the lowest income countries and decrease to about zero at higher income levels. Adding these net imports to directly measured energy consumption will therefore tend to flatten the slope when plotted against GDP (that is, decrease the income coefficient). Since net embodied imports, as measured for this study, are relatively small for most countries, the effect of their inclusion on income elasticity will be relatively small. 1/

Since the income elasticity of demand for aggregate energy is of some interest, three additional points should be made. First, the per capita income (GDP) elasticities shown in Table 5 are not the same as total energy/GDP elasticities. The per capita measures will be greater than the total measures as long as the growth rate of aggregate energy use exceeds the growth rate of GDP (Strout, 1983). Second, a significant quadratic term, LGDPSQ, means that the relationship of energy use with per capita GDP is not log-linear, and that the elasticity changes with income (falling as income increases if the signs are as shown in Table 5). For any per capita GDP level, the elasticity (n) equals:

$$n = b1 + 2\ b2\ LGDP(2)$$

where b1 = coefficient of LGDP

b2 = coefficient of LGDPSQ

This equation tells us that the theoretical per capita GDP beyond which per capita energy use would no longer grow (i.e., when elasticity, n, would equal zero) would be $43,462 in the case of ENA and equation 5.3 versus $1,064,906 in the case of END and equation 5.6.

The third point, however, is that the elasticities from cross-country equations using normal GDP measures (that is, derived using either official or equilibrium exchange rates and GDP measured in domestic prices) are not appropriate for the normal type of longer-run projections. This is because

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1/ If, as is likely, the energy used by poorer countries to produce their exports is lower than for the US, then our measure of net embodied energy imports will be understated as will the affect on the estimated income electricity.

Table 5

Estimating Equations for Per Capita Consumption of Commercial Energy (ENA) and Commercial Energy-Plus-Net-Embodied-Energy-Imports (END), 1967, in BPDOE/1000 Persons

[Suffix L- denotes natural logarithms]

Equation No.	Dependent Variable	Number of countries	Equation Fit: R-sq. (Adj R-sq'd)	Equation Fit: SEE	Coefficients of Independent Variables (t-ratios in parentheses): Intercept	LGDP	LGDPSQ	LPOP	LTMPI
5.1	LENA	38	.952	.369	-5.6103	1.2565			
			(.951)		(18.092)	(26.757)			
5.2	LENA	38	.956	.359	-5.2097	1.1730			-.4885
			(.953)		(13.678)	(17.611)			(1.725)
5.3	LENA	38	.971	.301	-11.341	2.7906	-.1306	.1253	-.8264
			(.967)		(7.079)	(5.865)	(3.422)	(2.862)	(3.276)
5.4	LEND	38	.959	.318	-4.9567	1.1728			
			(.958)		(18.548)	(28.982)			
5.5	LEND	38	.965	.299	-4.4998	1.0775			-.5572
			(.963)		(14.169)	(19.404)			(2.360)
5.6	LEND	38	.970	.281	-8.0800	2.0510	-.0757	.0753	-.7550
			(.96t)		(5.403)	(4.356)	(2.124)	(1.842)	(3.205)
SIMILAR EQUATIONS Except that Kravis-dollar GDP Measures (KGDP) Replace GDP									
						LKGDP			
5.7	LENA	37**	.961	.337	-10.441	1.7397			
			(.960)		(23.484)	(29.383)			
5.8	LENA	37**	.967	.316	-9.5906	1.6030			-.5941
			(.965)		(17.604)	(20.256)			(2.421)
5.9	LENA	37**	.970	.302	-10.484	1.6024		.0884	-.6625
			(.968)		(15.463)	(21.188)		(2.057)	(2.798)
5.10	LEND	37**	.963	.304	-9.4373	1.6204			
			(.962)		(23.527)	(30.329)			
5.11	LEND	37**	.972	.271	-8.4767	1.4657			-.6712
			(.970)		(18.159)	(21.614)			(3.193)
5.12	LEND	37**	.973	.267	-8.9983	1.4653		.0516	-.7112
			(.971)		(14.983)	(21.873)		(1.356*)	(3.391)
1969/1971 EQUATIONS, Larger and More Representative Sample (See Strout, 1983)									
						LGDP	LGDPSQ		
5.13	LENA	59	.947	.379	-5.4749	1.2397			
			(.946)		(21.767)	(31.748)			
5.14	LENA	59	.949	.375	-5.2079	1.1849			-.3660
			(.947)		(17.122)	(22.460)			(1.524*
5.15	LENA	59	.960	.336	-9.5984	2.5049	-.1056	.1335	-.6172
			(.957)		(7.040)	(5.750)	(2.996)	(3.288)	(2.595)
1976/78 EQUATION (See Strout, 1983, Annex Table 3)									
5.16	LENA	59	.961	.332	-10.062	2.6921	-.1204	.1081	-.5886
			(.958)		(7.807)	(6.618)	(3.699)	(2.733)	(2.429)

*NOT significant at 95% level of probability.
**Excludes Yugoslavia as well as Taiwan for lack of Kravis-dollar GDP estimates.

GDP growth projections ordinarily assume constant prices and not the gradually changing relative prices which in fact seem to occur during economic development and which are fully reflected in the nominal GDP measures. The Kravis measures, in contrast, assume a set of constant prices for all countries in all years, and estimating equations such as 5.7.12 in Table 5 are hence conceptually to be preferred for longer-run projections (Strout, 1983).

The implication of this final point is that, for GDP as normally projected under the implicit assumption of constant base-year prices, income elasticities of demand as derived from the historical evidence of cross-country data are very much greater than 1.0. When the additional energy needs of larger populations are allowed for, as in equations 5.9 and 5.12, the elasticity for ENA alone is about 1.60 and that for ENA plus net embodied energy, END, is 1.46. Note that in no cases was a quadratic term, LKGDP x LKGDP, statistically significant for the Kravis-dollar estimating equations. This suggests, again based upon the historical evidence and ignoring the consumption-dampening effect of higher energy prices, that per capita elasticity response of aggregate energy use to GDP could not in fact be expected to be decrease at higher income levels.

Note, finally, that while equations 5.9 and 5.12 are reasonably good for projection purposes, they could be improved upon if independent information were available on such structural factors as a country's production of energy-intensive materials, refined petroleum products, etc. The incorporation of these latter variables has been reported to reduce to statistical insignificance the effects of population and "winter temperature," suggesting that even the winter temperature variable probably reflects differences among countries in economic structure as well as climate (Strout 1983).

IV. Patterns of Direct and Indirect Trade in Energy

A similar approach and a similar set of equations can be employed, following the tradition of Chenery and Syrquin (1975), to investigate inter-country patterns of trade in energy and energy-consuming commodities. While direct exports of energy will be primarily affected by resource-related variables, direct energy imports and the imports and exports of embodied energy may be primarily determined by a country's per capita GDP and population.

Table 6 presents statistical data for the same 38 countries analyzed in Table 5 (except that in the case of energy-intensive materials exports, Ethiopia had to be omitted because it had no such exports). The additional variables used in Table 6 are defined as follows (omitting the natural log prefix L-):

ENDM	=	directly observed energy imports per capita, UN (1976) and World Bank (1980) for population
EMBM	=	energy embodied in total country commodity imports, per capita, from Annex Table C-1, col (9)
EMBX	=	energy embodied in total commodity exports, per capita, from Annex C
EIMM	=	energy embodied in imports of those more energy-intensive commodities identified in Table 1, per capita, from Annex Table C-4

EIMX	=	energy embodied in exports of more energy intensive commodities per capita (see Table 1 and Annex Table C-4)
MV	=	total commodity imports per capita, in 1967 US$/capita, from Annex Table C-3
ENP	=	total primary energy production per capita, from UN (1976)
CVAL	=	value of crop production per capita, 1965, based upon all crops reported on FAO commodity tapes (see FAO, 1979), and expressed in metric tons of cereal equivalents by dividing total crop value in domestic prices by the weighted domestic price of cereal crop production (See Strout 1979).

All energy variables are expressed in BPDOE/1000 persons. GDP, LGDPSQ, POP, and LTMPI are the same as in Table 5.

While all of the foreign trade variables shown in Table 6 are highly correlated with GDP, the best overall statistical fits are found for embodied imports and exports, energy-intensive commodity imports, and total commodity imports in dollar values per capita. A negative population size effect is significant in most cases. It reflects the fact, already well-established by Kuznets (1959), Chenery and Syrquin (1975), and others, that smaller countries must rely more than large countries on foreign trade for commodities where domestic production is restricted by limited domestic market size. (See, for example, the equation found for per capita total imports in U.S. dollars, MV, shown at the bottom of Table 6.)

Table 6

Estimating Equations for Direct Energy Imports Per Capita (ENDM), for Per Capita Imports and Exports of Energy Embodied in All Traded Commonidies (EMBM, EMBX) and of Energy-Intensive Imported Commodities (EIMM) and Exported Commodities (EIMX), 1967, in BPDOE/1000 persons

[Suffix L- denotes natural logarithm]

Equation No.	Dependent Variable	Number of countries	Equation Fit: R-sq. (Adj R-sq'd)	Equation Fit: SEE	Coefficients of Independent Variables (t-ratios in parentheses): Intercept	LGDP	LGDPSQ	LPOP	LENP	LTMPI
6.1	LENDM	38	.760	.933	-6.3565	1.2668				
			(.753)		(8.104)	(10.665)				
6.2	LENDM	38	.776	.912	-4.1073	1.2394		-.2094		
			(.764)		(2.588)	(10.555)		(1.619*)		
6.3	LEMBM	38	.926	.401	-1.2024	.9709		-.3694		
			(.922)		(1.722)	(18.792)		(6.521)		
6.4	LEMBM	38	.932	.392	-.9162	.8860		-.3575		-.5056
			(.926)		(1.299)	(12.169)		(6.399)		(1.619*)
6.5	LEMBX	38	.918	.504	-2.9865	1.1785		-.3608		
			(.913)		(3.407)	(18.176)		(5.076)		
6.6	LEMBX	37**	.912	.505	-2.8347	1.1597		-.3625		
			(.906)		(3.177)	(17.081)		(5.090)		
6.7	LEIMM	38	.917	.428	-2.2767	.9812		-.3363		
			(.912)		(3.059)	(17.820)		(5.571)		
6.8	LEIMM	38	.923	.417	-3.4477	1.0990		-.2834	-.0872	
			(9.17)		(3.459)	(12.595)		(4.268)	(1.711)	
6.9	LEIMX	37**	.855	.989	-9.1271	1.8057		-.2961		
			(.847)		(5.218)	(13.567)		(2.121)		
6.10	LEIMX	37**	.866	.967	-17.488	4.3843	-.2006	-.2575		
			(.854)		(3.177)	(2.708)	(1.598*)	(1.857)		
6.11	LEIMX	37**	.860	.989	-7.5041	1.6450		-.3732	.1292	
			(.812)		(2.541)	(6.781)		(2.258)	(1.006*)	
Memorandum: All Commodity Imports Per capita, in 1967 US$/person (MV)										
6.12	LMV	38	.932	.387	1.6545	.9799		-.3566		
			(.928)		(2.459)	(19.685)		(6.534)		

*NOT significant at 95% level of probability.

**37-country sample excludes Ethiopia (since EIMX=zero) in additin to Taiwan.

The effect of winter temperature, as might be expected, is weak although of marginal significance in the case of embodied energy imports where it probably picks up some differences among countries in their economic structures. The quadratic GDP term is nowhere significant. Per capita production of primary energy, on the other hand, has a slight negative relationship with the import of energy-intensive materials and a weak positive relationship with exports of these same goods.

What is most striking about the results of Table 6 are the variations in the GDP coefficients (the income elasticities). The income elasticity of demand for total imports in both value and embodied energy terms is very close to 1.0 although it rises to 1.17 for energy-intensive imports. For energy-intensive exports, in contrast, the per capita GDP coefficient is quite high, about 1.81 when population effects are allowed for (eq. 6.11). The equations confirm the Figure 1 message that a country's exports of energy-intensive materials (EIMX) are on the average much smaller that imports of energy-intensive materials (EIMM) at low levels of per capita GDP. With a 10 million population and a per capita GDP of US$200 (in 1970 prices), equations 6.7 and 6.9, for example, suggest that the average ratio of EIMX/EIMM would be a quite low 0.12. The ratio would not reach 0.50 until a GDP level of about $1117 per capita, and the country's exports of energy-intensive materials would not equal its imports (in energy equivalent) until the per capita GDP rose to $2590. (With a larger population, this final "cross-over" point might be a few hundred dollars less.)

Almost all developing countries can be expected to be net importers of embodied energy, and the vast bulk of the net embodied energy imports will be represented by the difference between imports and exports of the more energy-intensive commodities.

What more, if anything, can be said about the observed export pattern for the more energy-intensive materials? On the possibility that the statistical results of Table 6 may be affected by the inclusion of refined petroleum as an energy-intensive good, Table 7 shows similar results when petroleum products are excluded from the dependent variable. New variables introduced in this table are:

DLDC	=	a dummy variable equal to 1 when per capita GDP is less than US$1000 in 1967; 0 otherwise
LGDPLDC	=	LGDP x DLDC = LGDP when GDP < $1000; 0 otherwise
EIMNPM	=	non-petroleum energy-intensive materials, imports, in BPDOE/1000 persons
EIMNPX	=	non-petroleum energy-intensive materials, exports, in BPDOE/1000 persons

Tables 6 and 7 suggest that the cross-country pattern for imports (EIMM and EIMNPM) are quite similar except that any influence of per capita energy production (ENP) becomes smaller and statistically non-significant when petroleum products are excluded from energy-intensive imports. (Compare equations 6.8 and 7.2.)

For exports of energy-intensive materials other than refined petroleum, on the other hand, the "small country" effect becomes more pronounced, and the inclusion of measures of natural resource endowment can provide additional explanatory power. Equation 7.5 suggests, for example, that a country will tend to export more non-petroleum energy-intensive materials the more primary energy it itself produces (ENP). A relative

Table 7

Estimating Equations for Energy Embodied in Traded Energy-Intensive Commodities Other than Refined Petroleum Products (EIMNPM and EIMNPX for Imports and Exports, Respectively, Measured in BPDOE/1000 persons), 1967

[Suffix L- denotes natural logarithm]

Equation No.	Depend. Variable	Number of countries**	Equation Fit: R-sq. (Adj R-sq'd)	Equation Fit: SEE	Coefficients of Independent Variables (t-ratios in parentheses): Intercept	DLDC	LGDP	LGDPSQ	LGDPLDC	LPOP	LENP	LCVAL
7.1	LEIMNPM	38	.921	.413	-3.3183		.9943			-.2730		
			(.916)		(4.622)		(18.721)			(4.688)		
7.2	LEIMNPM	38	.921	.417	-3.7088		1.0336			-.2554	-.0291	
			(.914)		(3.719)		(11.840)			(3.844)	(0.570*)	
7.3	LEIMNPX	37	.894	.916	-10.518		2.0009			-.3304		
			(.888)		(6.492)		(16.229)			(2.555)		
7.4	LEIMNPX	37	.903	.903	-8.0854		1.7601			-.4454	.1937	
			(.894)		(3.764)		(9.378)			(3.102)	(1.671*)	
7.5	LEIMNPX	37	.924	.802	-9.2607		1.9056			-.4491	.1973	-.8236
			(.914)		(4.704)		(10.865)			(3.479)	(1.895)	(2.989)
7.6	LEIMNPX	37	.929	.789	-15.635		3.8310	-.1483		-.4120	.1829	-.8342
			(.917)		(3.238)		(2.843)	(1.441*)		(3.180)	(1.777)	(3.077)
7.7	LEIMNPX	37	.928	.792	5.8504	-14.792			1.9204	-.4801	.2370	-.5728
			(.916)		(4.966)	(8.224)			(6.725)	(3.736)	(2.352)	(2.061)
7.8	LEIMNPX	36	.944	.696	-17.152		4.7366	-.2156		-.5609	.1950	-.7256
			(.934)		(4.000)		(3.872)	(2.311)		(4.531)	(2.146)	(3.002)
7.9	LEIMNPX	36	.943	.698	7.3385	-15.586			2.0484	-.6315	.2446	-.4890
			(.934)		(6.432)	(9.710)			(8.035)	(5.132)	(2.754)	(1.985)

*NOT significant at 95% level of probability.
**37-country sample excludes Ethiopia (since EIMX and EIMNPX = 0) as well as Taiwan.
36-country sample excludes Taiwan, Ethiopia, and India.

abundance of domestic energy sources, in other words, is associated with increased exports of the non-petroleum energy-intensive commodities.

On the other hand, when a country's output of agricultural crops per capita (CVAL) is high, agricultural exports may reduce the need to export other commodities. There thus appears to be a strong and significant negative association between EIMNPX and CVAL when other factors are held constant. (Interestingly, a similar, significant association was not found between EIMNPX and per capita agricultural GDP in nomial US dollars. In this latter case, a positive association between crop prices and per capita GDP as well as the inclusion of forestry products may obscure the expected relationship.) The introduction of measures reflecting relative endowment of metal ores and of forest products would undoubtedly lead to further improvements in the equations' goodness-of-fits and would help reduce large underestimations of EIMNPX in the cases of Chile (copper), Malaysia (tin), Canada (nonferrous metals, pulp, and paper), and Sweden (forest products and metals).

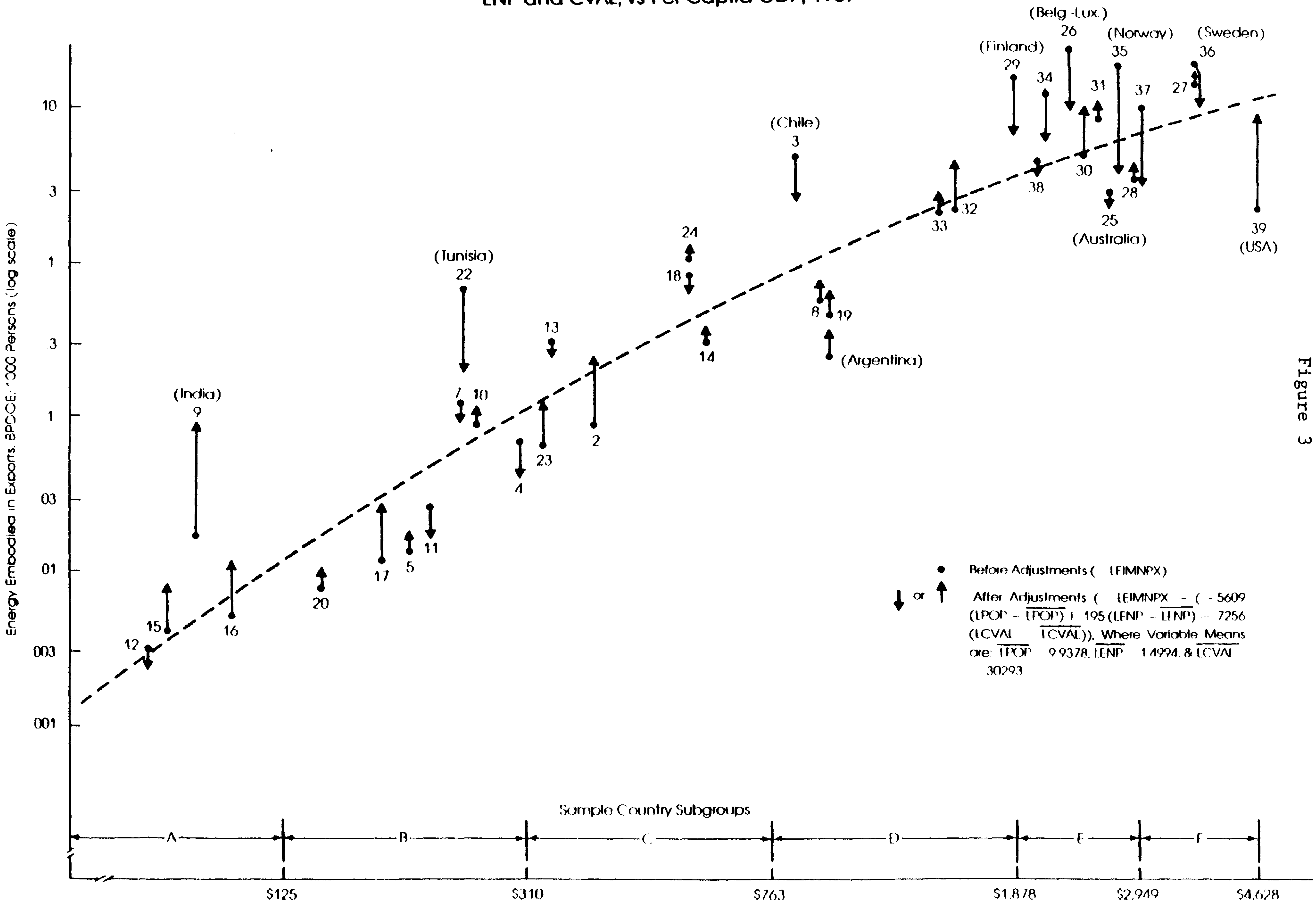
The tendency towards decreasing income elasticities of demand at higher levels of per capita GDP, suggested in Table 5 by negative coefficients for the quadratic term, LGDPSQ, is also present for the <u>production</u> of non-petroleum energy intensive materials (see equation 7.6.). This tendency can also be seen when dummy intercept and slope variables (DLDC, LGDPLDC) are introduced for all "less developed countries," defined for the present purposes as having less than US$1000 per capita GDP in 1967 and thus including the European countries Greece, Portugal, Spain and Yugoslavia (see Annex Table C-3). When this is done, as in equation 7.7, the "LDC" elasticity, denoted by the coefficient for LGDPLDC, becomes a quite high 1.92, that for the higher-income countries is not significantly different from zero (and thus not shown in Table 7), and all other coefficients are statistically significant.

Inspection of the residuals from equations 7.6 and 7.7 reveals that India has an anomalous position as an unusually large exporter of energy-intensive materials (largely iron and steel products) for a country of such low per capita income (US$90 in 1967, in 1970 prices). This probably reflects India's well-documented heavy industry strategy of development. Although the relative differences from the cross-country "norm" are large, the absolute numbers are small, and thus small absolute changes in India's exports, as could be expected from year to year, could affect the regression equations quite sharply. This is particularly true since as already noted (Table 2) the sample has relatively few countries of less than $125 per capita. Removing India from the sample, as has been done in equations 7.8 and 7.9, greatly improves the normality of the distribution of country residuals at the low end of the per capita GDP scale. These latter equations may thus provide a truer indication of India's actual deviation from a low-income, cross-country norm. (Note that the chief differences seen when India is excluded from the sample are a greater tendency towards a curvilinear per capita GDP response, a larger country-size effect, a small increase in the domestic energy production effect, and a small decrease in the negative production response associated with greater agricultural crop production.)

Figure 3 shows the 1967 pattern of non-petroleum energy intensive materials exports as a function of GDP per capita, based upon the log-quadratic equation, 7.8. The small circles indicate the observed values of per capita exports, and the arrows show the magnitude and direction of change associated with differences from the sample mean of each country's population size and per capita production of primary energy and of agricultural crops. A full listing of country names and numbers may be found in Annex Table C-1.

Figure 3

Per Capita Exports of Non-Petroleum Energy Intensive Materials, Before and After Adjusting for Estimated Effects of POP, ENP and CVAL, vs Per Capita GDP, 1967



The initially anomalous positions of India (9), Tunisia (22), Argentina (1), Chile (3), Finland (29), Belgium-Luxemburg (26), and the U.S.A. (39) are seen clearly in Figure 3. In all cases but India, corrections for country size and energy and crop production bring estimated energy-intensive materials production closer to the norm described by equation 7.8. For India, in contrast, the country's much larger-than-average population size would suggest less of a need to export these materials, and therefore the population-size "correction" moves India's estimated exports sharply away from the norm rather than closer to it.

The conclusion of this section must be, therefore, that while per capita exports (and presumably domestic production) of non-petroleum energy-intensive materials, vary considerably from country to country, most (93-94%) of this variation can be statistically explained by a relatively few factors. Chief of these is per capita GDP, although the effect of this variable decreases (in equation 7.9 it very significantly decreases) among the more developed nations. Large countries tend to export fewer of these energy-intensive commodities than do smaller countries, a tendency that is true for both total exports and total imports. The tendency reflects an increased self-sufficiency in domestically manufactured commodities as internal markets (in this case measured by population size) become larger.

Another factor associated with a tendency to export energy intensive materials, as suggested by theories of comparative advantage, is a country's own relative abundance of energy. The quantitative significance of this factor, however, is small. A similar effect, although this has not been explicitly tested, undoubtedly is produced by favorable resource situations with respect to forest products and minerals. In contrast, a relative abundance of agricultural crops is apparently associated with smaller exports of energy-intensive materials, other factors being the same.

V. Conclusions

Returning to the first of the four questions posed at the beginning of this paper, it seems abundantly clear that the embodied or hidden world trade in energy is equivalent to a sizeable fraction of the directly observed world trade in energy. The use of 1967 United States input-output coefficients suggests that the embodied-to-direct ratio may have been something over 40 per cent in 1967. The use of non-USA coefficients would probably reduce this ratio but probably by no more than one-fourth or so. A sizeable fraction, perhaps one-half, of this embodied energy trade is represented by a minority of commodities (21% of total imports, by value, in our 39-country sample) identified as especially energy-intensive. These are largely the primary metals, synthetic rubber, industrial chemicals including fertilizer, pulp and paper, and refined petroleum products.

With respect to the second question posed, the gap between embodied energy imports and embodied energy exports represents a small but significant omission in accounting for a country's total energy consumption, especially at lower levels of GDP per capita. Most of the import-export gap is represented by the previously-identified energy-intensive commodities. Inclusion of this missing energy in cross-country equations of energy demand would have a tendency to lower average income elasticities and to reduce the apparent decrease in these elasticities as country incomes arise.

Commodity trade among countries, as has already has been established by other authors, is determined largely by a country's need for imports as per capita GDP grows and by a country's ability to produce domestically a diversified assortment of goods. In cross-country models these factors are reflected in positive coefficients, usually 1.0 or greater, for per capital GDP in nominal dollars, and negative coefficients of less than one for the population measure of internal market size. These factors are also the principal determinants of international trade in embodied energy, whether measured by total commodities or by trade in the more energy-intensive commodities. The GDP and population coefficients, furthermore, are very similar in magnitude for all imported commodities, measured in dollars, and for embodied energy imports measured in energy-equivalents whether representing total traded commodities or only the more energy-intensive commodities (both with and without refined petroleum products).

The trade in embodied energy exports is another matter. As already noted, the so-called energy intensive commodities, mostly products of "heavy" manufacturing, account for much of the energy total although by dollar value they represent only one-fifth of all exports. These energy-intensive commodity exports from developing countries have a relatively high GDP elasticity, especially at lower levels of per capita GDP. For richer countries in contrast, the GDP coefficient is much lower and possibly approaches zero. A country's exports of non-petroleum energy-intensive goods, furthermore, appear far more sensitive to domestic market size in the country of origin, as measured by country population, than do imports.

Finally, conventional notions of comparative advantage in international trade are confirmed by positive associations between non-petroleum energy-intensive exports and a country's own primary energy production and also, by inference, with a country's relative abundance of forest products (pulp and paper) and metal mining (primary metals). On the other hand, countries with unusually high domestic production of agricultural crops and hence, presumable, a possible comparative advantage in agriculture, exported in 1967, other things being equal, decidely smaller quantities per capita of these same energy-intensive commodities.

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ANNEX A

Estimating 1967 Embodied Energy Coefficients for the Standard International Trade Classification (SITC)

(Note: The calculations shown in this Annex occasionally differ in minor details from the preliminary draft of the main text, especially Table 1, dated February 11, 1984.)

The embodied ("direct-plus-indirect") energy coefficients used for this study come from the inverse of a 368-order United States input-output table for 1967 (Herendeen and Bullard, 1974). A list of the input-output sectors and definitions in terms of the U.S. Standard Industrial Classification (SIC) can be found in U.S. Department of Commerce (1974). This annex deals with the problems (a) of classifying the 368 I-O sectors in terms of the commodity classification system in which most international trade data are reported, namely the Standard International Trade Classification or SITC, (b) of choosing a modified arrangement of the SITC for analyzing the embodied energy contained in international trade, and (c) of estimating weighted embodied energy coefficients for the chosen modified SITC system.

International trade flows are almost always reported in value (US dollar) terms at the 2-digit classification level, and more important flows for a particular country may also be reported, sometimes in quantity terms, at the 3-digit SITC level (UN, 1971). For analyzing international flows of embodied energy, it would be advantageous to chose a trade classification system that was as simple as possible. That is, the modified system should consist of the fewest sectors possible for which subsectors are relatively homogeneous with respect to their embodied energy content. 1-digit sectors, of which there are 10 in the SITC, would be most preferable. When 1-digit sectors contain non-homogeneous 2-digit sectors, combinations of the latter would have to be employed. Occasionally, when non-homogeneity of embodied energy was a problem at the 2-digit level, 3-digit or even 4-digit sectors might have to be used, but only when the trade represented was "substantial" and was generally reported at the 3- or 4-digit level in the published United Nations Commodity Trade Statistics.

Once a reduced form of the SITC has been determined, average embodied energy coefficients in BTU/US dollar or (occasionally) in BTU/unit of quantity could be estimated for each new sector. Since the objective was to estimate embodied energy flows assuming United States technology and industrial structure in 1967, it seemed logical to use 1967 U.S. exports as weights. To the extent that commodities within a sector are relatively similar with respect to their embodied energy content, the choice of weights will of course be irrelevant.

Bridging the Gap Between the I-O and the SITC

The first job was to make a rough cross-classification or "bridge" between the 368-sector I-O classification and the SITC. Despite the fact that the U.S. exports from the U.S. foreign trade sources had been classified by I-O sectors in the 1967 input-output table, it turned out that no bridge yet existed between the I-O sectors and the Standard Indusrial Trade Classification. It was necessary, therefore, to work slowly and carefully from the SIC definitions of each I-O sector to the SITC definition, with help along the way from the U.S. Standard Industrial Classification Manual (U.S. Tech. Comm. on Industrial Classification, 1967) and the very detailed (over 2600 items) bridge between the U.S. Schedule B commodities (identical to the SITC coding at the 1-, 2-, and 3-digit levels) and the SIC categories shown in Sections 1 and 3 of U.S. Bureau of the Census (1967).

It was found that 172 of the 368 I-0 sectors were included relatively unambiguously in individual 2-digit SITC sectors and that another 60 sectors represented non-exported construction or service. (In addition, six I-0 sectors without U.S. exports in 1967 could not readily be assigned to any SITC category and were thus omitted from the final classification bridge. These were 14.30, manufactured ice; 20.08, wood preserving; 36.12, ready-mix concrete; 42.04, coating and engraving; 49.04, industrial patterns; and 64.10, mortician's goods.) The final group of 130 I-0 sectors produced commodities belonging to two or more 2-digit SITC sectors. Some way had to be found, therefore, for "splitting" the I-0 sector exports among several SITC sectors, unless, of course, all of the SITC 2-digit sectors fell within a single 1-digit sector and the latter was a part of the modified SITC system ultimately chosen.

After preparing the first rough classification bridge it became apparent that only three or four of the ten 1-digit SITC sectors were reasonably homogenous with respect to the embodied energy coefficients (in BTU/US$) of their included I-0 sectors. It was decided, therefore, to proceed with splitting all relevant I-0 sectors without worrying about whether or not all of the split portions happened to end up in one of the four 1-digit SITC sectors in question.

Distributing I-0 Exports Among 2 or more SITC 2-Digit Sectors

Table A-1 lists the 130 I-0 sectors whose commodity exports did not fall neatly into a single 2-digit SITC category. Shown next to each I-0 sectors are the 2-digit SITC sectors which conceivably might contain exports from the I-0 sector. The "preliminary distribution factors of exports to SITC numbers" equal the "export weights used for SITC distribution factors" divided by the sum of these same export weights (shown in the final column of Table a-1). The "export weights," in turn, are equal to the total reported exports for the SITC group in question minus the amount contributed by I-0 sectors which do not require splitting. The order followed on each line for the preliminary distribution factors and for the export weights is the same as that shown in the column labeled "2-digit SITC Sectors."

Since the purpose of distributing the I-0 exports among these several SITC sectors was to provide weights for obtaining an average embodied energy coefficient and since, hopefully, the precise weight would make little difference to the average coefficient, the following distribution (or "splitting") rules were adopted:

1. Distribute the I-0 exports in question in proportion to that part of the recorded 2-digit SITC exports not already accounted for by exports from I-0 sectors which did not require splitting. (This is the step shown in Table A-1.)

2. Add up the resulting I-0 contributions, both split and non-split, to each 2-digit SITC sector and

compare with the reported U.S. exports under that SITC designation in 1967.

3. Make a proportional adjustment to the split I-0 contributions to each 2-digit SITC sector in question so that the total of the non-split and adjusted split contributions would exactly equal reported exports in that SITC category.

4. If this proportional adjustment process resulted in distributing I-0 exports to a single SITC sector in an amount greater than total reported I-0 exports for 1967, then a second round of adjustments would be needed. In this second round, one or more of the larger I-0 sectors in each 2-digit SITC category would have their exports to that and every other relevant SITC sector adjusted proportionally so that the exports found in Step 3 exactly matched the total reported exports for that I-0 sector. (Note that this step, to ensure consistency between total I-0 exports and the distributions made to the various SITC sectors, should have been carried out for all I-0 sectors. This was not done because of the budgetary constraints on this pilot study and because exact weights were not believed to be too important.)

5. Following the second round of adjustments, a new comparison would be made between I-0 components assigned to an SITC sector and the total reported U.S. exports under that SITC designation. The individual I-0 components within an SITC sector would then be proportionally adjusted to match the correct SITC total as was done in Step 3.

6. Steps 3 and 4 could then be repeated until a single component of a split I-0 sector no longer exceeded the total exports reported for that I-0 sector.

Several comments should be made about the procedure followed.

First, the distribution procedure is somewhat analagous to that commonly used for assigning "undistributed" output within input-output tables to individual cells. The distribution is made in proportion to the total inputs to a sector which have so far not been accounted for and in such a way, requiring successive iterations, that the total inputs to each sector eventually match the control total for the sector. One of the standard computer programs for making this kind of distribution of unknowns was not employed in the present instance for reasons of economy and because, as already noted, the resulting weights were believed to be of secondary importance.

Second, the chief difference between the short-cut method used for this project and a completely consistent adjustment of all affected I-0 sectors is that only a very weak consistency criterion has been imposed, namely that any individual I-0 distribution to a SITC category should not exceed total reported exports from that I-0 sector. To achieve this degree of consistency, only a few of the more important I-0 sectors (13 of 130) were subjected to more than round of adjustments. And in practice only three rounds of adjustments were carried out, despite the fact that this left a few sectors which came close to but which in fact did not quite meet the weak consistency test just described.

Third, the effect of the several rounds of adjustments on average embodied energy coefficients at the 2-digit SITC level is summarized in Table A-3. For only three SITC categories (nos. 00, 11, and 67) is there a difference of more than ten percent between the average coefficient after rounds 1 and 3, and in no case does the difference exceed fifteen percent. (Of course this says nothing about the differences which might have been observed if a fully-consistent distribution process had been carried out to full convergence.)

(Parenthetically, it should be noted that in practice another adjustment step was needed before the distribution adjustments could be carried out. This is because I-0 sector exports are reported in producers' values, that is before adding United States domestic trade and transportation margins paid for by the purchasers, while SITC exports are reported in f.o.b. prices which include all U.S. margins and are thus generally equivalent to purchasers' prices. Table A-2 summarizes by 2-digit I-0 sector, the 1967 differences between sector exports in purchasers' and producers' values. The

2-digit mark-up factors, that is the ratios of exports in purchsers' values to those in producers' values, are applied to all 4-digit, 368-sector I-0 groupings within each 2-digit I-0 sector to obtain the purchasers' values needed for comparability with reported SITC foreign trade statistics.)

No great claim is made for the arithmetic respectability of the method used, when necessary, to split I-0 sectors. The method, however, could be carried out easily and at relatively low cost on a personal computer and produced weights which give perhaps marginally better average energy coefficients than would have been the case if no weights had been used.

For those who might like to explore further the use of alternative weights, the 19-page Table A-4 presents the results for round three of the adjustment process described above. The "preliminary adjustment factor" for most I-0 sectors is identical to that shown in Table A-1 for the I-0 sector and the SITC sector in question. For the thirteen sectors to which a second or third round of adjustments were made (I-0 nos. 1.03, 2.02, 14.01, 14.21, 14.25, 18.04, 28.04, 32.03, 35.01, 37.01, 38.04, 59.03, and 60.04), the preliminary adjustment factor is that from the end of Round 2. The "final adjustment factor," in contrast, is the factor needed to ensure that the column of "final adjusted I-0 exports" in fact add up to the reported total exports for that SITC sector (shown in the next-to-last column). The final adjustment factor is obtained by proportionally changing all of the preliminary adjustment factors for an SITC (except for the preliminary factors with a value of "1", signifying that the I-0 sector does not have to be split and is thus correct as shown) so that the final adjusted I-0 export total matches the reported SITC export total. A comparison of the preliminary and final adjustment factors reveals the degree of adjustment needed for each SITC sector.

Other columns in Table A-4 should be relatively simple to interpret. The "I-0 Energy Coefficients" are those from Herendeen and Bullard (1974) and are denominated in BTU per US dollar, in producers' values. "I-0 exports in producers' values," in the column just following the energy coefficients, are total 1967 U.S. exports for that I-0 sector as given in the original input-output table (U.S. Department of Commerce, 1974). When multiplied by the "mark-up factor" (from Table A-2), the same export total in purchasers' values is found (under the assumption that the 2-digit I-0 mark-up factor is equally applicable to all 4-digit I-0 components) and is shown in the table under "Adjusted I-0 Exports: Purchaser Value." The latter number when multiplied by the final adjustment factor described earlier gives the final, adjusted I-0 export value already discussed and shown in the fourth column from the right. Dividing this value by the mark-up factor (to reconvert to producers' values) and multiplying by the I-0 energy coefficient yields an estimate of "total energy exported" in millions of BTU. Taking the sum of total energy exports for the SITC and dividing by total SITC exports in value terms (next to last column) gives the weighted average of embodied energy for that SITC (in BTU/ US$, purchasers' values; shown in the final column of the table).

A Modified Arrangement of the SITC for Embodied Energy Analysis

The weighted embodied energy coefficients by 2-digit SITC category, as shown in Tables A-3 and A-4, suggested that coefficient variation within four of the 1-digit SITC levels [Nos. 0 (Food and Live Animals), 1 (Beverages and Tobacco), 7 (Machinery and Transportation Equipment), and 9 (Commodities not Classified According to Kind)] was sufficiently small that little would be gained by collecting export data for the 2-digit components.

For three additional 1-digit sectors, nos. 4 (Animal) and (Vegetable Oils and Fats), 5 (Chemicals) and 8 (Miscellaneous Manufactured Articles), only a single 2-digit sector stood out as being significantly different from the mean. This suggested that the remaining 2-digit sectors be treated as a group, meaning in practice that export data need to be collected only for the outlier sectors (No. 43, Animal and Vegetable Oils and Fats, Processed, and Waxes of Animal or Vegetable Origin; No. 54, Medicinal and Pharmaceutical Products; and No. 81, Sanitary, Plumbing, Heating and Lighting Fixtures and Fittings) and for the 1-digit sector as a whole.

For SITC sector 6 (Manufactured Goods Classified Chiefly by Material), differences among the 2-digit components were such that it was felt best to include each separately in the final classification scheme. Furthermore, since the export composition of SITC 68, Non-ferrous Metals, may vary considerably from country-to-country and since the energy coefficient for the different non-ferrous metals differs widely, additional disaggregation will be advisable when a country's trade is dominated by any of the sector's components. When this occurs, the dominant export is usually reported in physical quantities, making feasible the use of energy coefficients expressed in the same units.

Tin and copper coefficients in physical units were used in the current study for exports from Chile, Malaysia, and Nigeria. (See Annex Table C-1, footnote c). The suggested coefficients, adapted from Strout (1976, Annex Table 1) and in the case of tin from a later unpublished study (1978), are copper, 122 million Btu/MT; lead, 30 million Btu/MT; zinc, 83 million Btu/MT; aluminum, 203 Btu/MT; and tin, 38.8 million Btu/MT.

SITC sector 2 (Inedible Crude Materials Except Fuels) required special treatment of several sectors. Natural rubber, for example, has no U.S. embodied energy coefficient since natural rubber is not produced in the United States. In the absence of better information or a special study, the U.S. coefficeint for "forest and fishery products" (Input-Output Sector 3.00) was used for SITC 2311 (natural rubber and similar natural gums). The coefficient, 65553 Btu per 1967 US dollar, is towards the lower end of the range for all coefficients and is far lower than the coefficient of 293202 estimated for SITC 2312 (synthetic rubber and rubber substitutes; equivalent to I-0 number 28.2 and shown under SITC 23 in Table A-4). For the category "Other Rubber" (SITC 23x, as shown in Table 1 of the main text), a weighted average of synthetic rubber (I-0 28.02) and reclaimed rubber and miscellaneous rubber products (I-0 32.03) was used.

One measure of non-weighted coefficient variability before and after the inclusion of selected 2-digit sectors is given in the following table. Note that in the case of Sector 0 (Food and Live Animals), the initial decision not to split out SITC 07 (Coffee, Tea, Cocoa, Spices and Manufacturers Thereof) was made on the basis of that sectors low weight in the 1967 export totals. In restrospect, especially where these items are an important part of a country's actual exports, the lower sector 07 coefficient shown in Table A-3 (31585) Btu/$) should be used in place of the sector 0 mean (56319 Btu/$).

SITC 2-Digit Sector Means, Standard Deviations, and Coefficients of Variation, By 1-Digit Grouping, With and Without Those 2-Digit Sectors Identified as "Outliers"

1-Digit SITC No.	Omitted 2-Digit	Remaining 2-Digit Sectors Number	Unweighted Mean Coef.	Standard Deviation	Coefficient of Variation
0 Food, etc.	-	10	55192	9730	.176
0 Food, etc.	07	9	57815	6033	.104
1 Beverages	-	2	45476	2734	.060
2 Crude Mtls	-	9	121299	71252	.587
2 Crude Mtls	23, 25 27, 28	5	62320	8212	.132
4 Oils, Fats	-	3	83976	14161	.169
4 Oils, Fats	43	2	73963	206	.003
5 Chemicals	-	9	177620	49747	.286
5 Chemicals	54	8	193450	23087	.119
7 Machinery	-	3	54430	896	.016
8 Manuf'd Arts	-	7	55930	16221	.290
8 Manuf'd Arts	81	6	50333	9366	.186
8 Manuf'd Arts	81, 84	5	47719	8016	.177

Source: Table A-3.

Ferrous and non-ferrous metal scrap, also a part of SITC2, posed additional problems. Coefficients for neither are found in the 1967 U.S. study, yet international trade in scrap metal is substantial and represents a significant amount of embodied energy. Review of a number of special energy studies suggested that energy savings from using ferrous scrap might range from 12 to 21 million Btu per short ton of scrap. (Arthur D. little, 1978; Gordian Associates, 1975; and Battelle Colombus, 1975.) The A.D. Little estimate of 17 million Btu's, given additional respectability by having been incorporated into the Oak Ridge Industrial Energy Use Data Book (Mack and others, 1980), was therefore employed for this study and translated into 510000 Btu per 1967 US dollar or 15.43 million Btu/metric ton.

Aluminum and copper scrap dominated U.S. nonferrous scrap exports in 1967 along with the relatively low-valued "ash and residues bearing nonferrous metal." The energy saving attributable to aluminum scrap would appear to be about 188 million Btu/ST according to data from Elliott-Jones (1974, p. 254) on the difference in energy used to produce aluminum from bauxite (100,000 Btu/lb) or entirely from scrap (6,000 Btu/lb). Similar data found in Gyftopoulos et al. (1974, p. 73) would suggest a scrap-associated savings of about 181 million Btu/ST. From the latter source (p. 80), savings attributable to the use of copper scrap would seem to be about 38 million Btu/ST. Using the copper estimate as representative of all other nonferrous scrap (principally "ash and residues") yields a weighted average for all nonferrous scrap of about 78 million Btu/ST or 70.78 million Btu/MT. In 1967 value terms the average nonferrous scrap coefficient would be about 146000 Btu/US$.

Since international movements of scrap are in almost all cases reported in physical units, it was possible to use Btu/metric ton energy coefficients, as shown in Table 1.

For SITC 3 (Mineral Fuels and Lubricants), the study was concerned only with energy embodied in non-fuels such as lubricants, asphalt, etc., and with energy used to produce the processed fuels (but not the energy of the fuels themselves). The energy coefficients for these several commodity groups, as shown in Tables 1 or A-4, were estimated as follows:

SITC No. Name	I-O No.	Orig Coef. Btu/Btu	Est´d Btu/MT (mil.)	Est´d 1967 US$/MT	Embodied Energy Coef.	Units
(1)	(2)	(3)	(4)	(5)	(6)	(7)
32 Coal, Coke, etc.,	700	.0068	27.778	-	188.9	´000/Btu/MT
331 Petr., Crude, etc.	800	.0568	40.833	-	2319	" "
332 Petr. Products[a/]	3101	.2082	42.222	17.27	509011	Btu/$

Weighting the Embodied Energy Coefficients

As already indicated, United States 1967 exports were used throughout for weighting the detailed embodied energy coefficients. The procedure within each 2-digit and 1-digit SITC sector is shown in Table A-4, and Table A-5 shows the data used for the residual, combined 2-digit categories (designated by the suffix -x) found in Table 1 of the main text.

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a/ Based on gasolines, kerosene and jet fuel, and fuel oils. Another set of calculations (not shown) produced the rough average coefficients for SITC 332.5 (Lube oils and greases), 332.6 (Pertoleum jelly, wax and petrolatum), and 332.9 (Naptha, mineral spirits, miscellaneous oils, pitch, petroleum asphalt, paving mixtures, and asphalt and tar coating, cement and pitches) that are given in Table A-4. Since there was considerable uncertainty about these latter coefficients, especially that for the miscellaneous category SITC 332.9, and since their weighted mean as shown in Table A-4 came to 521115 Btu/$, thus closely approaching that for the energy used to produce the refined petroleum fuels, the coefficient shown in this table (509011 Btu/$) was used for all embodied energy calculations involving SITC 332.

Source: Col. (3). Herendeen and Bullard (1974), Table 4b.
(4). Based on a coal value of 7000 kilocalories per MT and a crude oil equivalent to-coal factor of 1.47, from UN (1976).
(5). UN (1971), United States export data.
(6). Equals col (3) x col (4) x 1000, if col (5) is blank; equals col (3) x col (2) x 100000/col (3) otherwise.

<u>Supplemental References</u> (For item not found below, see the Bibliography.)

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Calculation of Preliminary Distribution Factors for Exports by 368-Order I-O Sectors Allocated to Two or More 2-Digit SITC Classifications, 1967, in Purchasers' Values

I-O Sector Number	2-Digit SITC Sectors	Preliminary Distribution Factors of Exports to SITC Nos (in same order as shown in previous column)						Export Weights Used for SITC Distribution Factors (= 1967 FT410 exports, mil.$ fob, minus I-O exports in purchasers' values assigned exclusively to SITC)						Sum of Export Weight
1.02	00 02 29	.218	.527	.254	0	0	0	46	111.04	53.58				210.62
1.03	00 06 21 26 9	.031	.025	.113	.398	.432	0	46	36.8	167.2	585.63	635.73		1471.36
2.01	21 22 26	.105	.523	.37	0	0	0	167.2	827.1	585.63				1579.93
2.02	04 05 08 21 22 26	.521	.096	.052	.032	.161	.114	2674.64	492.4	270.46	167.2	827.1	585.63	
	29	.106	0	0	0	0	0	53.58						5124.59
2.04	05 07	.98	.019	0	0	0	0	492.4	9.72					502.12
2.05	05 08 21 22 26 29	.205	.112	.069	.345	.244	.022	492.4	270.46	167.2	827.1	585.63	53.58	2396.37
2.06	05 08 22 26 29	.202	.193	.34	.241	.022	0	492.4	470.46	827.1	585.63	53.58		2429.17
3.00	03 23 29	.155	.654	.19	0	0	0	43.65	184.3	53.58				281.53
4.00	00 02	.292	.707	0	0	0	0	46	111.04					157.04
6.02	28 51	.011	.988	0	0	0	0	12.24	1098					1110.24
9.00	27 66	.39	.609	0	0	0	0	132.22	205.98					338.2
13.05	89 9	.325	.674	0	0	0	0	307.4	635.73					943.13
13.06	57 9	.028	.971	0	0	0	0	18.5	635.73					654.23
14.01	01 02 09 21 29 41	.175	.153	.153	.231	.074	.212	127.09	111.04	111.3	167.2	53.58	153.5	723.71
14.04	02 04 06 09	.037	.911	.012	.037	0	0	111.04	2674.64	36.8	111.3			2933.78
14.06	02 11	.907	.092	0	0	0	0	111.04	11.26					122.3
14.07	03 9	.064	.935	0	0	0	0	43.65	635.73					679.38
14.08	05 9	.436	.563	0	0	0	0	492.4	635.73					1128.13
14.09	05 9	.436	.563	0	0	0	0	492.4	635.73					1128.13
14.10	05 9	.436	.563	0	0	0	0	492.4	635.73					1128.13
14.11	05 9	.436	.563	0	0	0	0	492.4	635.73					1128.13
14.13	04 05	.844	.155	0	0	0	0	2674.64	492.4					3167.04
14.14	04 08 59	.82	.082	.096	0	0	0	2674.64	270.46	316.13				3261.23
14.16	04 08	.908	.091	0	0	0	0	2674.64	270.46					2945.1
14.17	06 08 42 59	.046	.342	.21	.4	0	0	36.8	270.46	166.4	316.13			789.79
14.19	06 08	.119	.88	0	0	0	0	36.8	270.46					307.26
14.20	05 06 07	.913	.068	.018	0	0	0	492.4	36.8	9.72				538.92
14.21	04 08 11	.904	.091	.003	0	0	0	2674.64	270.46	11.26				2956.36
14.23	06 09 29	.182	.551	.265	0	0	0	36.8	111.3	53.58				201.68
14.24	08 26 42	.264	.572	.162	0	0	0	270.46	585.63	166.4				1022.49
14.25	08 21 22 42 51	.106	.066	.327	.065	.434	0	270.46	167.2	827.1	166.4	1098		2529.16
14.26	08 21 22 42 43	.186	.115	.57	.114	.012	0	270.46	167.2	827.1	166.4	18.2		1449.36
14.27	08 09 41 43	.488	.201	.277	.032	0	0	270.46	111.3	153.5	18.2			553.46
14.29	09 42 43	.376	.562	.061	0	0	0	111.3	166.4	18.2				295.9
14.32	01 04 06 07 09 29	.042	.887	.012	.003	.036	.017	127.09	2674.64	36.8	9.72	111.3	53.58	3013.13
16.02	62 65	.308	.691	0	0	0	0	78.66	176.41					255.07
18.03	65 84	.567	.432	0	0	0	0	176.41	134.52					310.93
18.04	84 89 9	.124	.285	.589	0	0	0	134.52	307.4	635.73				1077.65
19.01	65 84	.567	.432	0	0	0	0	176.41	134.52					310.93
19.02	65 82 84 89	.278	.024	.212	.484	0	0	176.41	15.72	134.52	307.4			634.05
19.03	65 84 89	.285	.217	.497	0	0	0	176.41	134.52	307.4				618.33
20.01	24 63	.879	.12	0	0	0	0	338.9	46.5					385.4
20.02	24 63	.879	.12	0	0	0	0	338.9	46.5					385.4
20.03	24 63 82	.844	.115	.039	0	0	0	338.9	46.5	15.72				401.12
20.09	63 64 69 89	.079	.101	.818	0	0	0	46.5	58.98	475.89				581.37

Calculation of Preliminary Distribution Factors for Exports by 368-Order I-O Sectors Allocated to Two or More 2-Digit SITC Classifications, 1967, in Purchasers' Values

I-O Sector Number	2-Digit SITC Sectors	Preliminary Distribution Factors of Exports to SITC Nos (in same order as shown in previous column)						Export Weights Used for SITC Distribution Factors (= 1967 FT410 exports, mil.$ fob, minus I-O exports in purchasers' values assigned exclusively to SITC)						Sum of Export Weight
20.03	24 63 82	.845	.116	.039	0	0	0	338.9	46.5	15.72				401.12
20.09	63 64 69 89	.052	.066	.535	.346	0	0	46.5	58.98	475.89	307.4			888.77
23.02	82 89	.049	.951	0	0	0	0	15.72	307.4					323.12
24.01	25 59	.447	.552	0	0	0	0	256.1	316.13					572.23
27.01	51 53 55 58 59	.644	.063	.058	.047	.185	0	1098	108.7	99.7	80.32	316.13		1702.85
27.04	24 27 43 53 55 57	.252	.098	.013	.081	.074	.013	338.9	132.22	18.2	108.7	99.7	18.5	
	59 89	.235	.229	0	0	0	0	316.13	307.4					1339.75
28.02	23 58	.696	.303	0	0	0	0	184.3	80.32					264.62
28.03	26 65	.768	.231	0	0	0	0	585.63	176.41					762.04
28.04	26 65	.768	.231	0	0	0	0	585.63	176.41					762.04
29.01	54 59	.476	.523	0	0	0	0	288	316.13					604.13
29.02	51 55 59	.725	.065	.208	0	0	0	1098	99.7	316.13				1513.83
30.00	53 59	.255	.744	0	0	0	0	108.7	316.13					424.83
31.01	32 33 34 51 52 59	.328	.098	0	.435	.011	.125	827.1	248.8	.09	1098	28.9	316.13	2519.02
31.02	33 66	.547	.452	0	0	0	0	248.8	205.98					454.78
31.03	33 64 65 66	.36	.085	.255	.298	0	0	248.8	58.98	176.41	205.98			690.17
32.03	23 58 61 62 72 84	.09	.039	.013	.038	.6	.066	184.3	80.32	26.5	78.66	1220.7	134.52	
	89	.151	0	0	0	0	0	307.4						2032.4
32.04	58 71 89	.012	.938	.048	0	0	0	80.32	5950.9	307.4				6338.62
34.03	61 84	.175	.825	0	0	0	0	28.5	134.52					163.02
35.01	65 66 72 81	.106	.124	.735	.033	0	0	176.41	205.98	1220.7	55.78			1658.87
36.07	66 9	.244	.755	0	0	0	0	205.98	635.73					841.71
36.13	27 66	.39	.609	0	0	0	0	132.22	205.98					338.2
36.14	27 66	.39	.609	0	0	0	0	132.22	205.98					338.2
36.16	27 51 55 66 67 69	.052	.434	.039	.081	.203	.188	132.22	1098	99.7	205.98	514.91	475.89	2526.7
36.18	63 66 71	.014	.063	.922	0	0	0	46.5	205.98	3015.57				3268.05
36.19	27 59	.294	.705	0	0	0	0	132.22	316.13					448.35
36.22	59 66	.605	.394	0	0	0	0	316.13	205.98					522.11
37.01	32 33 52 59 67 69	.109	.139	.016	.177	.289	.267	194.96	248.8	28.9	316.13	514.91	475.89	1779.59
37.02	67 71 73	.053	.613	.333	0	0	0	514.91	5950.9	3239.55				9705.36
37.03	67 69 73	.121	.112	.765	0	0	0	514.91	475.89	3239.55				4230.35
37.04	67 69	.519	.48	0	0	0	0	514.91	475.89					990.8
38.01	28 68	.045	.954	0	0	0	0	12.24	255.74					267.98
38.03	28 68	.045	.954	0	0	0	0	12.24	255.74					267.98
38.04	51 68	.811	.188	0	0	0	0	1098	255.74					1353.74
38.09	68 69	.349	.65	0	0	0	0	255.74	475.89					731.63
38.10	68 69 72	.13	.243	.625	0	0	0	255.74	475.89	1220.7				1952.33
40.02	71 81	.981	.018	0	0	0	0	3015.57	55.74					3071.31
40.03	71 81	.981	.018	0	0	0	0	3015.57	55.78					3071.35
40.06	71 73	.482	.517	0	0	0	0	3015.57	3239.55					6255.12
41.02	71 72 73	.403	.163	.433	0	0	0	3015.57	1220.7	3239.55				7475.82
42.02	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
42.08	67 71	.145	.854	0	0	0	0	514.91	3015.57					3530.48
42.11	67 71 72 89	.101	.596	.241	.06	0	0	514.91	3015.57	1220.7	307.4			5058.58
43.01	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27

Calculation of Preliminary Distribution Factors for Exports by 368-Order I-O Sectors Allocated to Two or More 2-Digit SITC Classifications, 1967, in Purchasers' Values

I-O Sector Number	2-Digit SITC Sectors	Preliminary Distribution Factors of Exports to SITC Nos (in same order as shown in previous column)						Export Weights Used for SITC Distribution Factors (= 1967 FT410 exports, mil.$ fob, minus I-O exports in purchasers' values assigned exclusively to SITC)						Sum of Export Weight
44.00	71 72 73	.403	.163	.433	0	0	0	3015.57	1220.7	3239.55				7475.82
45.01	71 73	.482	.517	0	0	0	0	3015.57	3239.55					6255.12
45.03	71 73	.482	.517	0	0	0	0	3015.57	3239.55					6255.12
46.04	71 73	.482	.517	0	0	0	0	3015.57	3239.55					6255.12
47.03	71 86 89	.722	.204	.073	0	0	0	3015.57	853	307.4				4175.97
47.04	71 72 86 89	.558	.226	.158	.056	0	0	3015.57	1220.7	853	307.4			5396.67
48.06	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
49.05	69 71 72	.1	.639	.259	0	0	0	475.89	3015.57	1220.7				4712.16
49.06	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
50.00	69 71	.136	.863	0	0	0	0	475.89	3015.57					3491.46
51.04	71 86 89	.722	.204	.073	0	0	0	3015.57	853	307.4				4175.97
52.03	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
52.05	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
53.01	72 86 89	.512	.358	.129	0	0	0	1220.7	853	307.4				2381.1
53.03	72 86 89	.512	.358	.129	0	0	0	1220.7	853	307.4				2381.1
53.06	69 72	.28	.719	0	0	0	0	475.89	1220.7					1696.59
53.07	66 72	.144	.855	0	0	0	0	205.98	1220.7					1426.68
54.01	69 72	.28	.719	0	0	0	0	475.89	1220.7					1696.59
54.02	71 72	.711	.266	0	0	0	0	3015.57	1220.7					4236.27
54.03	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
54.04	65 69 72	.094	.254	.651	0	0	0	176.41	475.89	1220.7				1873
54.07	71 72	.711	.288	0	0	0	0	3015.57	1220.7					4236.27
55.02	72 81 86 89	.5	.022	.35	.126	0	0	1220.7	55.78	853	307.4			2436.88
55.03	67 69 72	.232	.215	.551	0	0	0	514.91	475.89	1220.7				2211.5
56.01	72 89	.798	.201	0	0	0	0	1220.7	307.4					1528.1
56.04	72 86 89	.512	.358	.129	0	0	0	1220.7	853	307.4				2381.1
57.03	66 72 86 89	.024	.5	.349	.125	0	0	58.98	1220.7	853	307.4			2440.08
59.03	71 72 73 9	.371	.15	.399	.078	0	0	3015.57	1220.7	3239.55	635.73			8111.55
60.04	73 89 9	.774	.073	.151	0	0	0	3239.55	307.4	635.73				4182.68
62.01	72 82 86 89	.505	.006	.358	.129	0	0	1200.7	15.72	853	307.4			2376.82
62.02	72 86 89	.508	.361	.13	0	0	0	1200.7	853	307.4				2361.1
62.03	72 86 89	.508	.361	.13	0	0	0	1200.7	853	307.4				2361.1
62.04	86 89	.735	.264	0	0	0	0	853	307.4					1160.4
62.05	54 66 71 73 86 89	.034	.024	.357	.383	.101	.098	288	205.98	3015.57	3239.55	853	834.9	8437
62.06	59 82 86 89	.211	.01	.571	.205	0	0	316.13	15.72	853	307.4			1492.25
62.07	86 89	.735	.264	0	0	0	0	853	307.4					1160.4
63.01	72 86 89	.512	.358	.129	0	0	0	1220.7	853	307.4				2381.1
63.02	86 89	.735	.264	0	0	0	0	853	307.4					1160.4
63.03	86 89	.735	.264	0	0	0	0	853	307.4					1160.4
64.01	66 69 89	.208	.481	.31	0	0	0	205.98	475.89	307.4				989.27
64.04	84 89	.304	.695	0	0	0	0	134.52	307.4					441.92
64.05	53 59 64 89	.137	.399	.074	.388	0	0	108.7	316.13	58.98	307.4			791.21
64.07	69 71 89	.158	.763	.077	0	0	0	626.2	3015.57	307.4				3949.17
64.12	59 71 72 86 89	.079	.514	.208	.145	.052	0	466.4	3015.57	1220.7	853	307.4		5863.07

Table A-2

Input-Output (I-O) Table Estimates of 1967 U.S. Exports, Producers' Values, Margins and Purchasers' (Approximate F.o.b.) Values, in Millions of 1967 US Dollars

2-Digit I-O No.	2-Digit I-O Name	Producers' Values	Margins: Transp.	Margins: Trade	Purchasers' Values	Mark-Up Factor /a
1	Livestock, etc.	55	3.9	1.7	60.6	1.101
2	Other agric. prod.	3183.4	398.6	311.8	3893.8	1.223
3	Forestry, fishery	47.4	6.8	7.4	61.6	1.299
4	Agricultural serv.	14.4	0	0	14.4	1
5	Iron mining	122.4	16.2	0	138.6	1.132
6	Nonferrous mining	35.2	.8	0	36	1.022
7	Coal mining	306.3	182.6	7.1	496	1.619
8	Crude petr., gas	82.1	8.1	0	90.2	1.098
9	Nonmetal. minerals	83.5	25.2	.2	108.9	1.304
10	Chem.&fert. mining	148.5	36.6	.5	185.6	1.249
11	New construction	15.1	0	0	15.1	1
12	Maint., repairs	0	0	0	0	N/A
13	Ordnance, etc.	308.7	8.4	4.5	321.6	1.041
14	Food products,etc.	1906	68.4	172.5	2146.9	1.126
15	Tobacco mfrs	601.1	1.8	17.8	620.7	1.032
16	Fabrics, yarn	250	2.9	12.2	265.1	1.06
17	Misc. textiles	89.2	2.6	7	98.8	1.107
18	Apparel	169.4	.8	12.8	183	1.08
19	Misc. fabr'd text.	74	.5	6.5	81	1.094
20	Lumber & wood	367.1	33	24.7	424.8	1.157
21	Wood containers	3.2	0	.1	3.3	1.031
22	H'sehold furniture	23.6	.6	1.4	25.6	1.084
23	Other furn.,fixt.	19	.7	2.4	22.1	1.163
24	Paper & paperbd	648.8	42.5	36.3	727.6	1.121
25	Paper. containers	23.6	.4	1.3	25.3	1.072
26	Printing & publ.	251.8	8.6	30.9	291.3	1.156
27	Chemicals & prod.	1710.3	90.2	85.1	1885.6	1.102
28	Plastics & syn.	669.9	24.5	20.9	715.3	1.067
29	Drugs, cleaning	435.1	6.9	32	474	1.089
30	Paints, etc.	47.5	1.6	6.4	55.5	1.168
31	Petroleum refining	764.7	42.7	140.8	948.2	1.239
32	Rubber,misc.plas.	322.7	10.3	31.6	364.6	1.129
33	Leather	43	.4	1.2	44.6	1.037
34	Footwear	19.8	.1	1.7	21.6	1.09
35	Glass & products	145.3	5.6	12.2	163.1	1.122
36	Stone, clay prod.	177	14.7	18.2	209.9	1.185
37	Primary iron,steel	518.5	23.6	20.6	562.7	1.085
38	Primary nonferrous	725.8	12	14	751.8	1.035
39	Metal containers	15.7	.4	.5	16.6	1.057
40	Heating,plumbing	284.4	7	20.6	312	1.097
41	Screw mach. prod.	274.4	4.7	7.1	286.2	1.043
42	Other fabr. metal	434.5	8	53.5	496	1.141
43	Engines, turbines	393.5	4.1	19.5	417.1	1.059
44	Farm machinery	419	10.2	52.6	481.8	1.149
45	Constr.,min'g mach.	1269.5	17.7	157.9	1445.1	1.138
46	Mtls handling mach.	131.9	2.8	6.7	141.4	1.072
47	Metalwork'g mach.	485.8	4.7	24.3	514.8	1.059
48	Spec. indus. mach.	790.6	7.3	41.6	839.5	1.061
49	Gen. indus. mach.	627	15.8	59.8	702.6	1.12
50	Machine shop prod.	63.2	.9	4.3	68.4	1.082
51	Office mach., etc.	709.7	3.3	63.4	776.4	1.093
52	Service ind. mach.	359.3	7.8	45.5	412.6	1.148
53	Electrical equip.	557.3	5.7	26.6	589.6	1.057
54	H'sehold appliance	149.1	3.3	19.9	172.3	1.155
55	Elec. ltg, wiring	168.8	3.9	17.2	189.9	1.125
56	Radio, TV, commun.	580.2	1.5	22.9	604.6	1.042
57	Electronic comp.	372	.6	15.8	388.4	1.044
58	Misc. elec. equip.	161.5	1.7	27.7	190.9	1.182
59	Motor vehicles,pts	1976.2	65.6	403.5	2445.3	1.237
60	Aircrafts & parts	1808.6	2.8	44.1	1855.5	1.025
61	Other transp equip	206.5	3.6	8	218.1	1.056
62	Prof., sci. equip.	568.2	2.8	67.5	638.5	1.123
63	Optical, photo eq.	321.8	1.1	61.1	384	1.193
64	Misc. manufactur'g	332	4.5	40.3	376.8	1.134
65	Transp., warehouse	3890.9	0	0	3890.9	1
66	Communications	139.6	0	0	139.6	1
67	Radio,TV broadcstg	0	0	0	0	1
68	Utilities	74.3	0	0	74.3	1
69	Trade	2614.8	0	0	2614.8	1
70	Finance, insurance	90.4	0	0	90.4	1
71	Real estate,rental	577.1	0	0	577.1	1
72	Hotel,misc.service	2.6	0	0	2.6	1
73	Business services	457.7	0	0	457.7	1
74	Research & devel.	0	0	0	0	1
75	Auto repair	0	0	0	0	1
76	Amusements	331.5	0	0	331.5	1
77	Medical,educ.,etc.	0	0	0	0	1
78	Federal government	106.4	0	0	106.4	1
79	State, local govt	0	0	0	0	1
80	Gross imports	-40791.4	0	0	-40791.4	1
81	Business travel,etc.	0	0	0	0	1
82	Office supplies	0	0	0	0	1
83	Scrap, used goods	580.1	43.5	149.1	772.7	1.332
84	Government industry	0	0	0	0	1
85	Receipts frm abroad	9188.3	0	0	9188.3	1
86	Household industry	0	0	0	0	1
	TOTAL, ex I-O No. 80	45922.8	1317.9	2504.8	49745.5	1.083

Source: Bureau of Economic Analysis, U.S. Department of Commerce, computer tapes of 1967 US IO Table, 484 sectors aggregated to 2-digit level at Department of Economics, Brandeis University

/a "Mark-up factor" equals purchasers' value divided by producers' value.

Table A-3

Weighted Average Embodied Energy Coefficients by 2-Digit SITC
Category, After Each of Three Rounds of Adjustment, 1967

Standard Industrial Trade Classification (SITC) No.	Description	1967 Exports (mil $)	Direct+Indirect Energy Coefficients, Btu/$ (Purchaser's Values), After Ajustment Round 1	Round 2	Round 3
00	Live animals	46	49595	52622	55101
01	Meat & meat preparations	151.3	60599	60752	60759
02	Dairy products & eggs	116.9	57915	58370	58529
03	Fish & fish preparations	67.3	51890	51890	51890
04	Cereal & cereal preparations	2681.4	57156	56970	56902
05	Fruits and vegetables	492.4	47420	46349	45727
06	Sugar, sugar preparations, honey	36.8	60888	60764	60626
07	Coffee, tea, cocoa, spices & mfrs thereof	29.2	31585	31585	31585
08	Feeding stuff for animals, ex unmilled cereals	331.6	62949	63403	63667
09	Miscellaneous food preparations	111.3	66127	66858	67131
11	Beverages	13.4	50265	42742	42742
12	Tobacco	635.3	48211	48211	48211
21	Hides, skins and fur skins, undressed	167.3	63505	65130	65737
22	Oil-seeds, oil nuts & oil kernals	827.2	58489	58412	58546
23	Crude rubber, incl. synthetic and reclaimed	184.4	213434	214399	214399
24	Wood, lumber and cork	338.9	69964	69964	69964
25	Pulp and waste paper	256.1	178868	178868	178868
26	Textile fibers (not further mfr'd) & their waste	591.5	68944	68609	69218
27	Crude fertilizer & crude mtls (excl. energy, prec. stones)	317.6	140599	140599	140599
28	Metalliferous ores and metal scrap	519.6	243143	246229	246229
29	Crude animals and vegetable materials, n.e.s.	77.8	51926	49103	48039
part 33	Petroleum and petroleum products [non-energy only]	371.4	521115	521115	521115
41	Animal oils and fats	153.5	76005	74850	74169
42	Fixed vegetable oils and fats	166.4	77207	73757	73757
43	Animal & vegetable oils & fats, processed, & waxes	18.2	104001	104001	104001
51	Chemical elements and compounds	1098	216444	217288	217288
52	Mineral tar & crude chem. from coal, petr. & natural gas	28.9	201271	210835	210835
53	Dyeing, tanning & coloring materials	108.7	215601	215601	215601
54	Medicinal and pharmaceutical products	288	51098	51098	51098
55	Essential oils & perfume mtls; toilet, polish'g, cleans'g	140.7	182669	182669	182669
56	Fertilizers, manufactured	230.6	191219	191219	191219
57	Explosives & pyrotechnic products	18.5	158040	158040	158040
58	Plastic mtls, regenerated cellulose, artificial resins	473.3	212040	212509	212509
59	Chemical materials and products, n.e.s.	415.9	163683	159323	159323
61	Leather, leathers mfrs, n.e.s., & dressed fur skins	72.4	60110	64501	64501
62	Rubber manufacturers, n.e.s.	156	83516	85391	85391
63	Wood and cork manufactures, excl. furniture	89.6	49469	49469	49469
64	Paper, paperboard and manufactures thereof	466.4	174605	174605	174605
65	Textile yarn, fabrics, make-up articles & related prod.	530.9	97118	97979	97979
66	Non-metallic mineral manufactures, n.e.s.	340.4	110938	110941	110941
67	Iron and steel	561.2	175142	198596	198596
68	Non-ferrous metals	547	167381	172652	172652
69	Manufactures of metals, n.e.s.	626.2	126694	131869	131869

n.e.s. = not elsewhere specified

Continued next page

Table A-3, Continued

Weighted Average Embodied Energy Coefficients by 2-Digit SITC Category, After Each of Three Rounds of Adjustment, 1967

No.	Standard Industrial Trade Classification (SITC) Description	1967 Exports (mil $)	Btu/$ (Purchaser's Values), After Ajustment Round 1	Round 2	Round 3
71	Machinery, other than electric	5950.9	54903	55070	55209
72	Electrical machinery, apparatus, and appliances	2096.9	53980	53178	53175
73	Transportation equipment	4525.2	55448	55109	54905
81	Sanitary, plumbing, heating & lighting fixtures & fittings	64.9	84017	89508	89508
82	Furniture	52	54900	54900	54900
83	Travel goods, handbags, & similar articles	8	43514	43514	43514
84	Clothing	181	62322	63408	63408
85	Footwear	9.3	39477	40556	40556
86	Professional, scientific and controlling instruments; photographic & optical goods, watches & clocks	852.9	40015	40015	40015
89	Miscellaneous manufactured articles, n.e.s.	834.9	59361	59545	59608
9	Commodities & transactions not classified according to kind	943.1	61664	61735	61783

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
FOOD,ANIMALS 0											4064.1	
Live Animals	0	1.02	.218	.4752984	72344	14.1	1.101	15.52	7.38	484828.3		
		1.03	.3	.6540804	65163	40.9	1.101	45.03	29.45	1743233.		
		4.00	.292	.6366383	33443	14.4	1	14.40	9.17	306591.7		
						69.4		74.96	46.00	2534653.	46	55101
Meat and Meat Preparations	0	14.01	.359	.4064993	67722	270.9	1.126	305.03	124.00	7457591.		
		14.13	1	1	73180	21.5	1.126	24.21	24.21	1573370		
		14.32	.042	.0475570	58897	57.8	1.126	65.08	3.10	161895.8		
						350.2		394.33	151.30	9192857.	151.3	60759
2 Dairy Products and Eggs	0	1.01	1	1	62064	0	1.101	.00	.00	0		
		1.02	.527	.6150716	72344	14.1	1.101	15.52	9.55	627404.0		
		4.00	.707	.8251529	33443	14.4	1	14.40	11.88	397376.5		
		14.01	.229	.2672702	67722	270.9	1.126	305.03	81.53	4903309.		
		14.02	1	1	78292	1.6	1.126	1.80	1.80	125267.2		
		14.03	1	1	72509	3.6	1.126	4.05	4.05	261032.4		
		14.04	.037	.0431834	76195	107.5	1.126	121.05	5.23	353713.5		
		14.05	1	1	61179	0	1.126	.00	.00	0		
		14.06	.907	1.058577	68480	2.4	1.126	2.70	2.86	173979.2		
						414.5		464.56	116.90	6842082.	116.9	58529
Fish and Fish Preparations	03	3.00	.155	.5675597	65553	47.4	1.299	61.57	34.95	1763528.		
		14.07	.064	.2343472	59502	33	1.126	37.16	8.71	460156.2		
		14.12	1	1	60406	21	1.126	23.65	23.65	1268526		
						101.4		122.38	67.30	3492211.	67.3	51890
Cereals and Cereal Preparations	04	2.02	.777	.8941708	68632	1758.3	1.223	2150.40	1922.83	1.0790e8		
		14.04	.911	1.048378	76195	107.5	1.126	121.05	126.90	8587223.		
		14.13	.844	.9712743	73180	21.5	1.126	24.21	23.51	1528174.		
		14.14	.82	.9436551	69108	143.9	1.126	162.03	152.90	9384312.		
		14.16	.908	1.044925	64762	298.6	1.126	336.22	351.33	20206698		
		14.18	1	1	47133	5.7	1.126	6.42	6.42	268658.1		
		14.21	.902	1.038021	44183	26.3	1.126	29.61	30.74	1206193.		
		14.31	1	1	58445	.3	1.126	.34	.34	17533.5		
		14.32	.887	1.020759	58897	57.8	1.126	65.08	66.43	3474914.		
						2419.9		2895.36	2681.40	1.5258e8	2681.4	56902
Fruit and Vegetables	05	2.02	.044	.0377087	68632	1758.3	1.223	2150.40	81.09	4550523.		
		2.04	.98	.8398758	43376	127.6	1.223	156.05	131.07	4648526.		
		2.05	.205	.1756883	42738	97.7	1.223	119.49	20.99	733586.9		
		2.06	.202	.1731172	50912	764.6	1.223	935.11	161.88	6738990.		
		14.08	.436	.3736590	72791	7.5	1.126	8.45	3.16	203992.6		
		14.09	.436	.3736590	74520	91.7	1.126	103.25	38.58	2553393.		
		14.10	.436	.3736590	65693	53	1.126	59.68	22.30	1300979.		
		14.11	.436	.3736590	71649	11.9	1.126	13.40	5.01	318590.3		
		14.13	.155	.1328375	73180	21.5	1.126	24.21	3.22	209002.5		
		14.20	.913	.7824557	56441	28.5	1.126	32.09	25.11	1258634.		
						2962.3		3602.13	492.40	22516216	492.4	45727
SUBTOTALS	00-05										3555.3	55454

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Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Purchaser Value	Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
FOOD, ANIMALS (CONTINUED)	0										4064.1	
Subtotals:	00-05										3555.3	55454
Sugar, Sugar Preparations and Honey	06	1.03	.083	.1796285	65163	40.9	1.101	45.0309	8.088833	478739.9		
		14.04	.012	.0259704	76195	107.5	1.126	121.045	3.143585	212722.4		
		14.17	.047	.1017173	125742	32.2	1.126	36.2572	3.687986	411842.6		
		14.19	.119	.2575396	117127	7.3	1.126	8.2198	2.116924	220203.4		
		14.20	.068	.1471655	56441	28.5	1.126	32.091	4.722688	236725.8		
		14.23	.182	.3938842	49124	30.1	1.126	33.8926	13.34976	582409.9		
		14.32	.012	.0259704	58897	57.8	1.126	65.0828	1.690225	88409.59		
						304.3		341.6193	36.80000	2231054.	36.8	60626
Coffee, Tea, Cocoa, Spices and Manufactures Thereof	07	2.04	.019	.0494081	43376	127.6	1.223	156.0548	7.710367	273462.7		
		14.20	.018	.0468076	56441	28.5	1.126	32.091	1.502104	75293.31		
		14.28	1	1	31617	17.3	1.126	19.4798	19.4798	546974.1		
		14.32	.003	.0078013	58897	57.8	1.126	65.0828	.5077288	26557.46		
						231.2		272.7084	29.2	922287.6	29.2	31585
Feeding Stuff for Animals (Not Including Unmilled Cereals)	08	2.02	.013	.0085509	68632	1758.3	1.223	2150.401	18.38779	1031881.		
		2.05	.112	.0736690	42738	97.7	1.223	119.4871	8.802497	307605.2		
		2.06	.193	.1269475	50912	764.6	1.223	935.1058	118.7093	4941725.		
		14.14	.082	.0539362	68106	143.9	1.126	162.0314	8.739365	528615.1		
		14.15	1	1	81983	54.3	1.126	61.1418	61.1418	4451677.		
		14.16	.091	.0598561	64762	298.6	1.126	336.2236	20.12502	1157493.		
		14.17	.342	.2249536	125742	32.2	1.126	36.2572	8.156187	910812.9		
		14.19	.88	.5788280	117127	7.3	1.126	8.2198	4.757850	494913.6		
		14.21	.032	.0210483	44183	26.3	1.126	29.6138	.6233198	24458.38		
		14.24	.264	.1736484	116952	11.7	1.126	13.1742	2.287679	237609.8		
		14.25	.073	.0480164	74168	310.5	1.126	349.623	16.78764	1105776.		
		14.26	.186	.1223432	61541	21.6	1.126	24.3216	2.975582	162629.0		
		14.27	.488	.3209864	107847	166.3	1.126	187.2538	60.10592	5756677.		
						3693.3		4412.854	331.6000	21112075	331.6	63667
Miscellaneous Food Preparations	09	14.01	.021	.0097344	67722	270.9	1.126	305.0334	2.969312	178585.9		
		14.04	.037	.0171511	76195	107.5	1.126	121.045	2.076049	140483.6		
		14.05	.5	.5	61179	0	1.126	0	0	0		
		14.07	.935	.4334118	59502	33	1.126	37.158	16.10472	851032.7		
		14.08	.563	.2609742	72791	7.5	1.126	8.445	2.203927	142474.3		
		14.09	.563	.2609742	74520	91.7	1.126	103.2542	26.94668	1783363.		
		14.10	.563	.2609742	65693	53	1.126	59.678	15.57442	908641.3		
		14.11	.563	.2609742	71649	11.9	1.126	13.3994	3.496897	222512.6		
		14.23	.551	.2554117	49124	30.1	1.126	33.8926	8.656565	377660.0		
		14.27	.201	.0931719	107847	166.3	1.126	187.2538	17.44680	1671035.		
		14.29	.376	.1742918	87020	75.1	1.126	84.5626	14.73857	1139032.		
		14.32	.036	.0166875	58897	57.8	1.126	65.0828	1.086070	56808.41		
						904.8		1018.805	111.3000	7471628.	111.3	67121
SUBTOTAL	0 (00-09)										4064.2	56319

Continued on next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Purchaser Value	Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
BEVERAGES AND TOBACCO 1												
Beverages	11	14.06	.092	.4702285	60340	2.4	1.126	2.70	1.27	68096.61		
		14.21	.066	.3373378	44183	26.3	1.126	29.61	9.99	391990.9		
		14.22	1	1	59292	1.9	1.126	2.14	2.14	112654.8		
						30.6		34.46	13.40	572742.3	13.4	42742
Tobacco	12	2.03	1	1	63135	13.5	1.223	16.51	16.51	852322.5		
		15.01	1	1	28475	122.6	1.032	126.52	126.52	3491035		
		15.02	1	1	55088	478.5	1.032	493.81	493.81	26359608		
						614.6		636.85	636.85	30702966	635.3	48211
SUBTOTAL 1											648.7	48213
******												
CRUDE MATERIALS, INEDIBLE, EXCEPT FUELS 2											3280.2	
Hides, Skins and Fur Skins, Undressed	21	1.03	.042	.0437381	65163	40.9	1.101	45.03	1.97	116569.2		
		2.01	.105	.1093452	100699	402.3	1.223	492.01	53.80	4429704.		
		2.02	.017	.0177035	68632	1758.3	1.223	2150.40	38.07	2136382.		
		2.05	.069	.0718554	42738	97.7	1.223	119.49	8.59	300032.4		
		14.01	.124	.1291314	67722	270.9	1.126	305.03	39.39	2369031.		
		14.25	.062	.0645657	74168	310.5	1.126	349.62	22.57	1486894.		
		14.26	.115	.1197590	61541	21.6	1.126	24.32	2.91	159193.9		
						2902.2		3485.91	167.30	10997807	167.3	65737
Oil-Seeds, Oil Nuts and Oil Kernals	22	2.01	.523	.4698838	100699	402.3	1.223	492.01	231.19	19035558		
		2.02	.083	.0745705	68632	1758.3	1.223	2150.40	160.36	8998839.		
		2.05	.345	.3099616	42738	97.7	1.223	119.49	37.04	1294245.		
		2.06	.34	.3054694	50519	764.6	1.223	935.11	285.65	11799312		
		14.25	.32	.2875006	74168	310.5	1.126	349.62	100.52	6620898.		
		14.26	.57	.5121104	61541	21.6	1.126	24.32	12.46	680741.0		
						3355		4070.95	827.20	48429594	827.2	58546
Crude Rubber (Including Synthetic and Reclaimed)	23	3.00	.654	.6826139	65553	47.4	1.299	61.57	42.03	2121026.		
		28.02	.696	.7264515	293202	172.1	1.067	183.63	133.40	36656788		
		32.03	.078	.0814127	95323	97.6	1.129	110.19	8.97	757424.8		
						317.1		355.39	184.40	39535239	184.4	214399
Wood, Lumber and Cork	24	20.01	.879	.7872917	54710	188	1.157	217.52	171.25	8097673.		
		20.02	.879	.7872917	65607	117.4	1.157	135.83	106.94	6063927.		
		20.03	.844	.7559434	55806	5.4	1.157	6.25	4.72	227805.3		
		27.04	.252	.2257082	183464	225.1	1.102	248.06	55.99	9321240.		
						535.9		607.66	338.90	23710646	338.9	69964
SUBTOTAL	21-24										1517.8	80823

SITC 2 Continued Next Page

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
CRUDE MATERIALS, INEDIBLE, EXCEPT FUELS 2 (CONTINUED)												
Subtotals	21-24										1517.8	80317
Pulp and Waste Paper	25	24.01	.919	.9546876	200511	239.3	1.121	268.2553	256.1	45808088	256.1	178868
Textile Fibers	26	1.03	.136	.1218071	65163	40.9	1.101	45.0309	5.485082	324636.2		
(Not Manufactured		2.01	.37	.3313869	100699	402.3	1.223	492.0129	163.0466	13424884		
Into Yarn, Thread		2.02	.057	.0510515	68632	1758.3	1.223	2150.401	109.7812	6160672.		
or Fabrics) and		2.05	.244	.2185362	42738	97.7	1.223	119.4871	26.11226	912498.6		
Their Waste		2.06	.241	.2158493	50912	764.6	1.223	935.1058	201.8419	8402434.		
		14.24	.272	.2436142	116952	11.7	1.126	13.1742	3.209422	333346.6		
		17.05	1	1	66983	4.4	1.107	4.8708	4.8708	294725.2		
		17.08	1	1	59127	.9	1.107	.9963	.9963	53214.3		
		28.03	.768	.6878518	208117	20.3	1.067	21.6601	14.89894	2906019.		
		28.04	.587	.5257409	141607	109.2	1.067	116.5164	61.25743	8129786.		
						3210.3		3899.255	591.5000	40942216	591.5	69218
Crude Fertilizer		9.00	.39	.7115184	104494	83.5	1.304	108.884	77.47297	6208176.		
and Crude Minerals		10.00	1	1	198507	148.5	1.249	185.4765	185.4765	29478290		
(Excluding Coal,		27.04	.098	.1787918	183464	225.1	1.102	248.0602	44.35113	7383699.		
Petroleum, and		36.13	.39	.7115184	507297	2.4	1.185	2.844	2.023558	866282.8		
Precious Stones)		36.14	.39	.7115184	159018	1.9	1.185	2.2515	1.601984	214974.1		
		36.16	.052	.0948691	71146	44.1	1.185	52.2585	4.957718	297655.5		
		36.19	.294	.5363754	141736	2.7	1.185	3.1995	1.716133	205264.0		
						508.2		602.9742	317.6	44654340	317.6	140599
Metalliferous		5.00	1	1	127708	122.4	1.132	138.5568	138.5568	15631459		
Ores and Metal		6.01	1	1	130650	24.3	1.022	24.8346	24.8346	3174795		
Scrap		6.02	.011	.0111293	128209	10.9	1.022	11.1398	.1239784	15552.99		
		38.01	.045	.0455291	139706	171.8	1.035	177.813	8.095658	1092765.		
		38.03	.045	.0455291	274427	4.6	1.035	4.761	.2167638	57474.25		
Subtotal, excluding scrap						334		357.1052	171.8278	19972047	171.8	116233
		a/ SITC 282	1	1	510000	188.4	1.289	242.8476	242.8476	96084000		
		b/ SITC 284	1	1	146000	81.4	1.289	104.9246	104.9246	11884400		
						603.8		704.8774	519.6000	1.2794e8	519.6	246229
Crude Animal and		1.02	.254	.1941174	72344	14.1	1.101	15.5241	3.013498	198009.6		
Vegetable		2.02	.009	.0068782	68632	1758.3	1.223	2150.401	14.79084	830028.4		
Materials, N.E.S.		2.05	.022	.0168133	42738	97.7	1.223	119.4871	2.008975	70204.07		
		2.06	.022	.0168133	50912	764.6	1.223	935.1058	15.72223	654497.4		
		2.07	1	1	55843	19.8	1.223	24.2154	24.2154	1105691.		
		3.00	.19	.1452060	65553	47.4	1.299	61.5726	8.940708	451185.7		
		14.01	.006	.0045855	67722	270.9	1.126	305.0334	1.398716	84124.18		
		14.23	.265	.2025241	49124	30.1	1.126	33.8926	6.864068	299458.7		
		14.32	.017	.0129921	58897	57.8	1.126	65.0828	.8455630	44228.35		
						3060.7		3710.315	77.80000	3737428.	77.8	48039
SUBTOTALS	2 (21-29)										3280.4	117360

a/ Iron and Steel Scrap b/Non-Ferrous Metal Scrap Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. (1-digit 2-digit)		4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MINERAL FUELS, LUBRICANTS AND RELATED MATERIALS - NON-ENERGY ONLY (part of SITC 3)												
Coal, Coke & Briquets	32	(Assumed to be all energy uses and therefore included in estimates of direct energy consumpt										
Petroleum and	p33*	(332.5)	1	1	507390	189.5	1.1	208.45	208.45	96150405		
Petroleum Products		(332.6)	1	1	265890	35.4	1.1	38.94	38.94	9412506		
(Non-Energy Only)		(332.9)	1	1	780280	112.8	1.1	124.08	124.08	88015584		
						337.7		371.47	371.47	1.9358e8	371.4	521115
Gas, Natural and Manufactured	34	(Assumed to be all energy uses and therefore included in estimates of direct energy consumpt										
Electrical Energy	35	(Assumed to be all energy uses and therefore included in estimates of direct energy consumpt										
SUBTOTAL 3 (= 33 part)											371.4	521213

*Energy coefficients of components in physical units are estimated as:

332.5 Lubricating oils & greases 5,962,000 Btu/barrel, or 41,750,000 Btu/metric ton

332.6 Petroleum jelly, petrolatum and wax 5,575,000 Btu/barrel, or 43,530,000/metric ton

332.91/95 Naptha, mineral spirits, miscellaneous oils including road oil, petroleum coke, pitch, & petroleum asphalt 6,028,000 Btu/barrel, 33,320,000 Btu/metric ton,

332.96 Bituminous paving mixtures, asphalt and tar coating cement and pitches (Btu's in physical units not available)

SITC No. (1-digit 2-digit)		4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
ANIMAL AND VEGETABLE OILS AND FATS 4											338.1	
Animal Oils and Fats	41	14.01	.262	.3051642	67722	270.9	1.126	305.0334	93.08528	5598509.		
		14.27	.277	.3226355	107847	166.3	1.126	187.2538	60.41472	5786453.		
								492.2872	153.5000	11384962	153.5	74169
Fixed Vegetable Oils and Fats	42	14.17	.211	.2937685	125742	32.2	1.126	36.2572	10.65122	1189437.		
		14.24	.162	.2255474	116952	11.7	1.126	13.1742	2.971406	308625.1		
		14.25	.17	.2366855	74168	310.5	1.126	349.623	82.75070	5450669.		
		14.26	.114	.1587185	61541	21.6	1.126	24.3216	3.860288	210982.2		
		14.29	.562	.7824545	87020	75.1	1.126	84.5626	66.16638	5113498.		
						451.1		507.9386	166.4	12273212	166.4	73757
Animal and Vegetable Oils and Fats, Processed, and Waxes of Animal or Vegetable Origin	43	14.26	.012	.0148905	61541	21.6	1.126	24.3216	.3621605	19793.71		
		14.27	.032	.0397080	107847	166.3	1.126	187.2538	7.435468	712160.6		
		14.29	.061	.0756933	87020	75.1	1.126	84.5626	6.400823	494671.1		
		27.04	.013	.0161314	183464	225.1	1.102	248.0602	4.001549	666188.9		
						488.1		544.1982	18.2	1892814.	18.2	104001
SUBTOTAL 4 (41-43)											338.1	75572

Continued next page

Table A-4, Continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
CHEMICALS 5											2802.5	
Chemical Elements and Compounds	51	6.02	.988	.6757074	128209	10.9	1.022	11.1398	7.527245	944286.2		
		14.25	.375	.2564679	74168	310.5	1.126	349.623	89.66707	5906241.		
		p27.01	.644	.4404408	281962	1216.6	1.102	1340.693	590.4960	1.5109e8		
		29.02	.725	.4958379	99505	85.2	1.089	92.7828	46.00523	4203627.		
		*31.01	.435	.2975027	217288.1	750.9	1.239	930.3651	276.7862	48541039		
		36.16	.434	.2968188	71146	44.1	1.185	52.2585	15.51131	931280.5		
		38.04	.723	.4944701	387646	140.7	1.035	145.6245	72.00696	26969284		
						2558.9		2922.487	1098.000	2.3858e8	1098	217288
Mineral Tar and Crude Chemicals from Coal, Petroleum and Natural Gas	52	*31.01	.011	.0155704	217288.1	750.9	1.239	930.3651	14.48615	2540491.		
		37.01	.022	.0311408	267425	426.6	1.085	462.861	14.41385	3552649.		
						1177.5		1393.226	28.9	6093140.	28.9	210835
Dyeing, Tanning and Coloring Materials	53	p27.01	.063	.0553090	281962	1216.6	1.102	1340.693	74.15244	18972931		
		27.04	.081	.0711116	183464	225.1	1.102	248.0602	17.63996	2936749.		
		30.00	.255	.2238699	122757	47.5	1.168	55.48	12.42030	1305376.		
		64.05	.137	.1202752	55786	32.9	1.134	37.3086	4.487299	220748.2		
						1522.1		1681.542	108.7	23435804	108.7	215601
Medicinal and Pharmaceutical Products	54	29.01	.476	.8314207	55705	315.5	1.089	343.5795	285.6591	14612159		
		62.05	.034	.0593872	49955	35.1	1.123	39.4173	2.340883	104130.7		
						350.6		382.9968	288	14716290	288	51098
Essential Oils and Perfume Materials: Toilet, Polishing and Cleansing Preparations	55	p27.01	.058	.0574727	281962	1216.6	1.102	1340.693	77.05323	19715140		
		27.04	.074	.0733272	183464	225.1	1.102	248.0602	18.18956	3028249.		
		29.02	.065	.0644090	99505	85.2	1.089	92.7828	5.976051	546048.6		
		29.03	1	1	66596	34.4	1.089	37.4616	37.4616	2290902.		
		36.16	.039	.0386454	71146	44.1	1.185	52.2585	2.019552	121251.5		
						1605.4		1771.256	140.7	25701591	140.7	182669
Fertilizers, Manufactured	56	p27.01	1	1	281962	67.4	1.102	74.2748	74.2748	19004239		
		27.02	1	1	173931	130.5	1.102	143.811	143.811	22697996		
						197.9		218.0858	218.0858	41702234	230.6	191219
Explosives and Pyrotechnic Products	57	13.06	.028	.1437409	89722	13	1.041	13.533	1.945245	167657.4		
		27.04	.013	.0667368	183464	225.1	1.102	248.0602	16.55475	2756081.		
						238.1		261.5932	18.5	2923739.	18.5	158040
Plastic Materials, Regenerated Cellulose and Artificial Resins	58	p27.01	.047	.0306739	281962	1216.6	1.102	1340.693	41.12428	10522218		
		28.01	1	1	216753	368.3	1.067	392.9761	392.9761	79830130		
		28.02	.303	.1977487	293202	172.1	1.067	183.6307	36.31274	9978413.		
		32.03	.021	.0137054	95323	97.6	1.129	110.1904	1.510199	127508.1		
		32.04	.012	.0078316	100095	155.7	1.129	175.7853	1.376686	122054.4		
						2010.3		2203.276	473.3000	1.0058e8	473.3	212509
SUBTOTAL	51-58										2386.7	190110

*See next page for this note.

Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967: I-O in producer values	Mark-up Factor	Adj'd I-O Exports: Purchaser Value	Adj'd I-O Exports: Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
CHEMICALS 5											2802.5	
SUBTOTAL	51-58										2386.7	190110
Chemical Materials and Products, N.E.S.	59	14.14	.096	.0403977	69108	143.9	1.126	162.0314	6.545689	401740.2		
		14.17	.4	.1683236	125742	32.2	1.126	36.2572	6.102942	681524.1		
		p24.01	1	1	200511	19.5	1.121	21.8595	21.8595	3909965.		
		p27.01	.185	.0778497	281962	1216.6	1.102	1340.693	104.3725	26705155		
		27.03	1	1	167757	70.7	1.102	77.9114	77.9114	11860420		
		27.04	.235	.0988901	183464	225.1	1.102	248.0602	24.53070	4083938.		
		29.01	.523	.2200831	55705	315.5	1.089	343.5795	75.61604	3867944.		
		29.02	.208	.0875283	99505	85.2	1.089	92.7828	8.121117	742049.4		
		30.00	.744	.3130819	122757	47.5	1.168	55.48	17.36978	1825567.		
		*31.01	.125	.0526011	217288.1	750.9	1.239	930.3651	48.93825	8582485.		
		36.19	.705	.2966703	141736	2.7	1.185	3.1995	.9491967	113531.9		
		36.22	.605	.2545894	93911	3.1	1.185	3.6735	.9352342	74117.12		
		37.01	.06	.0252485	267425	426.6	1.085	462.861	11.68656	2880442.		
		62.06	.211	.0887907	50277	18.9	1.123	21.2247	1.884556	84372.05		
		64.05	.399	.1679028	55786	32.9	1.134	37.3086	6.264217	308161.9		
		64.12	.079	.0332439	56934	74.6	1.134	84.5964	2.812315	141196.1		
						3465.9		3921.884	415.9000	66262608	415.9	159323
SUBTOTAL 5											2802.6	185541
(Memo: CHEMICALS excl. Medicinal & Pharmaceutical Products, SITC 54)	51-53,55-59										2514.6	200939

*31.01 (Refined Petroleum Products) assumed to have the same energy coefficient as would SITC No. 51 in the absence of 31.01.

Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No.	1-digit	2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports: Purchaser Value	Adj'd I-O Exports: Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MAUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL	6											3390.1	
Leather, Leather		6	32.03	.132	.2287997	95323	97.6	1.129	110.1904	25.21153	2128644.		
Maufactures, N.E.S.,			33.00	1	1	55969	43	1.037	44.591	44.591	2406667		
and Dressed Fur Skins			34.01	1	1	65359	1.2	1.09	1.308	1.308	78430.8		
			p34.03	.175	.3033329	47430	3.9	1.09	4.251	1.289468	56109.62		
							145.7		160.3404	72.4	4669851.	72.4	64501
Rubber Manu-		6	16.02	.308	.6959802	79691	15.5	1.06	16.43	11.43496	859682.1		
maufacturers, N.E.S.			32.01	1	1	99053	68.5	1.129	77.3365	77.3365	6785131.		
			32.03	.27	.6101125	95323	97.6	1.129	110.1904	67.22854	5676197.		
							181.6		203.9569	156	13321010	156	85391
Wood and Cork		6	20.01	.12	.1251352	54710	188	1.157	217.516	27.21891	1287076.		
Manufactures			20.02	.12	.1251352	65607	117.4	1.157	135.8318	16.99734	963824.2		
(Excluding			20.03	.115	.1199213	55806	5.4	1.157	6.2478	.7492440	36138.56		
Furniture)			20.04	1	1	39549	10.9	1.157	12.6113	12.6113	431084.1		
			20.05	1	1	47599	5.9	1.157	6.8263	6.8263	280834.1		
			20.06	1	1	67942	16.3	1.157	18.8591	18.8591	1107455.		
			20.07	1	1	55473	1.3	1.157	1.5041	1.5041	72114.9		
			20.09	.052	.0542253	71609	21.9	1.157	25.3383	1.373976	85038.07		
			21.00	1	1	48979	3.2	1.031	3.2992	3.2992	156732.8		
			36.18	.014	.0145991	84664	9.8	1.122	10.9956	.1605260	12112.99		
							380.1		439.0295	89.60000	4432410.	89.6	49469
Paper, Paper-		6	20.09	.066	.6857876	71609	21.9	1.157	25.3383	17.37669	1075478.		
board and			24.02	1	1	201228	126.3	1.121	141.5823	141.5823	25415096		
Manufactures			24.03	1	1	219213	199.6	1.121	223.7516	223.7516	43754915		
Thereof			24.04	1	1	87714	.4	1.121	.4484	.4484	35085.6		
			24.05	1	1	102792	6.1	1.121	6.8381	6.8381	627031.2		
			24.06	1	1	190326	5.9	1.121	6.6139	6.6139	1122923.		
			25.00	1	1	118643	23.6	1.072	25.2992	25.2992	2799975.		
			26.06	1	1	67715	2.5	1.156	2.89	2.89	169287.5		
			31.03	.085	.8832113	482118	11.8	1.239	14.6202	12.91273	5024582.		
			64.05	.074	.7689134	55786	32.9	1.134	37.3086	28.68708	1411232.		
							431		484.6906	466.4	81435606	466.4	174605
SUBTOTAL		61-64										784.4	132406

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Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

	SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL (CONTINUED)	6												
SUBTOTAL		61-64										784.4	132406
Textile Yarn, Fabrics, Make-Up Articles and Related Products		6	16.01	1	1	99259	221.7	1.06	235.002	235.002	22005720		
			16.02	.691	.9262696	79691	15.5	1.06	16.43	15.21861	1144138.		
			16.03	1	1	101872	7.8	1.06	8.268	8.268	794601.6		
			16.04	1	1	91616	5	1.06	5.3	5.3	458080		
			17.01	1	1	90231	17.5	1.107	19.3725	19.3725	1579043.		
			17.02	1	1	62593	3.3	1.107	3.6531	3.6531	206556.9		
			17.03	1	1	74592	6.3	1.107	6.9741	6.9741	469929.6		
			17.04	1	1	64790	1.4	1.107	1.5498	1.5498	90706		
			17.06	1	1	94268	19.3	1.107	21.3651	21.3651	1819372.		
			17.07	1	1	143044	18.5	1.107	20.4795	20.4795	2646314		
			17.09	1	1	67615	4.9	1.107	5.4243	5.4243	331313.5		
			17.10	1	1	78530	12.7	1.107	14.0589	14.0589	997331		
			18.03	.567	.7600505	105195	20.4	1.08	22.032	16.74543	1631052.		
			19.01	.567	.7600505	65498	3.2	1.094	3.5008	2.660785	159301.7		
			19.02	.278	.3726526	83651	22.4	1.094	24.5056	9.132076	698269.9		
			19.03	.285	.3820360	62151	48.4	1.094	52.9496	20.22865	1149206.		
			28.03	.231	.3096502	208117	20.3	1.067	21.6601	6.707054	1308202.		
			28.04	.413	.5536170	141607	109.2	1.067	116.5164	64.50546	8560848.		
			31.03	.255	.3418216	482118	11.8	1.239	14.6202	4.997501	1944621.		
			35.01	.167	.2238597	102999	125.3	1.122	140.5866	31.47167	2889082.		
			54.04	.094	.1260048	69691	32.6	1.155	37.653	4.744460	286273.8		
			64.09	1	1	73679	11.5	1.134	13.041	13.041	847308.5		
							739		804.9426	530.9000	52017270	530.9	97979
SUBTOTAL		61-65										1315.3	118510

Continued next page

Table A-4. continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

	SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Purchaser Value	Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL (CONTINUED)	6												
SUBTOTAL		61-65										1315.3	118510
Non-Metallic		66	9.00	.609	.8907181	104494	83.5	1.304	108.884	96.98495	7771738.		
Mineral Manu-			31.02	.452	.6610913	562526	2	1.239	2.478	1.638184	743762.1		
factures, N.E.S.			31.03	.298	.4358522	482118	11.8	1.239	14.6202	6.372247	2479560.		
			35.01	.173	.2530283	102999	125.3	1.122	140.5866	35.57239	3265526.		
			35.02	1	1	153106	20	1.122	22.44	22.44	3062120		
			36.01	1	1	480161	4.2	1.185	4.977	4.977	2016676.		
			36.02	1	1	340560	1.9	1.185	2.2515	2.2515	647064		
			36.03	1	1	110842	1.2	1.185	1.422	1.422	133010.4		
			36.04	1	1	179873	25.4	1.185	30.099	30.099	4568774.		
			36.05	1	1	259949	.4	1.185	.474	.474	103979.6		
			36.07	.244	.3568723	95319	2.1	1.185	2.4885	.8880767	71435.09		
			36.09	1	1	89927	2.9	1.185	3.4365	3.4365	260788.3		
			36.10	1	1	142050	1.6	1.185	1.896	1.896	227280		
			36.11	1	1	108774	.2	1.185	.237	.237	21754.8		
			36.13	.609	.8907181	507297	2.4	1.185	2.844	2.533202	1084461.		
			36.14	.609	.8907181	159018	1.9	1.185	2.2515	2.005452	269116.4		
			36.15	1	1	52869	1	1.185	1.185	1.185	52869		
			36.16	.081	.1184699	71146	44.1	1.185	52.2585	6.191059	371703.9		
			36.17	1	1	110543	16.9	1.185	20.0265	20.0265	1868177.		
			36.18	.063	.0921433	84664	9.8	1.185	11.613	1.070060	76451.92		
			36.20	1	1	156102	12.9	1.185	15.2865	15.2865	2013716.		
			36.21	1	1	150649	25.9	1.185	30.6915	30.6915	3901809.		
			36.22	.394	.5762610	93911	3.1	1.185	3.6735	2.116895	167763.5		
			53.07	.144	.2106132	148954	20.6	1.057	21.7742	4.585933	646256.4		
			57.03	.024	.0351022	51106	158	1.044	164.952	5.790177	283441.4		
			62.05	.024	.0351022	49955	35.1	1.123	39.4173	1.383634	61548.90		
			64.01	.208	.3042190	46523	112.6	1.134	127.6884	38.84524	1593648.		
							726.8		829.9522	340.4000	37764430	340.4	110941
SUBTOTAL		61-66										1655.7	116954

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Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	4-digit I-O Sector Adj. Factor Prelim.	4-digit I-O Sector Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	U.S. Exports, 1967: Mark-up Factor	U.S. Exports, 1967: Adj'd I-O Exports Purchaser Value	U.S. Exports, 1967: Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL 6 (CONTINUED)												
SUBTOTAL	61-66										1655.7	116954
Iron and Steel	67	36.16	.203	.2916130	71146	44.1	1.185	52.2585	15.23926	914946.9		
		37.01	.602	.8647833	267425	426.6	1.085	462.861	400.2744	98657505		
		37.02	.053	.0761354	98256	53.9	1.085	58.4815	4.452513	403213.0		
		37.03	.121	.1738186	170894	29.1	1.085	31.5735	5.488060	864402.4		
		37.04	.519	.7455523	149135	8.9	1.085	9.6565	7.199426	989572.7		
		40.07	1	1	114390	7.6	1.097	8.3372	8.3372	869364		
		40.08	1	1	140108	1.8	1.097	1.9746	1.9746	252194.4		
		40.09	1	1	86026	32.8	1.097	35.9816	35.9816	2821653.		
		42.08	.145	.2082950	74272	178.4	1.141	203.5544	42.39936	2759934.		
		42.11	.101	.1450882	104153	77.9	1.141	88.8839	12.89601	1177176.		
		55.03	.232	.3332720	72692	71.9	1.125	80.8875	26.95754	1741864.		
						933		1034.450	561.2000	1.1145e8	561.2	198596
Non-Ferrous Metal	68	38.01	.954	.9997768	139706	171.8	1.035	177.813	177.7733	23996134		
		38.02	1	1	110162	2.5	1.035	2.5875	2.5875	275405		
		38.03	.954	.9997768	274427	4.6	1.035	4.761	4.759937	1262082.		
		38.04	.277	.2902916	387646	140.7	1.035	145.6245	42.27357	15833024		
		38.05	1	1	157062	171	1.035	176.985	176.985	26857602		
		38.06	1	1	74927	0	1.035	0	0	0		
		38.07	1	1	102044	18.5	1.035	19.1475	19.1475	1887814		
		38.08	1	1	244677	82.8	1.035	85.698	85.698	20259256		
		38.09	.349	.3657464	115856	62	1.035	64.17	23.46995	2627183.		
		38.10	.13	.1362379	91726	52.9	1.035	54.7515	7.459231	661068.0		
		42.10	1	1	130190	6	1.141	6.846	6.846	781140		
						712.8		738.384	547.0000	94440708	547	172652
SUBTOTAL	61-68										2763.9	110667

Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIAL 6 (CONTINUED)												
SUBTOTAL	61-68										3310.9	92384
Manufactures of Metals, N.E.S.	69	20.09	.535	.6870249	71609	21.9	1.157	25.3383	17.40804	1077418.		
		23.06	1	1	76739	.8	1.163	.9304	.9304	61391.2		
		36.16	.188	.2414218	71146	44.1	1.185	52.2585	12.61634	757470.4		
		37.01	.315	.4045100	267425	426.6	1.085	462.861	187.2319	46147920		
		37.03	.112	.1438258	170894	29.1	1.085	31.5735	4.541083	715247.8		
		37.04	.48	.6163962	149135	8.9	1.085	9.6565	5.952230	818143.6		
		38.09	.65	.8347032	115856	62	1.035	64.17	53.56290	5995733.		
		38.10	.243	.3120506	91726	52.9	1.035	54.7515	17.08524	1514165.		
		38.11	1	1	138555	3.4	1.035	3.519	3.519	471087		
		38.12	1	1	87164	.7	1.035	.7245	.7245	61014.8		
		38.13	1	1	108676	3.9	1.035	4.0365	4.0365	423836.4		
		38.14	1	1	148579	11	1.035	11.385	11.385	1634369		
		39.01	1	1	141113	12.4	1.057	13.1068	13.1068	1749801.		
		39.02	1	1	141180	3.3	1.057	3.4881	3.4881	465894		
		40.05	1	1	117068	10	1.097	10.97	10.97	1170680		
		40.08	1	1	118751	1.8	1.097	1.9746	1.9746	213751.8		
		40.09	1	1	140108	32.8	1.097	35.9816	35.9816	4595542.		
		41.01	1	1	86026	55.1	1.043	57.4693	57.4693	4740033.		
		42.06	1	1	66674	1.9	1.141	2.1679	2.1679	126680.6		
		42.07	1	1	127289	1.7	1.141	1.9397	1.9397	216391.3		
		42.09	1	1	104800	.5	1.141	.5705	.5705	52400		
		49.05	.1	.1284159	59617	107.6	1.12	120.512	15.47565	823760.8		
		50.00	.136	.1746456	55371	63.2	1.082	68.3824	11.94268	611163.0		
		53.06	.28	.3595645	83345	42.4	1.057	44.8168	16.11453	1270639.		
		54.01	.28	.3595645	79185	18.1	1.155	20.9055	7.516875	515345.2		
		54.04	.254	.3261763	69691	32.6	1.155	37.653	12.28152	741048.7		
		55.03	.215	.2760941	72692	104.3	1.125	117.3375	32.39620	2093284.		
		64.01	.481	.6176804	46523	112.6	1.134	127.6884	78.87062	3235712.		
		64.07	.158	.2028971	65132	12.6	1.134	14.2884	2.899075	166510.2		
		64.11	1	1	61124	1.8	1.134	2.0412	2.0412	110023.2		
						1280		1402.498	626.2000	82576456	626.2	131869
SUBTOTAL	6 (61-69)										3937.1	70157

Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MACHINERY AND TRANSPORTATION EQUIPMENT	7										12573.0	
Machinery, Other Than Electric	71	26.08	1	1	37912	2.6	1.156	3.0056	3.0056	98571.2		
		32.04	.938	.8644494	100065	155.7	1.129	175.7853	151.9575	13468226		
		36.18	.922	.8497040	84664	9.8	1.185	11.613	9.867613	705005.5		
		37.02	.613	.5649334	98256	53.9	1.085	58.4815	33.03815	2991886.		
		40.02	.981	.9040777	74907	9.6	1.097	10.5312	9.521023	650128.8		
		40.03	.981	.9040777	71436	35.1	1.097	38.5047	34.81124	2266888.		
		40.06	.482	.4442054	105163	149.5	1.097	164.0015	72.85034	6983738.		
		41.02	.403	.3713999	111804	219.3	1.043	228.7299	84.95026	9106212.		
		42.02	.711	.6552490	67185	75	1.141	85.575	56.07293	3301718.		
		42.08	.854	.7870360	74272	178.4	1.141	203.5544	160.2046	10428326		
		42.11	.596	.5492664	104153	77.9	1.141	88.8839	48.82094	4456483.		
		43.01	.711	.6552490	70044	105	1.059	111.195	72.86041	4819107.		
		43.02	1	1	61751	288.5	1.059	305.5215	305.5215	17815164		
		44.00	.403	.3713999	71846	419	1.149	481.431	178.8034	11180428		
		45.01	.482	.4442054	68040	967.7	1.138	1101.243	489.1779	29247506		
		45.02	1	1	71376	104.9	1.138	119.3762	119.3762	7487342.		
		45.03	.482	.4442054	72338	196.9	1.138	224.0722	99.53407	6326973.		
		46.01	1	1	58410	7.4	1.072	7.9328	7.9328	432234		
		46.02	1	1	64339	36.2	1.072	38.8064	38.8064	2329072.		
		46.03	1	1	66328	17.5	1.072	18.76	18.76	1160740		
		46.04	.482	.4442054	59190	70.8	1.072	75.8976	33.71412	1861510.		
		47.01	1	1	41440	195.4	1.059	206.9286	206.9286	8097376		
		47.02	1	1	57719	95.9	1.059	101.5581	101.5581	5535252.		
		47.03	.722	.6653864	55029	71.2	1.059	75.4008	50.17067	2607027.		
		47.04	.558	.5142460	56151	123.3	1.059	130.5747	67.14752	3560340.		
		48.01	1	1	50881	118.4	1.061	125.6224	125.6224	6024310.		
		48.02	1	1	58888	124.5	1.061	132.0945	132.0945	7331556		
		48.03	1	1	49100	36.9	1.061	39.1509	39.1509	1811790		
		48.04	1	1	60987	72	1.061	76.392	76.392	4391064		
		48.05	1	1	42398	93.1	1.061	98.7791	98.7791	3947254.		
		48.06	.711	.6552490	58614	354.7	1.061	376.3367	246.5942	13622879		
		49.01	1	1	55256	295.6	1.12	331.072	331.072	16333674		
		49.02	1	1	80451	85.6	1.12	95.872	95.872	6886606.		
		49.03	1	1	62346	19.4	1.12	21.728	21.728	1209512.		
		49.05	.639	.5888946	59617	107.6	1.12	120.512	70.96887	3777635.		
		49.06	.711	.6552490	71552	28.1	1.12	31.472	20.62200	1317451.		
		49.07	1	1	64383	90.7	1.12	101.584	101.584	5839538.		
		50.00	.863	.7953303	55371	63.2	1.082	68.3824	54.38660	2783217.		
		51.01	1	1	36346	591.4	1.093	646.4002	646.4002	21495024		
		51.02	1	1	33183	32.9	1.093	35.9597	35.9597	1091721.		
		51.03	1	1	55429	13.2	1.093	14.4276	14.4276	731662.8		
		51.04	.722	.6653864	43862	72.2	1.093	78.9146	52.50870	2107170.		
SUBTOTAL	p71 (I-O 26.08-51.04)					5866		5003829.	4619.555	2.5762e8	9244.35	55767

Continued next page

Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No.			4-digit I-O Sector			I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions				Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
	1-digit	2-digit	Number	Adj. Factor Prelim.	Adj. Factor Final		I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final			
MACHINERY AND TRANSPORTATION EQUIPMENT	7	(CONTINUED)										12573.0	
SUBTOTAL		p71 (I-O 26.08-51.04)					5866		21192257	4619.555	2.5762e8	14150.23	55767
Machinery, Other Than Electric (Concluded)		71	52.01	1	1	60633	13.5	1.148	15.498	15.498	818545.5		
			52.02	1	1	67458	26.7	1.148	30.6516	30.6516	1801129.		
			52.03	.711	.6552490	67039	280.2	1.148	321.6696	210.7737	12308412		
			52.04	1	1	52897	13.6	1.148	15.6128	15.6128	719399.2		
			52.05	.711	.6552490	64614	25.3	1.148	29.0444	19.03131	1071158.		
			54.02	.711	.6552490	75746	25.5	1.155	29.4525	19.29872	1265628.		
			54.03	.711	.6552490	82849	22.8	1.155	26.334	17.25533	1237737.		
			54.06	1	1	53903	26	1.155	30.03	30.03	1401478		
			54.07	.711	.6552490	82493	14.9	1.155	17.2095	11.27651	805396.5		
			59.03	.259	.2386913	66762	1951.7	1.237	2414.253	576.2611	31101327		
			60.02	1	1	48384	314.7	1.025	322.5675	322.5675	15226445		
			62.05	.357	.3290069	49955	35.1	1.123	39.4173	12.96856	576887.4		
			64.07	.763	.7031715	65132	12.6	1.134	14.2884	10.04720	577067.0		
			64.12	.514	.4736962	56934	74.6	1.134	84.5964	40.07299	2011919.		
SUBTOTAL		71					8703.2		21195648	5950.9	3.2854e8	5950.9	55209

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Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MACHINERY AND TRANSPORTATION EQUIPMENT	7 (CONTINUED)										12573.0	
Electrical Machinery, Apparatus and Appliances	72	32.03	.3	.2112738	95323	97.6	1.129	110.1904	23.28034	1965591.		
		35.01	.4	.2816984	102999	125.3	1.122	140.5866	39.60302	3635536.		
		36.08	1	1	74685	82.8	1.185	98.118	98.118	6183918		
		38.10	.625	.4401537	91726	52.9	1.035	54.7515	24.09908	2135760.		
		41.02	.163	.1147921	111804	219.3	1.043	228.7299	26.25639	2814544.		
		42.02	.288	.2028228	67185	75	1.141	85.575	17.35657	1021999.		
		42.11	.241	.1697233	104153	77.9	1.141	88.8839	15.08567	1377053.		
		43.01	.288	.2028228	70044	105	1.059	111.195	22.55289	1491685.		
		44.00	.163	.1147921	71846	419	1.149	481.431	55.26447	3455641.		
		47.04	.226	.1591596	56151	123.3	1.059	130.5747	20.78222	1101928.		
		48.06	.288	.2028228	58614	345.7	1.061	366.7877	74.39293	4109771.		
		49.05	.259	.1823997	59617	107.6	1.12	120.512	21.98135	1170056.		
		49.06	.288	.2028228	71552	28.1	1.12	31.472	6.383241	407797.9		
		52.03	.288	.2028228	67039	280.2	1.148	321.6696	65.24194	3809891.		
		52.05	.288	.2028228	64614	25.3	1.148	29.0444	5.890868	331561.4		
		53.01	.512	.3605740	34892	166.2	1.057	175.6734	63.34325	2090987.		
		53.02	1	1	73545	35.2	1.057	37.2064	37.2064	2588784		
		53.03	.512	.3605740	46444	71.9	1.057	75.9983	27.40301	1204073.		
		53.04	1	1	62724	168.4	1.057	177.9988	177.9988	10562722		
		53.05	1	1	38590	41.1	1.057	43.4427	43.4427	1586049		
		53.06	.719	.5063529	83345	42.4	1.057	44.8168	22.69312	1789364.		
		53.07	.855	.6021303	148954	20.6	1.057	21.7742	13.11091	1847608.		
		53.08	1	1	58993	11.7	1.057	12.3669	12.3669	690218.1		
		54.01	.719	.5063529	79185	18.1	1.155	20.9055	10.58556	725729.5		
		54.02	.288	.2028228	75746	25.5	1.155	29.4525	5.973640	391757.0		
		54.03	.288	.2028228	82849	22.8	1.155	26.334	5.341137	383123.7		
		54.04	.651	.4584641	69691	32.6	1.155	37.653	17.26255	1041597.		
		54.05	1	1	56861	9.2	1.155	10.626	10.626	523121.2		
		54.07	.288	.2028228	82493	14.9	1.155	17.2095	3.490480	249298.8		
		55.01	1	1	44789	29.1	1.125	32.7375	32.7375	1303360.		
		55.02	.501	.3528272	70763	35.4	1.125	39.825	14.05135	883835.8		
		55.03	.551	.3880395	72692	104.3	1.125	117.3375	45.53159	2942029.		
		56.01	.798	.5619883	42778	87.1	1.042	90.7582	51.00505	2093948.		
		56.03	1	1	36419	47.4	1.042	49.3908	49.3908	1726261.		
		56.04	.512	.3605740	32048	434.6	1.042	452.8532	163.2871	5022096.		
		57.01	1	1	52390	62.2	1.044	64.9368	64.9368	3258658		
		57.02	1	1	50674	151.8	1.044	158.4792	158.4792	7692313.		
		57.03	.5	.3521230	51106	158	1.044	164.952	58.08339	2843304.		
		58.01	1	1	95011	14.7	1.182	17.3754	17.3754	1396662.		
		58.02	1	1	61604	9.8	1.182	11.5836	11.5836	603719.2		
		58.03	1	1	35530	29.2	1.182	34.5144	34.5144	1037476		
		58.04	1	1	60308	72.1	1.182	85.2222	85.2222	4348207.		
		58.05	1	1	63808	35.7	1.182	42.1974	42.1974	2277946.		
		59.03	.056	.0394378	66762	1951.7	1.237	2414.253	95.21276	5138718.		
		62.01	.505	.3556442	44916	162.1	1.123	182.0383	64.74087	2589404.		
		62.02	.508	.3577570	44599	263.4	1.123	295.7982	105.8239	4202706.		
		62.03	.508	.3577570	43634	25.2	1.123	28.2996	10.12438	393381.3		
		63.01	.512	.3605740	40078	30.4	1.193	36.2672	13.07701	439312.9		
		64.12	.208	.1464832	56934	74.6	1.134	84.5964	12.39195	622154.5		
SUBTOTAL	72					6624.4		7534.396	2096.9	1.1150e8	2096.9	53175

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Table A-4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

	SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports: Purchaser Value	Adj'd I-O Exports: Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MACHINERY AND TRANSPORTATION EQUIPMENT (CONCLUDED)	7											12573.0	
Transport Equipment		73	37.02	.333	.3706698	98256	53.9	1.085	58.4815	21.67733	1963067.	4525.2	
			37.03	.765	.8515388	170894	29.1	1.085	31.5735	26.88606	4234716.		
			40.04	1	1	124602	33.9	1.097	37.1883	37.1883	4224008.		
			40.06	.517	.5754844	105163	149.5	1.097	164.0015	94.38031	9047690.		
			41.02	.433	.4819821	111804	219.3	1.043	228.7299	110.2437	11817535		
			44.00	.433	.4819821	71846	419	1.149	481.431	232.0411	14509336		
			45.01	.517	.5754844	68040	967.7	1.138	1101.243	633.7479	37891221		
			45.03	.517	.5754844	72338	196.9	1.138	224.0722	128.9501	8196827.		
			46.04	.517	.5754844	59190	70.8	1.072	75.8976	43.67789	2411655.		
			59.01	1	1	77149	11.7	1.237	14.4729	14.4729	902643.3		
			59.02	1	1	83307	12.8	1.237	15.8336	15.8336	1066330.		
			59.03	.55	.6122175	66762	1951.7	1.237	2414.253	1478.048	79771564		
			60.01	1	1	38663	975.7	1.025	1000.093	1000.093	37723489		
			60.03	1	1	62864		1.025	0	0	0		
			60.04	.794	.8838194	45198	500.1	1.025	512.6025	453.0480	19977429		
			61.01	1	1	63682	36.7	1.056	38.7552	38.7552	2337129.		
			61.02	1	1	63740	16	1.056	16.896	16.896	1019840		
			61.03	1	1	54421	98.1	1.056	103.5936	103.5936	5338700.		
			61.04	1	1	109725	29	1.056	30.624	30.624	3182025		
			61.05	1	1	72664	3.7	1.056	3.9072	3.9072	268856.8		
			61.06	1	1	70186	15	1.056	15.84	15.84	1052790		
			61.07	1	1	96302	8	1.056	8.448	8.448	770416		
			62.05	.384	.4274391	49955	35.1	1.123	39.4173	16.84849	749480.5		
SUBTOTAL		73					5833.7		6617.354	4525.200	2.4846e8	4525.2	54905
SUMMARY, MACHINERY AND TRANSPORTATION EQUIPMENT													
SUBTOTAL		71					8703.2		9852.689	5950.9	3.2854e8	5950.9	55209
SUBTOTAL		72					6624.4		7534.396	2096.9	1.1150e8	2096.9	53175
SUBTOTAL		73					5833.7		6617.354	4525.200	2.4846e8	4525.2	54905
GRAND TOTAL	7						21161.3		24004.44	12573	6.8850e8	12573	54760

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Table A- 4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No.	1-digit	2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Exports Purchaser Value	Adj'd I-O Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MISCELLANEOUS MANUFACTURED ARTICLES	8											1985.9	
Sanitary, Plumbing, Heating and Lighting Fixtures and Fittings		81	35.01	.26	.3781637	102999	125.3	1.122	140.5866	53.16475	4880496.		
			36.06	1	1	91251	3.9	1.185	4.6215	4.6215	355878.9		
			40.01	1	1	98633	4.1	1.097	4.4977	4.4977	404395.3		
			40.02	.018	.0261806	74907	9.6	1.097	10.5312	.2757128	18826.63		
			40.03	.018	.0261806	71436	35.1	1.097	38.5047	1.008075	65645.24		
			55.02	.023	.0334529	70763	35.4	1.125	39.825	1.332263	83799.96		
							213.4		238.5667	64.90000	5809042.	64.9	89508
Furniture		82	19.02	.024	.1423969	83051	22.4	1.094	24.5056	3.489522	264907.0		
			20.03	.039	.2313950	55806	5.4	1.157	6.2478	1.445710	69731.44		
			22.01	1	1	46284	10.8	1.084	11.7072	11.7072	499867.2		
			22.02	1	1	47800	3.3	1.084	3.5772	3.5772	157740		
			22.03	1	1	89568	5.5	1.084	5.962	5.962	492624		
			22.04	1	1	60344	4	1.084	4.336	4.336	241376		
			23.01	1	1	49943	.8	1.163	.9304	.9304	39954.4		
			23.02	.049	.2907270	62249	9	1.163	10.467	3.043040	162877.2		
			23.03	1	1	63856	1.3	1.163	1.5119	1.5119	83012.8		
			23.04	1	1	48093	.6	1.163	.6978	.6978	28855.8		
			23.05	1	1	84399	4.3	1.163	5.0009	5.0009	362915.7		
			23.07	1	1	61532	2.2	1.163	2.5586	2.5586	135370.4		
			62.01	.006	.0355992	44916	162.1	1.123	182.0383	6.480423	259193.9		
			62.06	.01	.0593321	50277	18.9	1.123	21.2247	1.259305	56379.41		
							250.6		280.7654	52.00000	2854805.	52	54900
Travel Goods, Handbags & Similar Articles		83	p34.03	.68	.68	47430	10.8	1.09	11.772	8.00496	348325.9	8	43514
Clothing		84	18.01	1	1	67816	6.8	1.08	7.344	7.344	461148.8		
			18.02	1	1	63314	0	1.08	0	0	0		
			18.03	1	1	105195	20.4	1.08	22.032	22.032	2145978		
			18.04	.227	.3641768	50467	142.2	1.08	153.576	55.92881	2613481.		
			19.01	.432	.6930588	65498	3.2	1.094	3.5008	2.426260	145260.7		
			19.02	.212	.3401122	83051	22.4	1.094	24.5056	8.334654	632725.2		
			19.03	.217	.3481337	62151	48.4	1.094	52.9496	18.43354	1047224.		
			32.03	.14	.2246024	95323	97.6	1.129	110.1904	24.74903	2089594.		
			p34.03	.825	1.323550	47430	3.9	1.09	4.251	5.626410	244826.3		
			64.04	.304	.4877081	60337	34.4	1.134	39.0096	19.02530	1012283.		
							379.3		417.359	163.9	10392521	163.9	63408
Footwear		85	32.02	1	1	64616	.9	1.099	.9891	.9891	58154.4		
			34.02	1	1	40717	7.8	1.061	8.2758	8.2758	317592.6		
							8.7		9.2649	9.2649	375747	9.3	40556
SUBTOTAL		81-85					862.8		957.728	298.0699	19780441	298.1	66355

Continued next page

Table A- 4, continued

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Purchaser Value	Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MISCELLANEOUS MANUFACTURED ARTICLES	8	(CONTINUED)									1985.9	
SUBTOTAL	81-85					862.8		957.728	298.0699	19780441	298.1	66355
Professional,	86	47.03	.204	.1917714	55029	71.2	1.059	75.4008	14.45972	751372.8		
Scientific and Con-		47.04	.158	.1485288	56151	123.3	1.059	130.5747	19.39411	1028327.		
trolling Instruments;		51.04	.204	.1917714	43862	72.2	1.093	78.9146	15.13356	607308.7		
Photographic and		53.01	.358	.3365400	34892	166.2	1.057	175.6734	59.12113	1951613.		
Optical Goods,		53.03	.358	.3365400	46444	71.9	1.057	75.9983	25.57647	1123816.		
Watches and Clocks		55.02	.35	.3290196	70763	35.4	1.125	39.825	13.10320	824197.4		
		56.04	.358	.3365400	32048	434.6	1.042	452.8532	152.4032	4687350.		
		57.03	.349	.3280795	51106	158	1.044	164.952	54.11737	2649159.		
		62.01	.358	.3365400	44916	162.1	1.123	182.0383	61.26317	2450309.		
		62.02	.361	.3393602	44599	263.4	1.123	295.7982	100.3821	3986592.		
		62.03	.361	.3393602	43634	25.2	1.123	28.2996	9.603758	373152.6		
		62.04	.735	.6909411	62449	52.1	1.123	58.5083	40.42579	2248041.		
		62.05	.101	.0949457	49955	35.1	1.123	39.4173	3.742501	166479.7		
		62.06	.571	.5367719	50277	18.9	1.123	21.2247	11.39282	510059.7		
		62.07	.735	.6909411	43579	11.4	1.123	12.8022	8.845566	343260.0		
		63.01	.358	.3365400	40078	30.4	1.193	36.2672	12.20536	410030.7		
		63.02	.735	.6909411	46602	8.5	1.193	10.1405	7.006488	273693.5		
		63.03	.735	.6909411	46890	282.9	1.193	337.4997	233.1924	9165459.		
		64.12	.145	.1363081	56934	74.6	1.134	84.5964	11.53118	578938.2		
						2097.4		2300.784	852.9000	34129160	852.9	40015
SUBTOTAL	81-86					2960.2		3258.512	1150.970	53909600	1151	46932
Miscelleous	89	13.05	.325	.1696415	50322	15.6	1.041	16.2396	2.754910	133172.5		
Manufactured		18.04	.096	.0501095	50467	142.2	1.08	153.576	7.695615	359606.1		
Articles, N.E.S.		19.02	.484	.2526353	83051	22.4	1.094	24.5056	6.190980	469988.2		
		19.03	.497	.2594210	62151	48.4	1.094	52.9496	13.73624	780366.5		
		20.09	.346	.1806029	71609	21.9	1.157	25.3383	4.576172	283228.2		
		23.02	.951	.4963971	69249	9	1.163	10.467	5.195789	309375.0		
		24.07	1	1	104540	71.2	1.121	79.8152	79.8152	7443248		
		26.01	1	1	54800	3.1	1.156	3.5836	3.5836	169880		
		26.02	1	1	52700	66	1.156	76.296	76.296	3478200		
		26.03	1	1	45900	137.8	1.156	159.2968	159.2968	6325020		
		26.04	1	1	35190	5.3	1.156	6.1268	6.1268	186507		
		26.05	1	1	71211	32.6	1.156	37.6856	37.6856	2321479.		
		26.07	1	1	42432	1.9	1.156	2.1964	2.1964	80620.8		
		27.04	.229	.1195320	183464	225.1	1.102	248.0602	29.65113	4936402.		
		32.03	.059	.0307965	95323	97.6	1.129	110.1904	3.393474	286515.6		
		32.04	.048	.0250547	100095	155.7	1.129	175.7853	4.404256	390473.0		
		42.03	1	1	74609	51.5	1.141	58.7615	58.7615	3842364.		
		42.05	1	1	154204	29.5	1.141	33.6595	33.6595	4549018		
		42.11	.06	.0313184	104153	77.9	1.141	88.8839	2.783704	254102.7		
SUBTOTAL	p89	(I-O 13.05-42.11)				1214.7		1363.417	537.8037	36599566	537.80	68054
SUBTOTAL	81-p89					4174.9		4621.930	1688.774	90509167	537.8037	53595

Continued next page

Calculation of Weighted Average Energy Coefficients, US Exports, 1967, by 2-digit SITC Category
(All export values are in million 1967 US dollars)

SITC No. 1-digit	SITC No. 2-digit	4-digit I-O Sector Number	Adj. Factor Prelim.	Adj. Factor Final	I-O Energy Coef. (Btu/$)	U.S. Exports, 1967, in millions: I-O in producer values	Mark-up Factor	Adj'd I-O Purchaser Value	Exports Final	Total Energy Exported (mil.Btu)	FT 410 Sched. B Exports, by SITC (fob)	Est'd SITC Energy Coef. (Btu/$)
MISCELLANEOUS MANUFACTURED ARTICLES 8	(CONCLUDED)										1985.9	
SUBTOTAL	81-p89					4174.9		4621.930	1688.774	90509167	537.8037	53595
Miscelleous Manufactured Articles, N.E.S. (Continued)	89	47.03	.073	.0381041	55029	71.2	1.059	75.4008	2.873079	149294.3		
		47.04	.056	.0292305	56151	123.3	1.059	130.5747	3.816768	202375.2		
		51.04	.073	.0381041	43862	72.2	1.093	78.9146	3.006969	120669.4		
		53.01	.129	.0673346	34892	166.2	1.057	175.6734	11.82890	390476.9		
		53.03	.129	.0673346	46444	71.9	1.057	75.9983	5.117317	224852.1		
		55.02	.126	.0657687	70763	35.4	1.125	39.825	2.619239	164751.3		
		56.01	.201	.1049167	42778	87.1	1.042	90.7582	9.522054	390916.0		
		56.02	1	1	57066	11.1	1.042	11.5662	11.5662	633432.6		
		56.04	.129	.0673346	32048	434.6	1.042	452.8532	30.49270	937840.7		
		57.03	.125	.0652467	51106	158	1.044	164.952	10.76258	526850.9		
		60.04	.012	.0062637	45198	500.1	1.025	512.6025	3.210781	141581.3		
		62.01	.129	.0673346	44916	162.1	1.123	182.0383	12.25748	490255.6		
		62.02	.13	.0678566	44599	263.4	1.123	295.7982	20.07186	797137.0		
		62.03	.13	.0678566	43634	25.2	1.123	28.2996	1.920315	74613.54		
		62.04	.264	.1378011	62449	52.1	1.123	58.5083	8.062508	448348.6		
		62.05	.089	.0464557	49955	35.1	1.123	39.4173	1.831157	81456.33		
		62.06	.205	.1070046	50277	18.9	1.123	21.2247	2.271141	101679.6		
		62.07	.264	.1378011	43579	11.4	1.123	12.8022	1.764157	68459.66		
		63.01	.129	.0673346	40078	30.4	1.193	36.2672	2.442038	82038.57		
		63.02	.264	.1378011	46602	8.5	1.193	10.1405	1.397372	54585.35		
		63.03	.264	.1378011	46890	282.9	1.193	337.4997	46.50783	1827956.		
		64.01	.31	.1618119	46523	112.6	1.134	127.6884	20.66150	847649.9		
		64.02	1	1	54819	23.6	1.134	26.7624	26.7624	1293728.		
		64.03	1	1	65514	22.6	1.134	25.6284	25.6284	1480616.		
		64.04	.695	.3627718	60337	34.4	1.134	39.0096	14.15158	752966.6		
		64.05	.388	.2025258	55786	32.9	1.134	37.3086	7.555956	371707.7		
		64.06	1	1	79630	.6	1.134	.6804	.6804	47778		
		64.07	.077	.0401920	65132	12.6	1.134	14.2884	.5742792	32984.08		
		64.08	1	1	65550	4.8	1.134	5.4432	5.4432	314640		
		64.12	.052	.0271426	56934	74.6	1.134	84.5964	2.296170	115282.3		
						8329.4		9177.868	2523.674	1.4028e8	834.9	59608
SUBTOTAL	8 (81-89)					11289.6		12436.38	3674.643	1.9419e8	1985.9	52261
COMMODITIES AND TRANSACTIONS NOT CLASSIFIED ACCORDING TO KIND 9		1.03	.439	.4868963	65163	40.9	1.101	45.0309	21.92538	1297660.		
		13.01	1	1	29933	13.6	1.041	14.1576	14.1576	407088.8		
		13.02	1	1	95421	40.2	1.041	41.8482	41.8482	3835924.		
		13.03	1	1	99518	161.5	1.041	168.1215	168.1215	16072157		
		13.04	1	1	41302	3.6	1.041	3.7476	3.7476	148687.2		
		13.05	.674	.7475355	50322	15.6	1.041	16.2396	12.13968	586832.7		
		13.06	.971	1.076939	89722	13	1.041	13.533	14.57422	1256127.		
		13.07	1	1	68024	63.1	1.041	65.6871	65.6871	4292314.		
		18.04	.677	.7508628	50467	142.2	1.08	153.576	115.3145	5388497.		
		42.01	1	1	50328	12.1	1.141	13.8061	13.8061	608968.8		
		59.03	.135	.1497289	66762	1951.7	1.237	2414.253	361.4835	19509588		
		60.04	.194	.2151660	45198	500.1	1.025	512.6025	110.2946	4863509.		
						2957.6		3462.603	943.1	58267354	943.1	61783

Table A-5

Calculation of Residual ("--x") Coefficients for Table 1 (Revised)

Two-Didgit SITC Category Number	Description	1967 Export Weights $ millions	Direct+Indirect Export Coefficient Btu/$
21	Hides and skins	167.3	65737
22	Oil-seeds, oil nuts, and oil kernals	827.2	58546
24	Wood, lumber and cork	338.9	69964
26	Textile fibers and their waste	591.5	69218
29	Crude animals and vegetable materials, n.e.s.	77.8	48039
2x	Weighted mean of 2-order sectors shown		63823 a/
41	Animal oils and fats	153.5	74169
42	Fixed vegetable oils and fats	166.4	73757
4x	Weighted mean of 4-order sectors shown		73955
51	Chemical elements and compounds	1098	217288
52	Mineral tar & crude chemicals from hydrocarbons	28.9	210835
53	Dyeing, tanning & coloring materials	108.7	215601
55	Essential oils, perfumes, toilet arts., polishing, cleansing	140.7	182669
56	Fertilizers, manufactured	230.6	191219
57	Explosives & pyrotechnic products	18.5	158040
58	Plastic mtls, regenerated cellulose, arificial resins	473.3	212509
59	Chemical materials and products, n.e.s.	415.9	159323
5x	Weighted mean of 5-order sectors shown		201891 b/
82	Furniture	52	54900
83	Travel goods, handbags, etc.	8	43514
84	Clothing	181	63408
85	Footwear	9.3	40556
86	Professional, scientific, photographic, optical, watches, clocks	852.9	40015
89	Miscellaneous manufactured articles	834.9	59608
8x	Weighted mean of 8-order sectors shown		51056 c/

Source: Table A-4

a/ 63851 used for initial calculations.
b/ 200939 used for initial calculations.
c/ 50071 used for initial calculations.

Annex Table B-1

Foreign Trade of Selected Countries, Per Capita GDP of US$60-150, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Ethiopia Imports	Ethiopia Exports	Malawi Imports	Malawi Exports	Nigeria Imports	Nigeria Exports	India Imports	India Exports	Pakistan Imports	Pakistan Exports	Ceylon Imports	Ceylon Exports
TOTAL		143096	99990	70305	45684	625940	666771	2721589	1605055	1101114	645086	359201	334446
0	56319	9174	75128	4943	20882	59583	174930	818792	491844	192114	56446	161885	239150
1	48213	2002	0	6479	11719	5131	194	2614	44616	2785	2782	548	580
2	131162	6303	24052	1197	11846	16244	196605	282493	267020	38935	281486	10295	73052
2311	65553	0	0	0	0	-	17730	-	0	-	0	0	57587
23x	214399	0	0	0	0	340	43	11509	0	4189	0	0	0
25	178868	0	0	0	0	0	0	12130	0	3077	0	1360	0
27	140599	387	462	468	0	11157	0	67958	25848	2366	3202	3623	1381
28	246229	0	0	0	0	702	4511	8855	132053	3019	938	0	318
282	15.43	0	0	0	0	0	6763	11357	537063	43855	6969	0	0
284	70.78	0	0	0	0	1541	2012	7501	4348	N/A	0	0	0
28x	116233	0	0	0	0	81	3614	3501	116460	254	741	0	318
2x	63851	5916	23590	729	11846	4045	174321	182041	109119	26284	277346	5312	13766
3		12618	0	3660	0	24606	205660	100978	13403	62780	3849	25351	0
32	188.9	0	0	53.639	0	76.717	0	1.3	256.004	N/A	0	139.396	0
33		12423	0	3257	0	22893	205632	100838	11249	53589	3840	23481	0
331	2319	25.16	0	0	0	0	15011	7305	0	N/A	0	0	0
332	509011	9829	0	3227	0	22890	3729	23576	11249	21689	3840	23481	0
33x		-1	0	30	0	3	0	0	0	0	0	0	0
34	2651	1.233	0	0	0	N/A	0	0	0	0	0	0	0
3x		53	0	32	0	0	28	34	0	3	9	7	0
4	75572	349	585	453	621	844	34695	45494	3767	40907	959	1500	17997
43	104001	0	580	0	0	0	0	437	176	879	754	0	101
4x	73955	349	5	453	621	844	34695	45057	3591	40028	205	1500	17896
5	185541	13799	0	4950	103	59624	334	323069	21514	120737	5798	33760	877
54	51098	3760	0	1080	0	15419	0	26386	4892	17069	1113	4567	0
5x	200939	10039	0	3870	103	44205	334	296683	16622	103668	4685	29193	877
6	114584	35757	0	21677	360	202418	44485	381212	687428	225682	237318	66094	1736
61	64501	177	0	0	0	834	4925	127	73850	162	22621	240	496
62	85391	5400	0	1536	0	5897	147	2317	4570	7453	366	4421	0
63	49469	867	0	1043	167	1541	2289	429	358	824	0	1903	0
64	174605	2550	0	2045	0	16055	0	27531	3626	12513	1016	8592	0
65	97979	11181	0	10075	0	92529	347	11528	480547	17823	209315	26071	334
66	110941	1737	0	1055	0	12334	0	23928	44851	13602	2234	4165	713
67	198596	6915	0	1914	0	42833	0	152608	66730	111272	0	9126	0
68	172652	1042	0	461	0	4902	36637	141137	1926	31074	0	4488	118
69	131869	5886	0	3477	0	25494	0	21607	10969	30959	1642	7088	0
6x	114584	2	0	71	193	-1	140	0	1	0	124	0	75
7	54633	46712	0	17513	0	200471	0	692929	22417	393088	39272	51817	0
8	52261	15723	0	7514	0	48700	312	37131	45345	23948	16457	6937	550
81	89508	976	0	315	0	3087	0	293	367	1634	157	1468	0
8x	50071	14747	0	7199	0	45613	312	36838	44978	22314	16300	5469	550
9	61783	659	130	1918	0	8320	9556	36877	7701	137	720	1013	430
x		0	95	1	153	-1	0	0	0	1	-1	1	74
Embodied Energy ('000,000,000,000 Btu)													
Total	4.297	15.82	5.871	7.115	2.595	67.005	34.562	256.972	140.088	110.023	50.249	39.845	20.119
Energy Intensive Mtls		9.019	0	3.237	.021	32.763	8.3	135.735	23.284	62.967	3.073	22.149	.197

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('000 MT

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282, 284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton). Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-2

Foreign Trade of Selected Countries, Per Capita GDP of US$180-260, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Philippines Imports	Philippines Exports	Egypt (UAR) Imports	Egypt (UAR) Exports	Korea Imports	Korea Exports	Ghana Imports	Ghana Exports	Tunisia Imports	Tunisia Exports	Ivory Coast Imports	Ivory Coast Exports
TOTAL		1183823	799472	792003	557824	996140	320229	307183	271150	260311	149248	262798	325142
0	56319	178239	198628	267598	107817	94115	37928	51302	202516	55427	27147	30093	197938
1	48213	6603	13525	17739	4620	783	7019	3939	0	1865	10276	7780	0
2	131162	56537	464842	68123	300063	208473	58005	4402	55162	20792	39725	5137	103344
2311	65553	-	0	-	0	-	0	-	0	-	0	-	2255
23x	214399	4945	0	3174	0	10208	0	283	0	298	0	0	1
25	178868	5726	0	6736	0	16600	0	0	0	0	3485	0	0
27	140599	6821	0	5018	10251	12603	5758	1604	14768	7933	24682	2176	1722
28	246229	2535	103810	7786	410	20554	21568	0	13136	0	6797	0	2077
282	15.43	0	0	51720	0	313074	0	0	0	0	21834	0	4437
284	70.78	32118	3724	8954	0	1991	0	0	1056	0	1351	0	0
28x	116233	67	101841	584	410	473	21568	0	12927	0	5595	0	1916
2x	63851	36510	361032	45409	289402	148508	30679	2515	27258	12561	4761	2961	97289
3		114420	12922	56332	20987	61607	1772	18367	1852	10554	22177	14369	3724
32	188.9	14.433	0	480.818	0	89.699	172.318	29.857	0	145822	0	0	0
33		113648	12748	48651	20962	59384	0	17999	1852	6919	22138	14343	3682
331	2319	6365	0	8.291	882.498	1055	0	771.787	0	278.247	1566	661.745	0
332	509011	18062	12748	10345	9837	21338	0	7213	1852	3194	2127	2215	3682
33x		-1	0	38306	11125	0	0	1	0	0	0	0	0
34	2651	0	3.712	8.291	0	0	0	0	0	0	0	0	0
3x		10	0	1	25	81	20	14	0	12	39	26	42
4	75572	4955	59437	42566	884	6945	119	4173	320	13573	15396	3685	1184
43	104001	348	0	249	803	488	0	0	0	1293	0	0	0
4x	73955	4607	59437	42317	81	6457	119	4173	320	12280	15396	3685	1184
5	185541	107390	4599	68354	4118	113043	2359	38191	947	20497	22029	20660	1963
54	51098	15630	1024	9206	1320	7516	149	9295	0	6224	0	6628	0
5x	200939	91760	3575	59148	2798	105527	2210	28896	947	14273	22029	14032	1963
6	114584	233913	41653	100508	106691	183720	101382	83482	10054	64098	10014	84964	11054
61	64501	541	0	101	403	499	140	2861	0	597	0	478	0
62	85391	7399	353	3357	236	837	2044	7430	0	3963	0	6032	0
63	49469	690	35917	3601	276	501	36626	384	417	1227	396	315	2418
64	174605	32832	142	20302	0	4561	1830	7923	0	6009	0	7742	1042
65	97979	33824	4437	17879	102778	69636	49039	33115	0	18280	1981	36481	2019
66	110941	14174	187	7760	807	12470	1000	9828	0	5290	594	7650	409
67	198596	94285	0	33909	455	56078	1948	6541	0	16652	4121	10091	137
68	172652	22135	416	5174	1289	12416	1780	3218	9461	2962	2708	2001	1090
69	131869	28031	200	8425	390	26723	6976	12183	0	9119	174	14173	3852
6x	114584	2	1	0	57	-1	-1	-1	176	-1	40	1	87
7	54633	439350	732	159188	3130	310195	14185	83095	0	62261	861	73788	3973
8	52261	28223	2724	10508	9467	17221	97239	18438	0	11222	1623	21882	1845
81	89508	2232	0	368	0	1438	347	1821	0	1505	0	1240	0
8x	50071	25991	2724	10140	9467	1233	96892	16617	0	9717	1623	20642	1845
9	61783	14193	409	1086	0	0	219	1794	248	0	0	438	0
x		0	1	1	47	38	2	0	51	22	0	2	117
Embodied Energy ('000,000,000,000 Btu)													
Total		107.876	60.941	66.648	43.206	97.792	22.552	28.818	19.571	23.645	15.446	22.368	21.916
Energy Intensive Mtls		57.995	7.304	30.209	5.882	51.3	1.458	12.777	2.766	9.425	7.418	7.648	2.666

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('000 MT

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton). Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-3

Foreign Trade of Selected Countries, Per Capita GDP of US$300-399, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Colombia Imports	Colombia Exports	Taiwan Imports	Taiwan Exports	Turkey Imports	Turkey Exports	Malaysia Imports	Malaysia Exports	Brazil Imports	Brazil Exports
TOTAL		496862	509923	577924	488743	684669	522334	1127452	1167960	1666646	1654037
0	56319	24130	367716	39796	191259	4918	190977	256298	70552	312369	1031788
1	48213	1542	4432	8154	1446	244	118547	31825	8603	3868	22055
2	131162	26944	21608	131708	24227	51498	178084	58879	658072	57230	389180
2311	65553	-	125	-	0	-	0	0	400846	-	3888
23x	214399	7041	125	4958	0	13620	0	16341	19	10308	2173
25	178868	5795	0	6557	1999	2066	0	1209	0	8506	1480
27	140599	4603	0	4362	1450	3385	8193	9981	555	22859	4847
28	246229	639	225	9542	1407	2351	10463	13661	57347	1157	124810
282	15.43	4547	0	141548	1951	39027	0	5844	37230	0	8122
284	70.78	0	0	5377	0	1136	0	713	30644	123	0
28x	116233		225	1437	1215	116	10463	12875	52594	920	124512
2x	63851	8866	21133	106289	19371	30076	159428	17687	199305	14400	251982
3		7070	74690	21744	4648	53708	447	156809	72930	260486	834
32	188.9	0	0	9.315	3.87	12.18	0	18.118	0	1581	0
33		7070	74665	21480	4482	53261	421	155680	72260	219229	834
331	2319	0	4310	0	0	2480	0	7959	936.688	10559	0
332	509011	7070	13453	21480	4482	16392	421	39395	60247	46817	834
33x		0	0	0	0	-1	26	0	0	0	0
34	2651	0	0	0	0	0	0	0	0	278.897	0
3x		0	25	0	0	22	26	455	596	1	0
4	75572	10653	0	4814	185	4767	7341	4941	46234	17027	36979
43	104001	156	0	452	0	875	234	369	0	0	7785
4x	73955	10497	0	4362	185	3892	7107	4572	46234	17027	29194
5	185541	85360	4681	71881	16133	129064	4284	85922	13260	230394	29641
54	51098	13707	1817	7371	438	9658	0	14906	1967	14363	2472
5x	200939	0	2864	64510	15695	119406	4284	71016	11293	216031	27169
6	114584	83805	31436	92175	141214	125749	21272	199470	271583	235182	85817
61	64501	0	2420	392	585	126	0	781	132	336	7469
62	85391	2631	1915	712	2262	5738	0	6961	4679	1927	807
63	49469	228	712	0	30981	319	139	2224	8626	426	8125
64	174605	16392	8568	2210	4092	18600	0	23041	999	25726	167
65	97979	6331	7181	20764	61522	20585	2505	47870	4766	3999	11011
66	110941	4052	6205	1363	18384	11469	314	19551	4527	12039	7300
67	198596	32152	479	45539	13631	36726	1578	53687	2056	69487	47825
68	172652	11105	2175	10747	2977	16409	16567	8312	243340	79957	409
69	131869	10835	1781	10367	6782	15777	130	36985	2173	41286	2704
6x	114584	79	0	81	-2	0	39	58	285	-1	0
7	54633	229108	3423	189243	40442	292420	238	241984	5718	474994	43627
8	52261	17472	1799	15906	67817	22294	1144	65856	10569	61582	4174
81	89508	187	175	180	1441	369	0	3480	125	145	154
8x	50071	17285	1624	15726	66376	21925	1144	62376	10444	61437	4020
9	61783	10778	115	2503	1372	7	0	25468	10438	13514	9942
x		0	23	0	0	0	0	0	1	0	0
Embodied Energy ('000,000,000,000 Btu)											
Total		38.033	33.936	63.252	38.466	75.079	34.197	105.449	131.857	164.194	116.32
Energy Intensive Mtls		17.31	9.417	37.417	9.728	49.001	4.249	54.162	75.536	103.067	16.212

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('00C MT

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton). Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-4

Foreign Trade of Selected Countries, Per Capita GDP of US$500-599, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Portugal		Yugoslavia		Mexico	
		Imports	Exports	Imports	Exports	Imports	Exports
TOTAL		1059160	701367	1707331	1251664	1745896	1025654
0	56319	149027	107646	174588	285198	60694	458726
1	48213	8087	57292	7536	50958	5576	8463
2	131162	154728	63013	198755	106227	154441	235453
2311	65553	-	0	-	0	-	2356
23x	214399	6362	0	14396	0	20831	90
25	178868	3982	15266	8192	5886	16380	2650
27	140599	9217	9364	20536	9441	19090	79669
28	246229	1196	6795	12064	17720	34552	20423
282	15.43	4573	13508	32993	42354	702029	0
284	70.78	453	2301	5521	2006	22913	0
28x	116233	912	5757	8510	15283	5060	20423
2x	63851	133971	31588	143567	73180	63588	130265
3		90687	9883	84556	22493	56706	39485
32	188.9	688.585	0	1581	133.664	209.456	0
33		69967	9710	59721	19945	26199	30540
331	2319	3	0	2589	321.805	N/A	1574
332	509011	29368	9710	20501	15130	25168	11370
0 33x		0	0	-1	0	-1	1
34	2651	150.395	20217	0	10.846	274.903	N/A
3x		0	2	1020	1478	356	0
4	75572	10679	8590	30749	2285	4028	2096
43	104001	445	0	1741	0	1711	1895
4x	73955	10234	8590	29008	2285	2317	201
5	185541	95501	46349	167334	74156	241127	67191
54	51098	20842	6767	16284	7606	23355	22738
5x	200939	74659	39582	151050	66550	217772	44453
6	114584	207453	297018	401760	280710	216661	159392
61	64501	1625	1125	5679	11428	1602	2636
62	85391	5334	6690	24812	2650	6161	658
63	49469	905	50757	4000	17846	4100	4052
64	174605	10553	5831	15261	19486	38364	1166
65	97979	37438	142874	88945	48941	13307	29826
66	110941	51119	62362	29675	21134	15772	10106
67	198596	53894	9542	137609	45590	63406	15497
68	172652	25944	2712	57314	76591	11084	86943
69	131869	20641	15124	38465	37042	62865	8509
6x	114584	0	1	0	2	0	-1
7	54633	303342	35795	571756	254663	900819	23251
8	52261	39318	66614	69918	173771	105057	30185
81	89508	1233	2033	1889	3327	1685	170
8x	50071	38085	64581	68029	170444	103372	30015
9	61783	337	9167	379	1203	788	1410
x		1	0	0	0	-1	2
Embodied Energy ('000,000,000,000 Btu)							
Total		100.481	64.303	164.112	111.125	163.985	91.584
Energy Intensive Mtls		49.052	19.008	85.227	47.807	85.17	33.505

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('00

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton). Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. X

Annex Table B-5

Foreign Trade of Selected Countries, Per Capita GDP of US$800-999, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Chile		Greece		Argentina		Spain	
		Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
TOTAL		722499	907684	1186288	495213	1095538	1464528	3453134	1375235
0	56319	107401	37266	168634	133190	65067	1025657	480938	496359
1	48213	5134	848	1399	144912	5456	4938	62201	58099
2	131162	52327	128752	119413	86225	131281	210963	490837	70360
2311	65553	-	0	-	0	-	0	-	0
23x	214399	4237	0	4026	0	18448	1607	35289	818
25	178868	1402	9702	12732	0	20303	0	31801	2518
27	140599	7214	21663	11384	14174	9983	1970	44139	18609
28	246229	219	83230	3373	12535	15627	3313	72034	10716
282	15.43	0	0	0	0	29885	0	351306	0
284	70.78	0	0	0	1640	0	0	26525	12878
28x	116233	219	83230	3373	12230	12099	3313	41058	10114
2x	63851	39255	14157	87898	59516	66920	204073	307574	37699
3		60977	1180	94142	4778	93913	7693	427185	80078
32	188.9	288.719	0	238.482	0	846.001	0	1554	22.588
33		56884	0	87732	4778	57528	7572	382837	64722
331	2319	2265	0	3992	0	2288	9.239	21217	0
332	509011	13949	0	28802	4778	11373	7469	25230	64722
33x		0	0	1	0	0	0	0	0
34	2651	36.09	37.928	14.891	0	355.378	1.712	N/A	0
3x		-1	29	-1	0	0	3	2465	14956
4	75572	8450	1437	3006	24023	1380	94543	25900	63706
43	104001	243	407	556	161	206	975	2433	419
4x	73955	8207	1030	2450	23862	1174	93568	23467	63287
5	185541	73456	8198	120604	15908	159514	44254	317908	86167
54	51098	9174	0	32945	646	18489	7552	30593	5602
5x	200939	64282	8198	87659	15262	141025	36702	287315	80565
6	114584	84655	725064	220976	70820	279745	31340	496077	190435
61	64501	0	0	3606	7892	0	11732	7191	13484
62	85391	12872	0	14863	840	7362	529	10231	8339
63	49469	307	107	6054	317	408	0	5278	25241
64	174605	4621	11941	21794	1535	44975	360	33665	4608
65	97979	13106	0	51931	15636	10934	462	59567	36463
66	110941	7889	0	15112	3892	14641	1208	52561	11675
67	198596	10252	7745	64432	5683	134560	12139	186388	9821
68	172652	11333	704873	17379	32294	45256	1578	92252	49785
69	131869	24198	339	25806	2730	21530	3309	48944	31019
6x	114584	77	59	-1	1	79	23	0	0
7	54633	296822	2484	414258	5625	309913	29008	993477	178241
8	52261	31586	2445	43374	9731	48767	15793	158509	147988
81	89508	661	0	3925	0	124	0	9589	9735
8x	50071	30925	2445	39449	9731	48643	15793	148920	138253
9	61783	1691	10	481	0	503	338	102	3802
x		0	0	1	1	-1	1	0	0
Embodied Energy ('000,000,000,000,000 Btu)									
Total		60.227	144.901	109.807	39.631	121.146	97.14	288.406	131.918
Energy Intensive Mtls		25.976	128.703	55.017	12.471	84.103	14.267	142.651	61.109

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('000mt)

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton).
Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-6

Foreign Trade of Selected Countries, Per Capita GDP of US$1400-2299, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Japan Imports	Japan Exports	Italy Imports	Italy Exports	Finland Imports	Finland Exports	United Kingdom Imports	United Kingdom Exports	Netherlands Imports	Netherlands Exports	Belgium-Luxem. Imports	Belgium-Luxem. Exports
TOTAL		11664019	10442403	9697027	8701682	1697879	1534440	17714267	13861495	8337462	7287608	7175903	7032422
0	56319	1733051	361199	1714470	807250	155050	55733	4431028	462726	1023288	1634918	861972	504612
1	48213	71773	11242	64423	95724	18517	2861	423436	448949	118295	92696	119867	49439
2	131162	4442814	210272	1929617	228063	144248	459263	2613886	402851	836811	583317	952037	394040
2311	65553	-	0	-	0	-	0	-	0	-	0	-	0
23x	214399	131737	23058	89098	16893	7565	0	122689	30509	19864	48062	21064	2106
25	178868	116112	1006	168826	651	1091	242137	347539	5075	74254	9981	38622	12984
27	140599	193957	6867	120416	45604	24214	2364	142804	69100	119751	56846	143094	97761
28	246229	1600496	540	387262	12305	11060	11836	558208	54845	142550	97151	284517	63255
282	15.43	6708000	4495	4969000	2544	111861	4906	3211	1134000	164466	566080	196946	818430
284	70.78	127429	N/A	198049	19676	799	1747	120647	34575	99104	87495	233176	75690
28x	116233	1207407	174	133385	8081	6489	10863	524025	5601	114702	37400	210450	8357
2x	63851	2400512	178801	1164015	152610	100318	202926	1442646	243322	480392	371277	464740	217934
3		2239660	33035	159076	532418	191029	6382	2011065	354598	867415	573080	615472	195154
32	188.9	25712	105.576	12532	221.228	2795	20.415	69.764	2656	7541	4707	10108	2033
33		1798216	29915	1417529	520292	155992	5629	1970075	315349	741125	433939	416625	160280
331	2319	N/A	0	86439	0	4970	0	74641	192.368	31871	0	17588	275.838
332	509011	340976	29841	89468	520279	81276	5629	625430	311468	199125	433929	121656	155620
33x		0	74	0	13	0	0	0	0	-1	10	0	-1
34	2651	1209	23.103	36.678	216.509	5.798	307	977.42	12.464	N/A	N/A	N/A	N/A
3x		0	1	-1.43e6	1	295	184	1370	102	558	4021	1	0
4	75572	50583	19253	134400	15053	2362	3826	172520	16479	86780	61663	39011	21092
43	104001	4394	762	8005	1938	1129	1236	15239	8732	6111	27692	6087	4900
4x	73955	46189	18491	126395	13115	1233	2590	157281	7747	80669	33971	32924	16192
5	185541	610645	684369	669511	681365	175629	34116	905901	1359253	657811	892837	517133	476694
54	51098	98042	37255	80838	78343	25530	869	44011	216226	54641	82389	79351	39514
5x	200939	512603	647114	588673	603022	150099	33247	861890	1143027	603170	810448	437782	437180
6	114584	1258223	3643790	1594690	1871378	358982	693593	3497570	3469999	1808512	1397445	1845687	3329773
61	64501	11194	14960	45996	54906	9228	2548	75201	84153	30870	28381	25580	32367
62	85391	5220	119423	41627	100352	19396	2188	42361	148379	50346	48152	57419	42066
63	49469	33107	111578	9913	69218	5969	87570	222842	14304	47371	23206	30348	35573
64	174605	19293	89855	77638	66603	8028	469795	426608	148111	159122	150144	137241	98073
65	97979	102274	1229404	221908	627241	92775	27512	500680	690387	455893	482144	293539	619679
66	110941	90538	297000	123347	215015	19546	7962	689873	761344	191478	89422	368582	551563
67	198596	369228	1272533	481313	354827	114711	41176	330391	631662	429980	304887	268779	1161941
68	172652	589665	105790	477210	73191	44375	38214	1046334	569013	209903	129391	497945	604274
69	131869	37704	403247	115738	310026	44954	16630	163280	422646	233549	141716	166254	184236
6x	114584	0	0	0	-1	0	-2	0	0	0	2	0	1
7	54633	971612	3817264	1617028	2954161	526442	212745	2384082	5812985	1998540	1485888	1697071	1369769
8	52261	248652	1613538	352090	1473885	110814	65688	1033799	1132901	817056	477077	519175	568137
81	89508	3347	21291	15374	36595	3746	3378	16195	30713	35206	22587	25616	21304
8x	50071	245305	1592247	336716	1437290	107068	62310	1017604	1102188	781850	454490	493559	546833
9	61783	37005	48441	1461722	42385	14806	233	240981	400754	122954	88687	8479	123713
x		1	0	0	0	0	0	-1	0	0	0	-1	-1
Embodied Energy ('000,000,000,000 Btu)													
Total		1030.379	979.893	876.722	929.235	180.358	193.182	1720.015	1345.63	783.294	837.394	675.365	847.037
Energy Intensive Mtls		504.078	437.017	404.662	484.47	105.193	149.66	900.76	645.216	389.514	504.92	324.629	522.043

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('000 MT).

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton).
Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-7

Foreign Trade of Selected Countries, Per Capita GDP of US$2400-2999, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	France Imports	France Exports	German Fed. Rep. Imports	German Fed. Rep. Exports	Australia Imports	Australia Exports	Norway Imports	Norway Exports	Denmark Imports	Denmark Exports	Switzerland Imports	Switzerland Exports
TOTAL		12377461	11377444	17350636	21735688	3455960	3295142	2746323	1736352	3133901	2473682	4099076	3470938
0	56319	1679960	1414137	3245483	460937	135156	1338046	206532	249436	298440	1047380	528222	137772
1	48213	190176	354315	335523	79728	41682	9688	22242	2930	53797	41847	90216	47252
2	131162	1579884	726294	2588091	614284	235362	1179003	245292	190232	256741	160862	261863	75762
2311	65553	-	0	-	0	-	0	-	0	-	0	-	0
23x	214399	108160	48509	107729	38517	29646	465	4974	0	6829	211	8651	765
25	178868	133164	20245	168411	13730	30771	218	13314	77642	11148	5507	26241	4384
27	140599	155136	94650	227422	82978	71266	3123	21695	24280	22539	12738	32599	6061
28	246229	221807	202259	687541	140547	4946	228189	84379	33646	3249	9204	4415	18717
282	15.43	464509	2191000	1105000	2170000	0	250852	24021	6379	0	62578	22796	30509
284	70.78	59554	146168	278183	204955	4328	8157	2490	51018	11960	13545	5047	34205
28x	116233	185221	61563	516325	14505	3253	209183	82962	27457	663	1947	2030	1648
2x	63851	961617	360631	1396988	338512	98733	947008	120930	54664	212976	133202	189957	45835
3		1795663	347448	1735452	728434	270168	122285	197497	30512	331713	32878	257324	4849
32	188.9	15482	925.379	8582	26619	13.439	N/A	1055	189.21	4341	77.481	1092	23.229
33		1449763	299910	1607176	228287	269722	33613	175823	23637	276641	25790	233636	4412
331	2319	72348	0	71999	81.687	15175	N/A	3192	0	6485	0	3936	0
332	509011	143276	299901	443175	226896	33417	33017	118568	23637	160292	25787	160868	4411
33x		0	9	0	0	0	0	0	0	0	3	1	1
34	2651	745.884	493.655	721.868	333.154	0	2.17	N/A	N/A	77.657	17.022	3.349	0
3x		30153	14609	0	0	39	-1	583	4089	6381	5286	0	85
4	75572	131102	33312	156624	72397	14594	15180	6042	43459	11371	28113	18313	3814
43	104001	18777	3864	12711	26799	1665	987	785	17762	3526	4335	4295	1418
4x	73955	112325	29448	143913	45598	12929	14193	5257	25697	7845	23778	14018	2396
5	185541	962419	1244133	940823	2704657	334549	90479	206710	138522	284467	148314	402648	702980
54	51098	91152	177034	83006	288378	40543	13460	16573	2981	29618	38107	45551	213622
5x	200939	871267	1067099	857817	2416279	294006	77019	190137	135541	254849	110207	357097	489358
6	114584	2394461	2874223	3796405	4966171	694322	333077	496339	626348	766610	213947	941352	581746
61	64501	50228	97216	108589	95807	6873	6757	8683	4787	18604	5970	39797	8647
62	85391	55960	177392	114262	168375	36790	2711	21098	7762	44594	8066	40570	11994
63	49469	44235	48589	92721	77755	12867	1957	15959	9925	26196	21877	26313	10173
64	174605	192067	139282	369968	195373	101152	10683	22245	136398	99973	15411	61158	20581
65	97979	334246	705098	852812	832184	279171	10856	119615	21460	199160	60012	179474	250684
66	110941	209558	221455	312592	459674	60773	18663	36704	12606	54474	25730	135834	87906
67	198596	717729	951810	734001	1758664	90015	104403	134024	121510	172422	24057	210504	23778
68	172652	542235	254814	1008008	562510	27369	145292	64075	277721	71946	10519	142202	73291
69	131869	248203	278567	203452	815829	79312	31755	73937	34178	79241	42306	105500	94693
6x	114584	0	0	0	0	0	0	-1	1	0	-1	0	-1
7	54633	2737491	3303557	2501565	9782744	1315675	129751	1147561	385340	861789	572463	1002662	1056641
8	52261	900677	1027753	1268001	2026004	289989	38779	211090	61208	264899	221329	567296	839725
81	89508	46121	30314	35090	101603	4000	1686	8393	3381	13430	9825	15381	7772
8x	50071	854556	997439	1232911	1924401	285989	37093	202697	57827	251469	211504	551915	831953
9	61783	5628	52272	782669	300332	124463	38854	7019	8363	4074	6549	29180	20397
x		0	0	0	0	0	0	-1	2	0	0	0	0
Embodied Energy ('000,000,000,000 Btu)													
Total		1079.304	1165.753	1638.688	2086.555	297.651	262.346	278.934	210.815	338.73	180.202	428.118	296.947
Energy Intensive Mtls		564.701	638.435	835.573	1092.226	128.21	80.105	143.57	149.051	200.377	45.586	237.222	122.494

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34 ('000 MT).

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton). Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Annex Table B-8

Foreign Trade of Selected Countries, Per Capita GDP of US$3000-4999, 1967, and Calculated Total Energy Embodied in Non-Energy Imports and Exports a/

Commodity Classification (SITC No.) b/	Embodied Energy Coef. c/	Canada Import	Canada Exports	Sweden Imports	Sweden Export	United States Imports	United States Exports
TOTAL		10250065	10555253	4700283	4525646	26815632	31147209
0	56319	737443	1337204	469387	122173	4003122	4064069
1	48213	56555	181968	68310	2255	698064	648742
2	131162	585941	2492493	278943	1003637	2963545	3280148
2311	65553	-	0	-	0	-	0
23x	214399	46426	57999	28423	3629	197762	184345
25	178868	7889	508458	921	438166	402696	256060
27	140599	66677	256562	47905	10656	269493	317676
28	246229	166786	940949	56083	205851	973937	519563
282	15.43	511352	418607	94455	17247	N/A	6926000
284	70.78	41347	110571	77074	N/	N/A	183588
28x	116233	126307	867933	36688	199719	899383	160236
2x	63851	298163	728525	145611	345335	1119657	2002504
3		666230	558083	526523	37080	2250067	1104375
32	188.9	14977	1522	2717	23.322	N/A	46208
33		494059	383020	472067	29038	2088132	538889
331	2319	23914	23903	6145	34.457	70884	3896
332	509011	164815	14986	363917	28468	920741	446870
33x		0	0	0	0	0	0
34	2651	N/	N/A	3.512	0	N/A	2609411
3x		9285	15065	6345	7299	-1	0
4	75572	32121	16961	21312	14437	122448	338053
43	104001	3707	624	4111	4815	9615	18175
4x	73955	28414	16337	17201	9622	112833	319878
5	185541	566199	371978	395159	171519	963069	2802522
54	51098	53295	19567	45848	18578	71656	287978
5x	200939	512904	352411	349311	152941	891413	2514544
6	114584	1598870	2563391	1027718	1262448	6387852	3390106
61	64501	29616	12145	24304	19333	89222	72429
62	85391	63022	21802	48169	36964	93653	156038
63	49469	45140	107702	27854	33041	302520	89554
64	174605	82955	978279	42173	412084	961607	466387
65	97979	359039	48570	280466	70510	811904	530932
66	110941	190782	23151	80531	36039	731064	340393
67	198596	339332	232492	214862	406642	1372760	561163
68	172652	184194	1054655	193577	106922	1562343	546984
69	131869	304791	84596	115781	140914	462779	626227
6x	114584	-1	-1	1	-1	0	-1
7	54633	4767632	2830007	1369574	1673019	5791218	12573000
8	52261	976556	120701	531854	220839	2576206	2003059
81	89508	37049	7723	12642	32701	33485	64871
8x	50071	939507	112978	519212	188138	2542721	1938188
9	61783	262518	82468	11503	18239	1060041	943138
x		0	-1	0	0	0	-3
Embodied Energy ('000,000,000,000 Btu)							
Total		832.354	1041.443	556.524	488.704	2713.281	2633.493
Energy Intensive Mtls		311.996	580.896	345.142	295.544	1472.484	1105.372

a/ Per Capita GDP in 1970 US$. Foreign trade is in $US million except SITC 282 & 284 (MT) & 32,331,34

b/ "x" = all other SITC commodities in the classification which are not separately shown.

c/ Units are Btu/US$ except for 282 ,284 (Btu/metric ton); 32, 331, 34 (Btu/thousand metric ton).
Energy intensive materials consist of SITC 23, 25, 332, 5x (=51-53,55,56,58), 64, 67 and 68.

Source of trade data: United Nations, Commodity Trade Statistics, 1967, Statistical Papers, Series D, vol. XVII

Table C-1

Aggregate Commercial Energy Consumption and Trade in Embodied Energy, Sample Countries, 1967

Country and ID No.		Country Population ('000) (1)	Consumption, '000 MTCE Aggregate Energy UN J-19 (1976) (2)	Consumption, '000 MTCE Aggregate Energy As Adjusted (3)	Adjusted Per Capita Consumption kgCE (4)	Adjusted Per Capita Consumption BPDOE/1000 (5)	Estimated Embodied Energy Total, thousand MTCE Imports (6)	Estimated Embodied Energy Total, thousand MTCE Exports (7)	Estimated Embodied Energy Total, thousand MTCE Net Imports (8)	Estimated Embodied Energy Imports Per Capita BPDOE/1000 (9)	Embodied Energy Imports/Tot. Consumpt'n (10)
Argentina	1	22787	33176	33540	1.472	20.244	4361	3497	864	2.632	.13
Brazil	2	87377	33717	42094	.482	6.629	5911	4209	1702	.93	.14
Chile c/	3	8845	9385	10605	1.199	16.489	2168	3496	-1328	3.371	.204
Colombia	4	19553	11248	12599	.644	8.857	1369	1222	147	.963	.109
Egypt	5	30620	8375	8923	.291	4.002	2399	1555	844	1.077	.269
Ethiopia	6	23668	507	568	.024	.33	570	211	359	.331	1.004
Ghana	7	8095	891	1320	.163	2.242	1037	705	332	1.762	.786
Greece	8	8646	7864	8368	.968	13.312	3953	1427	2526	6.288	.472
India	9	510583	85935	71799	.141	1.939	9251	5043	4208	.249	.129
Ivory Coast	1	4477	662	718	.16	2.2	805	789	16	2.473	1.121
Korea, Rep.	2	29356	17197	17470	.595	8.183	3521	812	2709	1.649	.202
Malawi	3	4140	167	193	.047	.646	256	93	163	.85	1.326
Malaysia c/	4	9835	4267	4475	.455	6.257	3796	3341	455	5.308	.848
Mexico	5	45713	39666	42865	.938	12.9	5903	3297	2606	1.776	.138
Nigeria c/	6	61449	1930	1970	.032	.44	2412	1054	1358	.54	1.224
Pakistan/Bang.	7	118054	10640	11120	.094	1.293	3961	1809	2152	.461	.356
Philippines	8	33652	8300	8783	.261	3.589	3884	2194	1690	1.587	.442
Portugal	9	9095	5116	6679	.734	10.094	3617	2315	1302	5.469	.542
Spain	10	32647	40625	46724	1.431	19.68	10383	4749	5634	4.374	.222
Sri Lanka	11	11686	1440	1557	.133	1.829	1434	724	710	1.688	.921
Taiwan	12	13603	9419	10177	.748	10.287	2277	1385	892	2.302	.224
Tunisia	13	4823	1081	1093	.227	3.122	851	556	295	2.427	.779
Turkey	14	32756	13382	14056	.429	5.9	2703	1231	1472	1.135	.192
Yugoslavia	15	19804	23615	26714	1.349	18.552	5908	4001	1907	4.103	.221
Australia	16	11822	58263	60519	5.119	70.399	10715	9444	1271	12.465	.177
Belgium-Lux.	17	9875	46980	47696	4.83	66.424	24313	30493	-6180	33.86	.51
Canada	18	20014	154347	192541	9.62	132.299	29965	37492	-7527	20.59	.156
Denmark	19	4826	20945	21323	4.418	60.758	12194	6487	5707	34.749	.572
Finland	20	4581	13921	17223	3.76	51.709	6493	6955	-462	19.492	.377
France	21	49552	160964	175035	3.532	48.574	38855	41967	-3112	10.784	.222
Germany, FR	22	59687	259096	266273	4.461	61.35	58993	75116	-16123	13.593	.222
Italy	23	52624	116613	131140	2.492	34.271	31562	33452	-1890	8.248	.241
Japan	24	101026	230067	250782	2.482	34.134	37094	35276	1818	5.05	.148
Netherlands	25	12557	45702	45606	3.632	49.949	28199	30146	-1947	30.884	.618
Norway	26	3784	15133	29775	7.869	108.218	10042	7589	2453	36.496	.337
Sweden	27	7856	39136	53141	6.764	93.022	20035	17593	2442	35.073	.377
Switzerland	28	6071	17321	24099	3.97	54.597	15412	10690	4722	34.912	.64
United Kingdom	29	54875	267028	256709	4.678	64.334	61921	48443	13478	15.518	.241
United States	30	198456	1941458	2008215	10.119	139.161	97678	94806	2872	6.769	.049
SUMMARY: Subgroup Totals and Weighted Means, ranked by GDP/capita (1970 US$), Taiwan Included											
a. $51-125	(5)	717894	99179	85650	.119	1.637	16452	8208	8244	.315	.192
b. 126-309	(8)	142262	49194	52463	.369	5.075	15300	8568	6732	1.479	.292
c. 310-762	(7)	218183	129182	147060	.674	9.269	30132	19764	10368	1.899	.205
d. 763-1878	(7)	231156	451651	498382	2.156	29.65	96012	88848	7164	5.712	.193
e. 1879-2948	(9)	213049	891432	927035	4.351	59.837	260640	260388	252	16.824	.281
f. 2949-4628	(3)	226326	2134941	2253897	9.959	136.961	147672	149904	-2232	8.973	.066
Total	(39)	1748870	3755579	3964487	2.267	31.177	566201	535665	30536	4.452	.143

See following page for sources and notes.

Table C-1, Sources and Notes

Source: col (1), World Bank, World Tables, 2nd Ed [1980] (Washington, 1980)
(2), UN, World Energy Supplies, 1950-1974, Series J No. 19 (NY, 1976)
(3), Col (2) adjusted by (a) changing coal energy values for India, Pakistan, Spain, Finland, France, Norway, and UK to agree with implicit energy value for 1973 as reported in UN Series J No. 22 (1979); and (b) converting primary electricity consumption to thermal equivalent, assuming efficiencies of .30 (or .36 in the case of "hydro" countries)
(4), Col (3)/Col (1)
(5), Col (4) x .687623 x (7.3/365) x 1000
(6) & (7), 36 x trillion Btu values from Annex Tables B-1 through B-6
(8), Col (6) - Col (7)
(9), Col (6)/Col (1) converted to BPD oil equivalent (BPDOE) using same procedures as for Col (5)
(10), Col (6)/Col (3)

a/ Taiwan's energy use equals implicit "all other" consumption derived from regional and country data under "Far East, Developing" section of Table 2, pp. 78-91, UN Series J No. 19.

b/ Per capita GDPs based on World Bank data file print outs of January and February 1982, supplemented where needed by Wold Bank, World Tables, 1980.

c/ For Chile, copper exports (SITC 682) converted at 122 million Btu/MT and for Malaysia and Nigeria tin exports (SITC 687) converted at 38.8 million Btu/MT instead of at the 172,652 Btu/US$ used for SITC 68.

Table C-2

Direct Foreign Trade in Energy and Energy Embodied in All Imports and Exports, Sample Countries, 1967

Country	1967 Population ('000) (1)	Direct Foreign Trade, '000 MTCE: 1967 Aggr. Energy (UN J-19) Imports (2)	Exports + Bunkers (3)	Net Imports (4)	Imports Per Capita BPDOE/1000 (5)	Estimated Embodied Energy: Total, in '000 MTCE Imports (6)	Exports (7)	Imports Per Capita BPDOE/1000 (8)	Ratio to Direct Trade Imports (9)	Exports (10)
Argentina	22787	5096	1736	3360	3.076	4361	3497	2.632	.856	2.014
Brazil	87377	18649	1006	17643	2.935	5911	4209	.93	.317	4.184
Chile b/	8845	3471	177	3294	5.397	2168	3496	3.371	.625	19.751
Colombia	19553	112	8474	-8362	.079	1369	1222	.963	12.223	.144
Egypt	30620	4317	3862	455	1.939	2399	1555	1.077	.556	.403
Ethiopia	23668	559	59	500	.325	570	211	.331	1.02	3.576
Ghana	8095	1098	393	705	1.865	1037	705	1.762	.944	1.794
Greece	8646	8081	1912	6169	12.854	3953	1427	6.288	.489	.746
India	510583	13670	4280	9390	.368	9251	5043	.249	.677	1.178
Ivory Coast	4477	976	363	613	2.998	805	789	2.473	.825	2.174
Korea, Rep.	29356	5582	214	5368	2.615	3521	812	1.649	.631	3.794
Malawi	4140	175	19	156	.581	256	93	.85	1.463	4.895
Malaysia b/	9835	13074	8169	4905	18.282	3796	3341	5.308	.29	.409
Mexico	45713	2352	4990	-2638	.708	5903	3297	1.776	2.51	.661
Nigeria b/	61449	806	22287	-21481	.18	2412	1054	.54	2.993	.047
Pakistan/Bangl.	118054	6347	714	5633	.739	3961	1809	.461	.624	2.534
Philippines	33652	9478	1135	8343	3.873	3884	2194	1.587	.41	1.933
Portugal	9095	5393	1293	4100	8.155	3617	2315	5.469	.671	1.79
Spain	32647	38029	11027	27002	16.02	10383	4749	4.374	.273	.431
Sri Lanka	11686	2036	796	1240	2.396	1434	724	1.688	.704	.91
Taiwan a/	13603	3811	463	3348	3.853	2277	1385	2.302	.597	2.991
Tunisia	4823	576	2505	-1929	1.642	851	556	2.427	1.477	.222
Turkey	32756	4857	377	4480	2.039	2703	1231	1.135	.557	3.265
Yugoslavia	19804	6151	1697	4454	4.271	5908	4001	4.103	.96	2.358
Australia	11822	29656	14522	15134	34.499	10715	9444	12.465	.361	.65
Belgium-Luxemb.	9875	46245	12099	34146	64.403	24313	30493	33.86	.526	2.52
Canada	20014	66485	58049	8436	45.685	29965	37492	20.59	.451	.646
Denmark	4826	23658	2520	21138	67.417	12194	6487	34.749	.515	2.574
Finland	4581	14045	566	13479	42.164	6493	6955	19.492	.462	12.288
France	49552	130550	22247	108303	36.232	38855	41967	10.784	.298	1.886
Germany, FR	59687	142565	40800	101765	32.848	58993	75116	13.593	.414	1.841
Italy	52624	141390	42731	98659	36.95	31562	33452	8.248	.223	.783
Japan	101026	198931	21756	177175	27.08	37094	35276	5.05	.186	1.621
Netherlands	12557	70439	35008	35431	77.145	28199	30146	30.884	.4	.861
Norway	3784	11405	2954	8451	41.45	10042	7589	36.496	.88	2.569
Sweden	7856	36743	3199	33544	64.321	20035	17593	35.073	.545	5.5
Switzerland	6071	15159	1238	13921	34.339	15412	10690	34.912	1.017	8.635
United Kingdom	54875	140157	28316	111841	35.125	61921	48443	15.518	.442	1.711
United States	198456	209844	87260	122584	14.542	97678	94806	6.769	.465	1.086
SUMMARY: Per Capita Means (Weighted) of Subgroups ranked by GDP/capita (1970 US$), including Taiwan										
a. $51-125 (5	143579	.03	.038	-.007	.413	.023	.011	.315	.763	.3
b. 126-309 (8	17783	.17	.125	.045	2.337	.108	.06	1.479	.633	.482
c. 310-762 (7	31169	.249	.082	.166	3.422	.138	.091	1.898	.555	1.099
d. 763-1878 (7	33022	1.77	.346	1.424	24.052	.415	.384	5.601	.235	1.112
e. 1878-2948 (9	23672	2.862	.75	2.113	39.365	1.223	1.222	16.825	.427	1.63
f. 2949-4628 (3	75442	1.383	.656	.727	19.024	.653	.662	8.974	.472	1.009
Total (39	1748870	.819	.258	.561	11.223	.324	.306	4.438	.395	1.187

Source: United Nations (1976), Table 2; World Bank (1980); and Annex B.

a/ Cols (2)-(3) equal implicit "all other countries" under Far East, Developing, UN(1976), pp. 78-91.

b/ See Annex Table C-1, footnote c/ for special copper and tin conversions /er Chile, Malaysia, Nigeria.

Table C-3

Aggregate Commodity Trade and Embodied Energy, Sample Countries, 1967

Country	1967 Population ('000) (1)	Aggregate Commodity Trade, in million US$: Imports (2)	Exports (3)	Estimated Embodied Energy — Aggregate, in quadrillion Btu: Imports (4)	Exports (5)	As Ratio to Commodities, in Btu/US$: Imports (6)	Exports (7)	1967 Per Capita GDP, 1970 US$ (8)
Argentina	22787	1095538	1464528	121.146	97.14	110581	66329	924
Brazil	87377	1666646	1654037	164.194	116.905	98518	70679	393
Chile a/	8845	722499	907684	60.227	97.117	83359	106994	827
Colombia	19553	496862	509923	38.033	33.936	76546	66551	300
Egypt	30620	792003	557824	66.648	43.206	84151	77455	199
Ethiopia	23668	143096	99990	15.82	5.871	110555	58716	68
Ghana	8095	307183	271150	28.818	19.571	93814	72178	240
Greece	8646	1186288	495213	109.807	39.631	92564	80028	911
India	510583	2721589	1605055	256.972	140.088	94420	87279	90
Ivory Coast	4477	262798	325142	22.368	21.916	85115	67404	256
Korea, Rep.	29356	996140	320229	97.792	22.552	98171	70425	213
Malawi	4140	70305	45684	7.115	2.595	101202	56803	74
Malaysia a/	9835	844732	907459	105.449	92.801	124831	102265	341
Mexico	45713	1745896	1025654	163.985	91.584	93926	89293	598
Nigeria a/	61449	625940	666771	67.005	28.665	107047	42991	80
Pakistan/Bangl'h	118054	1101114	645086	110.023	50.249	99920	77895	102
Philippines	33652	1183823	799472	107.876	60.941	91125	76227	180
Portugal	9095	1059160	701367	100.481	64.303	94869	91682	559
Spain	32647	3453134	1375235	288.406	131.918	83520	95924	931
Sri Lanka	11686	359201	334446	39.845	20.119	110927	60156	144
Taiwan	13603	577924	488743	63.252	38.466	109447	78704	318
Tunisia	4823	260311	149248	23.646	15.446	90837	103492	244
Turkey	32756	684669	522334	75.079	34.197	109657	65470	328
Yugoslavia	19804	1707331	1251664	164.112	111.125	96122	88782	563
Australia	11822	3455960	3295142	297.651	262.346	86127	79616	2609
Belgium-Luxemb'g	9875	7175903	7032422	675.365	847.037	94116	120447	2289
Canada	20014	10250065	10555253	832.355	1041.443	81205	98666	3620
Denmark	4826	3133901	2473682	338.73	180.202	108086	72848	2877
Finland	4581	1697879	1534440	180.358	193.182	106225	125897	1851
France	49552	12377461	11377444	1079.304	1165.753	87199	102462	2411
Germany, FR	59687	17350636	21735688	1638.688	2086.555	94445	95997	2558
Italy	52624	9697027	8701682	876.722	929.235	90411	106788	1493
Japan	101026	11664019	10442403	1030.379	979.893	88338	93838	1419
Netherlands	12557	8337462	7287608	783.294	837.394	93949	114907	2086
Norway	3784	2746323	1736352	278.934	210.815	101566	121413	2712
Sweden	7856	4700283	4525646	556.524	488.704	118402	107985	3676
Switzerland	6071	4099076	3470938	428.118	296.947	104443	85552	2934
United Kingdom	54875	17714267	13861495	1720.015	1345.63	97098	97077	2058
United States	198456	26815632	31147209	2713.281	2633.493	101183	84550	4620
SUMMARY: Per Capita Means (Weighted) of Subgroups ranked by GDP/capita (1970 US$), including Taiwan								
a. $51-125 (5)	143579	6.5	4.3	.0006	.0003	98012	74273	90
b. 126-309 (8)	17783	32.7	23	.003	.0017	91240	72744	212
c. 310-762 (7)	31169	38	30	.0038	.0025	100955	83859	442
d. 763-1878 (7)	33022	127.7	107.8	.0115	.0107	90358	99037	1285
e. 1878-2948 (9)	23672	358.6	339.2	.034	.0339	94777	100078	2378
f. 2949-4628 (3)	75442	184.5	204.3	.0181	.0184	98218	90067	4499
Total (39)	1735267	94.9	89.8	.009	.0086	95108	95246	1160

Source: Annex B. Population from World Bank (1980).

a/ Copper and tin exports converted using Btu/MT, not Btu/$ average for SITC 68. Btu/US$.

Table C-4

Total Embodied Energy Versus Energy Incorporated in "Energy Intensive Materials" a/

[Energy in '000,000,000,000 Btu]

Country	Total Embodied Energy			Embodied Energy in Energy Intensive Materials			Energy Intensive Mtls as % of Total b/	
	Imports	Exports	Net	Imports	Exports	Net	Imports	Exports
Argentina	121146	97140	24006	84103	14267	69836	69.4	14.7
Brazil	164194	116905	47289	103067	16212	86855	62.8	13.9
Chile c/	60227	97117	-36890	25976	80919	-54943	43.1	83.3
Colombia	38033	33936	4097	17310	9417	7893	45.5	27.7
Egypt	66648	43206	23442	30209	5882	24327	45.3	13.6
Ethiopia	15820	5871	9949	9019	0	9019	57	0
Ghana	28818	19571	9247	12777	2766	10011	44.3	14.1
Greece	109807	39631	70176	55017	12471	42546	50.1	31.5
India	256972	140088	116884	135735	23284	112451	52.8	16.6
Ivory Coast	22368	21916	452	7648	2666	4982	34.2	12.2
Korea, Rep.	97792	22552	75240	51300	1458	49842	52.5	6.5
Malawi	7115	2595	4520	3237	21	3216	45.5	.8
Malaysia c/	105449	92801	12648	54162	36480	17682	51.4	39.3
Mexico	163985	91584	72401	85170	34010	51160	51.9	37.1
Nigeria c/	67005	28665	38340	32763	2403	30360	48.9	8.4
Pakistan (+Bangl.)	110023	50249	59774	62967	3073	59894	57.2	6.1
Philippines	107876	60941	46935	57995	7304	50691	53.8	12
Portugal	100481	64303	36178	49052	19008	30044	48.8	29.6
Spain	288406	131918	156488	142651	61109	81542	49.5	46.3
Sri Lanka	39845	20119	19726	22149	197	21952	55.6	1
Taiwan	63252	38466	24786	37417	9728	27689	59.2	25.3
Tunisia	23646	15446	8200	9425	7418	2007	39.9	48
Turkey	75079	34197	40882	49001	4249	44752	65.3	12.4
Yugoslavia	164112	111125	52987	85227	47807	37420	51.9	43
Australia	297651	262346	35305	128210	80105	48105	43.1	30.5
Belgium-Luxemburg	675365	847037	-171672	324629	522043	-197414	48.1	61.6
Canada	832355	1041443	-209088	311996	500896	-188900	37.5	48.1
Denmark	338730	180202	158528	200377	45586	154791	59.2	25.3
Finland	180358	193182	-12824	105193	149660	-44467	58.3	77.5
France	1079304	1165753	-86449	564701	638435	-73734	52.3	54.8
Germany, FR	1638688	2086555	-447867	835573	1092226	-256653	51	52.3
Italy	876722	929235	-52513	404662	484470	-79808	46.2	52.1
Japan	1030379	979893	50486	504078	437017	67061	48.9	44.6
Netherlands	783294	837394	-54100	389514	504920	-115406	49.7	60.3
Norway	278934	210815	68119	143570	149051	-5481	51.5	70.7
Sweden	556524	488704	67820	345142	295544	49598	62	60.5
Switzerland	428118	296947	131171	237222	122494	114728	55.4	41.3
United Kingdom	1720015	1345630	374385	900760	645216	255544	52.4	47.9
United States	2713281	2633493	79788	1472484	1105372	367112	54.3	42
SUMMARY: Subgroup Means, Subgroups ranked by GDP/capita (1970 US$), including Taiwan								
a. $51-125 (5)	91387	45494	45893	48744	5756	42988	53.3	12.7
b. 126-309 (8)	53128	29711	23417	26102	4639	21463	49.1	15.6
c. 310-762 (7)	119507	78483	41024	66157	23928	42229	55.4	30.5
d. 763-1878 (7)	381006	352588	28418	188811	177130	11681	49.6	50.2
e. 1878-2948 (9)	905012	904085	928	465570	475010	-9439	51.4	52.5
f. 2949-4628 (3)	1367387	1387880	-20492	709874	633937	75937	51.9	45.7
Total (39)	15727817	14878971	848846	8091488	7175184	916304	51.4	48.2

Source: Annex B. a/ For SITC categories identified as "energy-intensive", see Table 1.

b/ Embodied energy in energy-intensive materials as % embodied energy in all commodities.

c/ Copper and tin exports converted at Btu/MT rather that SITC 68 average of 172,652 Btu/US$.

Table C-5

Total Embodied Energy Versus Energy Incorporated in "Energy Intensive Materials" a/

[Energy in '000,000,000,000 Btu]

Country	Total Embodied Energy			Embodied Energy In Energy Intensive Mtls, excl. Petrol.			Energy Intensive Mtls as % of Total b/	
	Imports	Exports	Net	Imports	Exports	Net	Imports	Exports
Argentina	121146	97140	24006	78314	10465	67849	64.6	10.8
Brazil	164194	116905	47289	79237	15788	63449	48.3	13.5
Chile c/	60227	97120	-36893	18875	80919	-62044	31.3	83.3
Colombia	38033	33936	4097	13711	2569	11142	36.1	7.6
Egypt	66648	43206	23442	24943	875	24068	37.4	2
Ethiopia	15820	5871	9949	4016	0	4016	25.4	0
Ghana	28818	19571	9247	9105	1824	7281	31.6	9.3
Greece	109807	39631	70176	40356	10039	30317	36.8	25.3
India	256972	140088	116884	123734	17558	106176	48.2	12.5
Ivory Coast	22368	21916	452	6521	792	5729	29.2	3.6
Korea, Rep.	97792	22552	75240	40439	1458	38981	41.4	6.5
Malawi	7115	2595	4520	1594	21	1573	22.4	.8
Malaysia c/	105449	92801	12648	34110	5813	28297	32.3	6.3
Mexico	163985	91584	72401	72359	27718	44641	44.1	30.3
Nigeria c/	67005	28665	38340	21111	505	20606	31.5	1.8
Pakistan (+Bangl.)	110023	50249	59774	51927	1119	50808	47.2	2.2
Philippines	107876	60941	46935	48801	815	47986	45.2	1.3
Portugal	100481	64303	36178	34103	14066	20037	33.9	21.9
Spain	288406	131918	156488	129808	28165	101643	45	21.4
Sri Lanka	39845	20119	19726	10197	197	10000	25.6	1
Taiwan	63252	38466	24786	26484	7447	19037	41.9	19.4
Tunisia	23646	15446	8200	7800	6336	1464	33	41
Turkey	75079	34197	40882	40657	4035	36622	54.2	11.8
Yugoslavia	164112	111125	52987	74792	40105	34687	45.6	36.1
Australia	297651	262346	35305	111201	63299	47902	37.4	24.1
Belgium-Luxemburg	675365	847037	-171672	262704	442830	-180126	38.9	52.3
Canada	832355	1041443	-209088	228103	573268	-345165	27.4	55
Denmark	338730	180202	158528	118787	32460	86327	35.1	18
Finland	180358	193182	-12824	63822	146795	-82973	35.4	76
France	1079304	1165753	-86449	491772	485782	5990	45.6	41.7
Germany, FR	1638688	2086555	-447867	609992	976734	-366742	37.2	46.8
Italy	876722	929235	-52513	359122	219642	139480	41	23.6
Japan	1030379	979893	50486	330518	421828	-91310	32.1	43
Netherlands	783294	837394	-54100	288157	284045	4112	36.8	33.9
Norway	278934	210815	68119	83217	137019	-53802	29.8	65
Sweden	556524	488704	67820	159905	281053	-121148	28.7	57.5
Switzerland	428118	296947	131171	155338	120249	35089	36.3	40.5
United Kingdom	1720015	1345630	374385	582409	486675	95734	33.9	36.2
United States	2713281	2633493	79788	1003817	877910	125907	37	33.3
SUMMARY: Subgroup Means, Subgroups ranked by GDP/capita (1970 US$), including Taiwan								
a. $51-125 (5)	91387	45494	45893	40476	3841	36636	44.3	8.4
b. 126-309 (8)	53128	29711	23417	20190	1858	18331	38	6.3
c. 310-762 (7)	119507	78483	41024	51677	16425	35253	43.2	20.9
d. 763-1878 (7)	381006	352588	28418	145831	131122	14709	38.3	37.2
e. 1878-2948 (9)	905012	904085	928	337947	378637	-40689	37.3	41.9
f. 2949-4628 (3)	1367387	1387880	-20492	463942	577410	-113468	33.9	41.6
Total (39)	15727817	14878974	848843	5841858	5828218	13640	37.1	39.2

Source: Annex B. a/ For SITC categories identified as "energy-intensive", see Table 1.

b/ Embodied energy in energy-intensive materials as % embodied energy in all commodities.

c/ Copper and tin exports converted using Btu/MT rather than SITC 68 average of 172652 BTU/$.